



User Guide | PUBLIC

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SAP IoT API Reference Guide

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1 What is SAP IoT

Introducing SAP Internet of Things (SAP IoT) API services

Introduction

The SAP Internet of Things (IoT) services represent a network of physical objects known as things that are used to collect and exchange data. It helps to set up a thing model, companies, and service personnel in a company and their relationships. It also provides a collection of REST-based as well as OData-based services to store and retrieve data efficiently for a thing, company, and service personnel.

A thing is any physical object (for example a car or a robot - or any of its components or parts, regardless of size or complexity) that is relevant from a user or application perspective. Companies (also known as business partners) can manufacture and service a thing.

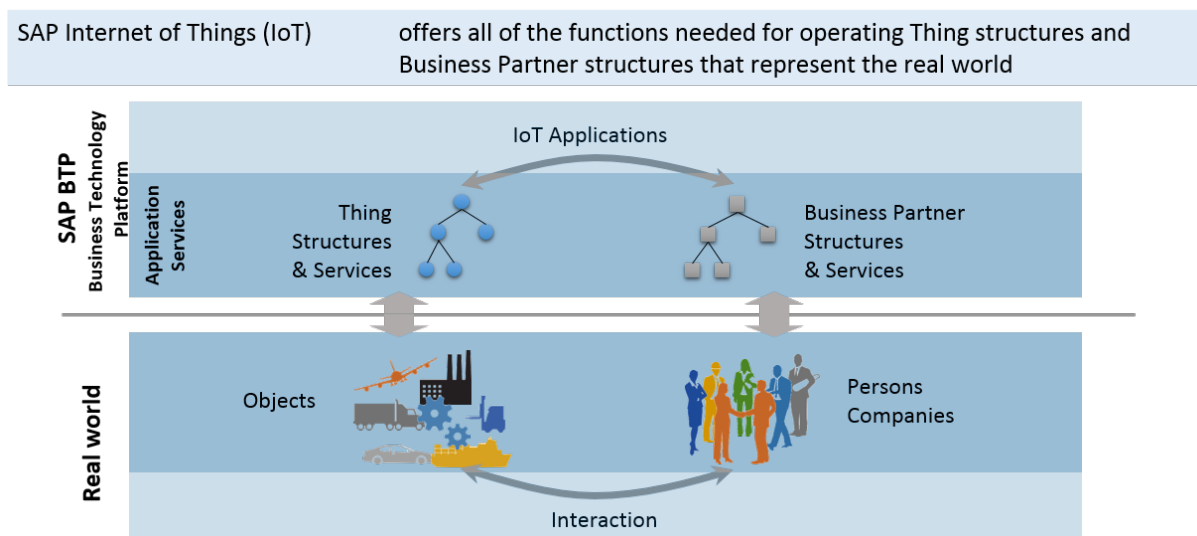
Here's a list of the most important groups of services available in the SAP IoT space:

- Business Partner
- Geolocation
- Authorization
- Configuration
- Thing
- Rule
- Event
- File

Each of these groups comprises a number of services for detailed operations on the elements managed within the SAP IoT Platform.

Of all the groups of services listed above, the Business Partner as well as the Thing services stand out. Together, they constitute a digital representation of both the real-world things (physical objects like machines or products of all kinds) as well as the persons and organizations that are interested in manufacturing, monitoring, controlling, or distributing these objects. Obviously, each kind of scenario dealing with the Internet of Things can't exist without these two constituents, Business Partner and Thing. Therefore, SAP combines these essential entities in one software layer as the basis for reuse and as a unified and neutral cross-business

approach with respect to these central elements. The following picture illustrates the relations between business partners and things, the real world, and its representation on SAP BTP:



As a prerequisite for the different types of access to things, a detailed modeling framework is required to define ownership and access rights for the objects involved as follows:

- **Ownership:**

One of the first and central questions in an IoT scenario is: What are the objects that I can access, and how can my objects be protected against unauthorized access by third parties (and how does the system ensure that I don't accidentally access objects outside of my own area of responsibility)?

To accomplish this, SAP IoT introduces a tenant concept. A tenant serves as a container that hosts all the objects that belong to one particular cloud platform consumer (that is, an organization that has been onboarded on the SAP IoT platform). Members of the onboarded organization can access the objects contained in the tenant to which they've been assigned, and they are restricted to objects in that single tenant. Objects in other tenants can't be accessed by cloud platform consumers. This strict separation can only be overcome by system administrators who are operating the platform for the cloud platform provider.

- **Access rights:**

The SAP IoT platform comes with a two-dimensional authorization concept, object instance-based authorizations and functional authorizations:

- With object instance-based authorizations (referred to as "capabilities"), you can set up relationships between members of your organization and the objects that each member may access. The maximum number of accessible objects is the number of objects that exist within the tenant to which your organization is assigned. As long as no such relationships have been established, a user would have no chance to see if there are any objects at all within the tenant.
- With functional authorizations (referred to as "scopes"), you can control the type of access for which a user is entitled with respect to the objects he or she may access. The following scopes are supported: read, write, delete. In addition, there's a fourth scope dealing with the physical deletion of objects that have already been logically deleted. This fourth scope, however, is exclusively granted to administrative personnel operating the platform.

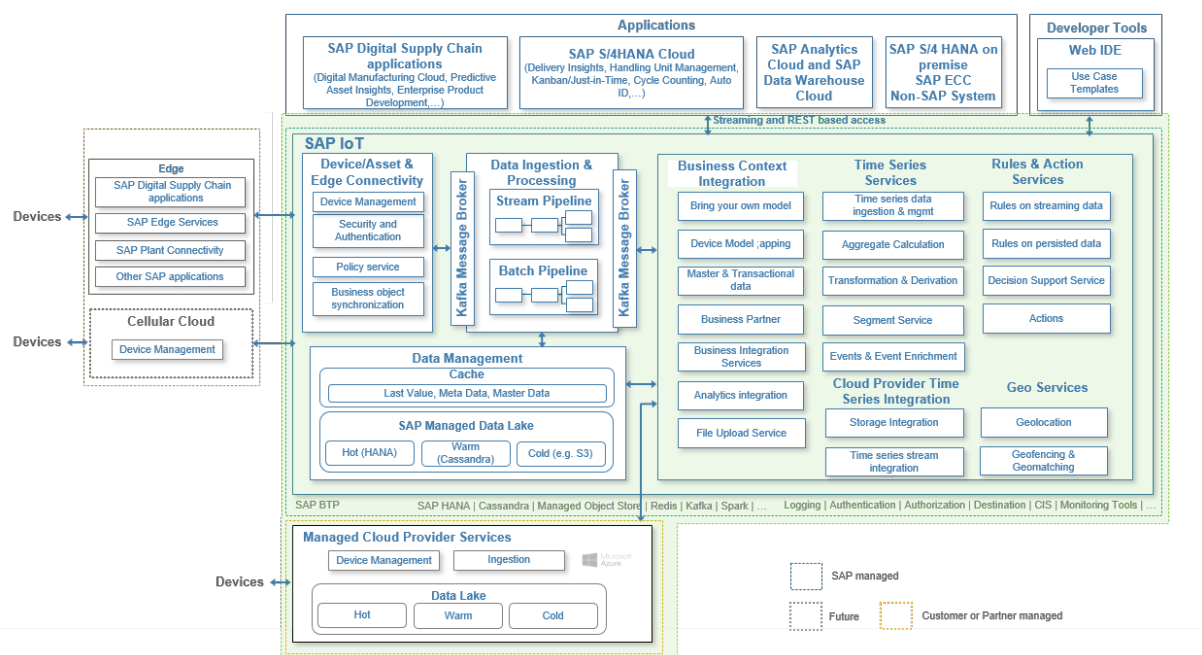
Architecture Overview

The following diagram shows the different layers and components of SAP IoT and how they interact with other software layers as well as real-world devices in a sample system landscape.

Note

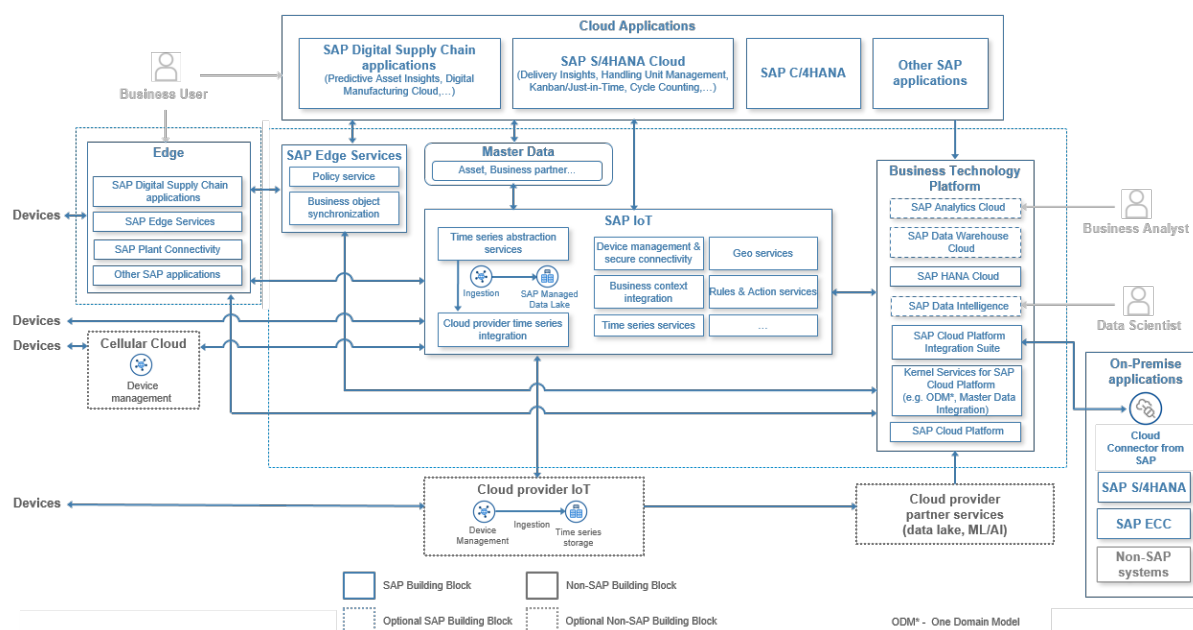
The diagram contains a small number of elements that aren't yet available but may be part of a later release. These elements are enclosed by a black dotted rectangular.

Tip: You may want to have the following diagrams displayed in a separate browser tab or window to improve readability via the [Show image in new tab](#) browser function.



SAP IoT- Architecture Details

The following diagram shows where and how SAP IoT is integrated into a larger Industrial IoT (IIoT) landscape, connecting SAP IoT with SAP S/4 HANA, SAP BTP, SAP Edge Services, and various cloud providers:



SAP IoT - Architecture Landscape Overview

Reuse Aspects

Although the Internet of Things can be seen as an opportunity for entering completely new areas of business activities, there's even more to it than just that. Even though the Internet of Things is for sure a new paradigm of generating and handling data, it doesn't replace the traditional world of business as we know it. Rather, the Internet of Things can be regarded as a complement, or enhancement, of already existing business scenarios and the IT infrastructure used for managing these scenarios. The enormous amount of data that is generated by the Internet of Things can be connected to existing infrastructures and applications. These applications can then take advantage of the massively increased data basis provided by IoT-based solutions and the insights that are made possible on this basis. Here are some examples for such enhancements of familiar business areas:

- **Logistics, Transportation Management:** With IoT-based solutions like SAP Networked Logistics Hub or SAP Connected Vehicles, you can access real-time data about the current traffic situation. With that, you can optimize the routing of the vehicles that you use to deliver goods to your customers.
- **Public Sector:** Local or regional authorities can use the same traffic data not only to avoid current traffic jams but to develop a mid-term or long-term strategy of an improved traffic situation, which would bring advantages for local companies as well as for the daily life of people.
- **Logistics, Warehousing, Manufacturing:** IoT-based solutions dealing with predictive maintenance give you the chance of early knowing when to produce, put on stock, or deliver certain goods to the place where they are needed. With that, you can avoid downtimes and the costs that are usually related to such downtimes. In addition, this lets you optimize service offerings related to your products that are in use at your customers' sites.
- **Agriculture:** Sensor data from the Internet of Things can help farmers to always find the best point in time when to start the seed of certain types of crop or vegetable as well as to find the optimal treatment for the soil on their fields.

Related Information

[Business Partner \[page 29\]](#)

[Geolocation \[page 137\]](#)

[Object Instance-Based Authorization \[page 204\]](#)

[Configuration: OData Service \[page 340\]](#)

[Event Services \[page 1194\]](#)

[File \[page 1297\]](#)

1.1 About this API Reference

Introduces the formal structure of this API reference and the naming conventions used

Formal Structure of this API Reference

In this reference, we have grouped the content by the following scheme:

1. Topic introduction
2. Service
3. Service methods
4. Deleted Service (where applicable)
5. Deleted Service methods (where applicable)

❖ Example

Here is an example for this scheme taken from the Business Partner section:

1. [Business Partner \[page 29\]](#)
2. [Person \[page 59\]](#)
3. [Create a Person \[page 63\]](#)
4. [DeletedPerson \[page 81\]](#)
5. [Delete a DeletedPerson \[page 88\]](#)

Naming Conventions

The names of the service method chapters in this documentation follow the "CRUD" scheme that is common in the realm of REST services, that is, "create/read/update/delete". The service chapter names match the technical HTTP requests according to the following table:

Service Methods and HTTP Requests

Service Method	HTTP Request	Description
Create	<i>POST</i>	Creating a new instance of a database entity managed by a service
Read	<i>GET</i>	Retrieve a single instance of a database entity managed by a particular service
Read all	<i>GET</i>	Retrieve multiple database entities managed by a particular service
Update	<i>PUT</i>	Modify a database entity managed by a service
Delete	<i>DELETE</i>	Delete a database entity managed by a service (logically or physically, depending on the service)

Case Sensitivity

Note that capital and non-capital letters in the technical names used by the services must be used exactly as given in this documentation. This affects payload parameters, request parameters, filter values and so on. In other words, the services that make up the SAP IoT solution are case-sensitive. Programming against the API without taking care of the proper letter case leads either to HTTP errors or, which is even worse, to unpredictable results.

❖ Example

Here is an example of a collective GET request for retrieving a subset of persons stored in the system:

```
/Persons?$top=25&$orderby='personName.familyName' desc
```

In the following example, the system will complain about an unknown parameter because of a misspelled "T" instead of "t" for the \$top parameter:

```
/Persons?$Top=25&$orderby='personName.familyName' desc
```

In the following example, the system returns an HTTP error because the correct capitalization of the referenced payload attribute has not been observed:

```
/Persons?$top=25&$orderby='PersonName.FamilyName' desc
```

Scope and Application Names

When it comes to the names of scopes, which are required as functional authorizations for accessing database entities in a particular way, the problem arises that these names consist of multiple components which are (at least partially) depending on the individual conditions that are in effect for a given deployment landscape. Therefore, we use a generic syntax that makes use of symbolic rather than technical names. The mapping between symbolic and technical scope names is explained in the [Functional Authorization \[page 263\]](#) section.

Encoding Special Characters

There are certain specifications to be followed while using the service request URIs described in this document. Some special characters are not supported in the request URIs and using them will fetch unexpected results. Instead of using such special characters directly in the request URI, you must encode them as follows:

Special Characters	ASCII Code
{	%7B
}	%7D
\	%5C

For example, the following is an invalid request URI that will **not** fetch the expected result:

```
$filter=JSON1_adt%20eq%20'{"glossary\":{"value\":"1-4\"}}'
```

Instead, the special characters in the request must be encoded as follows:

```
$filter=JSON1_adt%20eq%20'%7B%5C"glossary%5C":%7B%5C"value%5C":%5C"1-4%5C"%7D%7D'
```

Peak Load Limitation

With the services described in this API reference document, you can gain access to every feature and functionality that is part of SAP IoT. Especially when accessing time series data generated by sensors of your managed things, this may result in gigantic data streams, which potentially could endanger the stability and service readiness of the platform. With SAP IoT offered as a hosted solution, this potential danger might grow even more serious in case several customers hosted on the same machine could try to load excessive amounts of data simultaneously.

To avoid this kind of problems, SAP has decided to limit the maximum allowed number of data streams per customer to a certain amount that depends on the customer's license model. For more information, see SAP note [2608168](#).

Disclaimer

This API reference document presents all the services that are offered to customers and partners for use in their own applications based on SAP IoT. When exploring the platform, you may discover additional services that are **not** explained in this reference. These undocumented services are mostly providing features and functions that are needed by the IoT-related ready-to-use apps that are shipped by SAP as a part of the SAP IoT.

For these undocumented services, SAP does not offer any support whatsoever, nor does SAP give any warranty with regard to the future availability of such services. Programming against the API of undocumented services is completely at your own risk. We therefore highly recommend **not** using any undocumented services in your applications.

Related Information

[Application Names in Service URIs \[page 21\]](#)

1.2 Application Names in Service URIs

Important information on application naming conventions in SAP IoT

In this API reference, we are presenting all service methods offered by SAP IoT together with the application to which the service belongs. The application names, however, are to a certain extent subject to individual decisions made by the system administrators on customer site. The application name given for each service method therefore has to be translated to the situation that is in effect for a particular system landscape. The following section explains how this translation works.

Scopes and Application Names

In this API reference documentation, the scopes that are required for executing a service are listed for each service method in the *Permissions* part of the method documentation. Since the scopes are defined by the various applications that make up the SAP IoT, each scope name consists of the application and the activity that is controlled by the scope. A formal description of a fully qualified scope looks as follows:

```
<xs_appname>[.<additional_resource>].<action>
```

Here is an explanation of the different parts of this formal description:

- **<xs_appname>**: This name is defined during deployment. Within a productive system landscape, this name does not change over time, but it may vary from landscape to landscape. For example, the name used in a development landscape may not be the same as in the test landscape, and both may differ from the name in the productive landscape.
- **<action>**: Self-explanatory. According to the CRUD pattern known from databases, the following actions are supported: Create, Read, Update, Delete.

i Note

The four supported activities are abbreviated to their initial letter in lowercase (that is, *c*, *r*, *u*, and *d*). Some complex operations in the SAP IoT platform require that a user performing the operation needs a high number of permissions, which have to be passed to the system all at once. The short abbreviations make sure that this does not result in a field length overflow.

- **<additional_resource>**: Identifier of a particular resource within an application for which a scope is defined. For example, the `<thing>.event.r` scope is required for a user to read the events that have been logged for a thing, where `event` is a resource that belongs to the `thing` application.

i Note

In this API reference documentation, we present the application-specific part of the scopes in a simplified form that makes it easy to understand the application in question, but still needs to be adapted to the

particular `<xs_appname>` that is in effect in your system landscape. The following symbolic names are used for this:

Symbolic Application Names for Scopes

Application	Symbolic Name
action-modeler	<code><action>.AM</code>
authorization	<code><auth></code>
business-partner	<code><bp></code>
location	<code><loc></code>
rule	<code><rule></code>
tenant-administration	<code><tenant></code>
thing	<code><thing></code>
vocabulary	<code><vocabulary></code>

Keep in mind that the angle brackets are used here to indicate the symbolic character of the name of the application defining the scope. In a real usage scenario, the entire symbolic name (including the angle brackets) must be replaced by the technical application name that has been chosen for your system landscape.

Application Names and Service URIs

In the previous section, we have explained the relation between application names and scope qualifiers. A similar mechanism is in place (although not relevant for authorization) with respect to the service endpoints that are given in the *Base URI* part of each service overview chapter. Here, the formal description of a fully qualified URI looks like this:

```
http://<application name>.<application domain>[:<port number>][/<path>]
```

Like in the *Scopes and Application Names* section above, the `<application name>` as well as the `<application domain>` part are subject to arbitrary decisions of system administrators and cannot be considered a stable and uniform URI part across all installations around the globe. The reliable part, however, is the fact that by default, the `<application name>` part is identical with the application names listed above.

Note

In certain scenarios, the service URIs become longer as there could be too many request parameters in the URL to fetch the desired result set in the response payload. The long service URI results in large header size and the execution of the service fails with an error status code 400. Header size is limited to 16k. To overcome the long service URI, you can break the request into multiple requests.

For example, to [Read Reference Properties Data for a List of Property Sets \[page 933\]](#), you use the request URL `https://appiot-mds.cfapps.eu10.hana.ondemand.com/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:car/ReferenceProperties/'wheel_rr,Pressure&wheel_rr,RotationSpeed&wheel_fl,Pressure&wheel_fl,RotationSpeed'?timerange=2015-03-10T08:00:00.000Z-2018-08-09T12:00:00.000Z`. The request might fail when there are huge number of reference properties in the request URL. To avoid larger header size, you can split a single request and hence, reduce the number of properties per request.

Here are some examples of service URIs to access the services:

Service URIs

Application	Service URI
Actions [page 753]	<code>https://action-modeler.cfapps.eu10.hana.ondemand.com/Actions</code>
Actions [page 753]	<code>https://sap-iot-noah-live-action-modeler.cfapps.eu10.hana.ondemand.com/envPing</code>
Advanced Thing List [page 1400]: OData	<code>https://advancedlist-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings</code>
Assignment [page 853]	<code>https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/assignments</code>
Authorization: ObjectGroup [page 205]	<code>https://authorization.cfapps.eu10.hana.ondemand.com/ObjectGroups</code>
Business Partner: Organization [page 32]	<code>https://business-partner.cfapps.eu10.hana.ondemand.com/Organizations</code>
Business Partner: Person [page 59]	<code>https://business-partner.cfapps.eu10.hana.ondemand.com/Persons</code>
Composite Events: OData Service [page 1326]: OData	<code>https://composite-events-odata.cfapps.eu10.hana.ondemand.com/CompositeEvents</code>
Composite Things: REST Service [page 1307]: REST	<code>https://apiiot-composite-things.cfapps.eu10.hana.ondemand.com/Composite/Things/PropertySet</code>
Composite Things: OData Service [page 1312]: OData	<code>https://composite-things-odata.cfapps.eu10.hana.ondemand.com/CompositeThings</code>
Composite Thing Configuration for a Specific Thing Hierarchy: OData Service [page 1357]: OData	<code>https://cs-hierarchy-meta-sap.cfapps.eu10.hana.ondemand.com/CompositesThingHierarchy</code>
Content Manager [page 1471]	<code>https://sap-iot-noah-live-cm-metadata-management.cfapps.eu10.hana.ondemand.com/metadata/v1/model.svc</code>
Content Manager Runtime [page 1471]	<code>https://sap-iot-noah-live-cm-runtime.cfapps.eu10.hana.ondemand.com/data/v1/odata.svc</code>

Application	Service URI
Credentials [page 821]	https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/credentials
Custom Master Data [page 658]	https://config-customdata-sap.cfapps.eu10.hana.ondemand.com/CustomDataConfiguration https://customdata.cfapps.eu10.hana.ondemand.com/ObjectType https://customdata-associations.cfapps.eu10.hana.ondemand.com/CustomDataAssociation
Custom Master Data Composite Services [page 730]	https://composite-custom-master-data-sap.cfapps.eu10.hana.ondemand.com/CompositeMasterData/v1/Things https://composite-custom-master-data-sap.cfapps.eu10.hana.ondemand.com/CompositeMasterData/Details/v1/Things
Device Connectivity: gateway configuration	https://iot-device-management.cfapps.eu10.hana.ondemand.com/api/v1/gateways/<gatewayId>/configuration
Event Configuration [page 522]: OData	https://events-sap.cfapps.eu10.hana.ondemand.com/ES
Event List: OData Service [page 1455]	https://bpanalytics-event-sap.cfapps.eu10.hana.ondemand.com/BPanalytics/EventType/v1/<event type name>
Events Aggregate: OData Service [page 1464]	https://events-aggregate-sap.cfapps.eu10.hana.ondemand.com/EventsAggregate/v1/Events?timeRange=<from time>-<to time>&divisions=<divisions>
Export Time Series Data [page 987]	https://coldstore-export-sap.cfapps.eu10.hana.ondemand.com/ https://coldstore-downloader-sap.cfapps.eu10.hana.ondemand.com/
File [page 1297]: REST	https://appiot-fs.cfapps.eu10.hana.ondemand.com/Files

Application	Service URI
Geolocation [page 137]	<code>https://sap-iot-noah-live-geolocation-runtime.cfapps.eu10.hana.ondemand.com</code>
Geolocation: Thing Clustering [page 191]	<code>https://sap-iot-noah-live-geo-runtime.cfapps.eu10.hana.ondemand.com</code>
Mapping [page 829]	<code>https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/mappings</code>
Monitoring and Logging [page 1541]	<code>https://service-metrics-sap.cfapps.eu10.hana.ondemand.com/ServiceMonitoring</code>
Onboarding Things [page 780]: REST	<code>https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things</code>
Package Configuration [page 343]: OData	<code>https://config-package-sap.cfapps.eu10.hana.ondemand.com/Package</code>
Read Thing Configuration Details for a Thing [page 801]	<code>https://apiot-mds.cfapps.eu10.hana.ondemand.com/Configuration</code>
Smart Sensing [page 751]	<code>https://sap-iot-noah-live-sis-subscriptions.cfapps.eu10.hana.ondemand.com</code>
Standard or Predefined Events (Deprecated) [page 1195]: REST	<code>https://apiot-mds.cfapps.eu10.hana.ondemand.com/Events</code>
Thing Detail [page 1385]: OData	<code>https://details-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings/v1/<thing type name></code>
Thing Hierarchy [page 1156]: OData	<code>https://apiot-thing-hierarchy.cfapps.eu10.hana.ondemand.com/ThingHierarchy</code>
Thing Configuration [page 358]: OData	<code>https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration</code>
Thing Time Series Data: OData Service [page 996]	<code>https://analytics-thing-sap.cfapps.eu10.hana.ondemand.com/<property set type name></code>
Time Series Aggregate Store [page 960]: REST	<code>https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things</code>
Time Series Cold Store [page 981]: REST	<code>https://apiot-coldstore.cfapps.eu10.hana.ondemand.com/Things</code>
Time Series Store [page 941]: REST	<code>https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things</code>

Application	Service URI
Value Helps [page 1576]	https://business-partner.cfapps.eu10.hana.ondemand.com/<Value Help>

Related Information

[Functional Authorization \[page 263\]](#)

1.3 Migrating from REST to OData

This topic is relevant only for users who have been using the REST-based Thing Model Configuration APIs provided as part of the predecessor product SAP IoT Application Enablement.

As of March 2019, the REST-based Thing Model configuration APIs are deprecated. We highly recommend using the new OData version of Thing Modeler configuration APIs, as this is the only version that will see future enhancements and new features.

Deprecation End Date

Please note that the deprecation phase of REST-based Thing Model configuration ended by March 2020. These APIs are decommissioned, and you cannot use them in your production environment. SAP already stopped providing maintenance support services for these APIs after March 2019.

Decommissioned and Alternate APIs

	Deprecated APIs	Alternate APIs
Package Configuration APIs	https://appcore-conf.cfapps.eu10.hana.ondemand.com/Configuration https://appcore-conf.cfapps.eu10.hana.ondemand.com/Configuration('<package name>')	CRUD APIs from https://config-package-sap.cfapps.eu10.hana.ondemand.com

	Deprecated APIs	Alternate APIs
Thing Configuration APIs	<code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration/ThingTypes</code> <code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration/ThingTypes('<thingType name>')</code> <code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration/PropertySetTypes</code> <code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration/PropertySetTypes('<propertySetType name>')</code> <code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration/ThingTypes('<thingType name>')/PropertySetTypes</code> <code>https://appiot-mds.cfapps.eu10.hana.ondemand.com/Configuration('<packageName>')/Annotations</code>	CRUD APIs from <code>https://config-thing-sap.cfapps.eu10.hana.ondemand.com</code>
Event Configuration and events APIs	All APIs from <code>https://appiotes.cfapps.eu10.hana.ondemand.com</code>	CRUD APIs from <code>https://events-sap.cfapps.eu10.hana.ondemand.com</code>

1.4 Device Connectivity API Reference

Where to find the API reference for Device Connectivity.

In earlier releases, the features and functions for accessing physical devices and their attached sensors used to be offered by a dedicated stand-alone service of SAP BTP. With the integration of SAP IoT services for SAP BTP for the Cloud Foundry Environment into SAP IoT, we decided to leave and further maintain the already existing

API reference at its previous location on SAP Business API Hub. In order to make it easy for you to access this part of the documentation, a dedicated app has been added to the Fiori Launchpad of SAP IoT. To access the Device Connectivity API Reference, proceed as follows:

1. On the SAP IoT Fiori Launchpad, search for the *Ingestion* app group.
2. Start the *Device Connectivity* app.

Once you've started the app, it takes you directly to the Device Connectivity API Reference.

2 Business Partner

A business partner is an entity with a particular role as an actor in a business scenario.

i Note

Important: All API services related to SAP IoT Business Partner are deprecated as of October 2021 and will be decommissioned in the future (details to be communicated as soon as possible). In case you've used any of the affected services in your applications based on SAP IoT, we recommend getting in touch with SAP support in order to find an alternative solution. The following services are affected:

- [Organization \[page 32\]](#)
- [Person \[page 59\]](#)
- [BPRelationship \[page 91\]](#)
- [BPRole \[page 106\]](#)
- [BPUserRelationship \[page 120\]](#)

In addition, all the "Deleted*" services associated with these five services are affected as well.

Overview

Business partners can be defined on different levels of abstraction, and they can refer to either human beings or to a legal body. Here are some examples of different types of business partners:

- Company
- Employee
- Customer
- Supplier

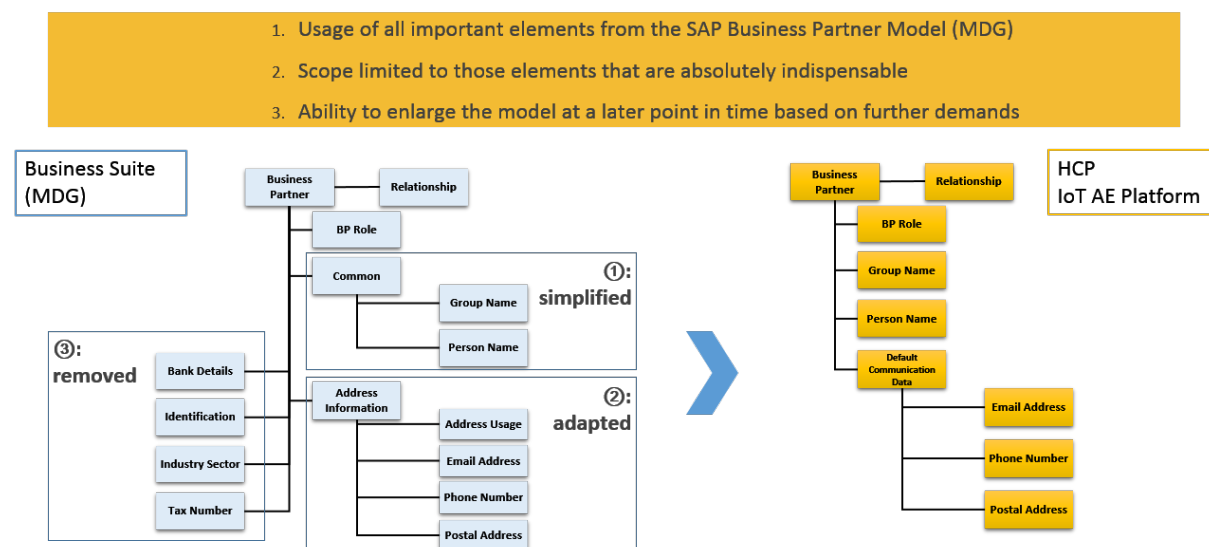
Business partners can have relationships both within and across the boundaries of a particular business partner type. For example, the concept of an employee only makes sense in combination with a company to which an employee belongs.

Business Partner Concepts in SAP Master Data Governance and SAP IoT

The concept of the business partner as a central entity that is needed for all kinds of business scenarios has a long tradition in SAP solutions. Therefore, it's desirable that different solutions follow an aligned approach with respect to the internal structure and the basic functions and features that are supported by each implementation of the business partner concept. To ensure seamless integration with existing solutions, the business partner concept of SAP IoT is based on the well-established approach that is provided by the cross-application solution SAP Master Data Governance (MDG). The following picture illustrates the relationship between the business partner implementation both of SAP Master Data Governance and SAP IoT. The central message here is that the SAP IoT implementation is structurally aligned with the SAP Master Data Governance

solution while leaving out some of the more specific details, which, however, might be added with a later release if needed:

Reusing Important Elements of the MDG Business Partner Model



When comparing these two business partner concepts with each other, you may find the following aspects worth knowing:

- **Categories**
SAP Master Data Governance supports three different business partner categories: Organization, Person, and Group. Of these three categories, SAP IoT currently only supports the first two, Organization and Person.
- **Roles**
Of the numerous business partner roles offered by SAP Master Data Governance and especially by the many solutions that make use of the business partner concept, SAP IoT uses only two roles to further specify business partners that fall into the person category: Employee and Contact Person.
- **Relationships**
As the word "partner" in the term "business partner" already implies, speaking of business partners makes sense only if there are two or more of them appearing in a particular business scenario. And with a multitude of business partners involved in a scenario, the question arises how the different business partners relate to each other. The answer to this question are the relationships that can be established to connect one business partner to another. Here, almost all combinations are possible:
 - 1:1
Example: One employee acts as an assistant to his or her manager.
 - 1:N
Example: One company has many employees.
 - M:N
Example: Many companies are suppliers of many companies acting as customers.
 - No relationship
Although the network of relationships is essential for the interactions between business partners, it is of course also possible that there are certain business partners within a scenario that don't have any direct relationship between each other. Example: Employee A works for company C, and employee B works for D, and C is customer of D, but A and B aren't related.

While SAP IoT reimplements the concepts of categories, roles, and relationships in an almost identical way as it is known from SAP Master Data Governance, there are also a few extensions that are specific for the SAP IoT approach:

- **Persons and Users**
In SAP Master Data Governance, business partners of type person always represent a person acting in a certain business scenario. In SAP IoT, however, a person can also be associated with a user account that is needed for the person to log on to the system and perform the tasks for which system access is a prerequisite. This additional aspect is technically implemented by introducing a new type of relationship that is not known in SAP Master Data Governance, namely a relationship between a business partner and a user. Here, the user is an entity provided by a self-contained external identity provider solution like SAP Cloud Identity (SCI). For more information, see [BPUserRelationship \[page 120\]](#).
- **Organizations and Tenants**
Similar to the technical extension of a person by a user, the business-oriented concept of an organization (whose instances typically represent a company or a department within a company) is also extended by a technical entity that goes beyond the concept known from SAP Master Data Governance. Here, the organization can be associated with a tenant. A tenant is an entity that belongs to the area of authorizations in SAP IoT. A tenant serves as a virtual container for all the objects ("things") that belong to an organization. It protects the objects against all kinds of unauthorized access from outside, and at the same time ensures that a company can only access its own objects. For more information, see [Tenant \[page 287\]](#).

Business Partner in SAP IoT

In the realm of an application services infrastructure for the Internet of Things (IoT), a number of specific roles of business partners come into play, all of them belonging to the business partner as a company or an organization:

- **Cloud Platform Host**
An organization providing the technical IT infrastructure (data centers including servers, storage solutions, high-performance Internet backbone connections, and so on) that is needed to offer a platform for cloud-based solutions.
- **Cloud Platform Provider (technical ID: T0)**
An organization providing a technical platform offering cloud-based solutions for productive business support (for example, machinery administration in production plants of different companies around the globe.)
- **Cloud Platform Consumer (technical ID: T1)**
An organization consuming the services of a cloud platform provider (for example, a manufacturer of industrial robots that are used in car production lines or smartphone assembly lines).
- **Cloud Platform Consumer 2nd Level (technical ID: T2)**
An organization acting as a customer of a cloud platform consumer (for example, a car manufacturer or a smartphone manufacturer that have the industrial robots of the cloud platform consumer installed in their production lines).

Example

ABC Systems, a technology company with expertise both in mechanical engineering and information technology, plans to offer a cloud-based software solution that enables providers of machine tools like Miller, Inc., to administer all the machines they have sold to customers around the world. One of these customers is CCC Ltd., a car manufacturer. ABC Systems, however, is only interested to offer the software solution as a service, but refuses to take care of the physical IT infrastructure needed to run the solution. Therefore, ABC Systems establishes a cooperation with Cloud IT, a company specialized in complex data center scenarios. It is then up to Cloud IT to handle the basic technical requirements such as short response times, 24/7 availability, load balancing, backup services, and so on.

In this example, the companies involved take over the following roles:

- Cloud Platform Host: Cloud IT
- Cloud Platform Provider: ABC Systems
- Cloud Platform Consumer: Miller Inc.
- Cloud Platform Consumer 2nd Level: CCC Ltd.

Related Information

[Organization \[page 32\]](#)

[Person \[page 59\]](#)

2.1 Organization

An Organization represents a business partner of type organization that is assigned to one tenant.

Organizations are used to model the different companies or legal bodies that are involved in setting up an IoT services infrastructure. An Organization falls into one of the following categories:

- Cloud Platform Host
- Cloud Platform Provider
- Cloud Platform Consumer
- Cloud Platform Consumer 2nd Level

To identify an organization, both the `organizationName1` and the `emailAddress` attributes are required. The values for both fields shall be unique within the scope of the tenant to which the organization belongs.

By default, creating, accessing, or deleting an organization is only possible for organizations that are assigned to the same tenant to which the current user is logged on.

i Note

The Organization services described here are focused on the isolated entity of a single organization. This is fine for accessing or modifying certain fields and attributes of an organization. However, for onboarding an organization (that is, creating a new organization and setting up relationships to associated objects), we recommend using the services described in the [Onboarding Organizations \[page 292\]](#) section.

Prerequisites

The tenant is an attribute of the organization that must be provided upon creation of an organization. That is, to create an organization with a reference to a given tenant, the tenant name must be valid and the tenant must already exist in the system.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/Organizations`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/Organizations`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create an Organization [page 36]	<code>/Organizations</code>	<code><bp>.c</code> <code><bp>.r</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read an Organization [page 38]	<code>/Organizations('<ID>')</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read all Organizations [page 40]	<code>/Organizations</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read all Matching Organizations [page 43]	<code>/Organizations</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>PUT</i>	Update an Organization [page 45]	<code>/Organizations('<ID>')</code>	<code><bp>.r</code> <code><bp>.u</code> <code><bp>.tenant.r</code>
<i>DELETE</i>	Delete an Organization [page 47]	<code>/Organizations('<ID>')</code>	<code><bp>.d</code> <code><bp>.r</code> <code><bp>.tenant.r</code>

Payload

Format: *JSON*

For PUT, POST, and GET requests, only the media type JSON is supported. The JSON for these methods has the following structure:

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32 },
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" }
},
  "organizationName" : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
},
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true },
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"  : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"         : { "type": "string", "maxLength": 255 },
  "houseNumber"        : { "type": "string", "maxLength": 10 },
  "cityName"           : { "type": "string", "maxLength": 255 },
  "postalCode"         : { "type": "string", "maxLength": 10 },
  "country"            : { "type": "string", "maxLength": 2 },
  "countryDescription"  : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"             : { "type": "string", "maxLength": 3 },
  "regionDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "longitude"          : { "type": "number" },
  "latitude"           : { "type": "number" }
},
  "objectGroup"       : { "type": "string", "maxLength": 32, "required":
true },
  "externalIDs"        : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false" }]
  }
}
```

i Note

A special mechanism has been implemented for the fields dealing with phone numbers in the communication data block of the payload with respect to the preceding numeric country code. Unlike manual dialing with a phone, the country code is **not** given as the standardized number for a country (for example, 1 for USA, 49 for Germany). Instead, the system expects the alphabetical ISO country code as a prefix (for example, "US" for USA, "DE" for Germany). The following fields are affected:

- mobileDestinationLocation
- landlineDestinationLocation

This mechanism is in effect for the service request types POST, GET, and PUT. You may look up the required ISO country codes in the [Country Codes \[page 1583\]](#) section of this documentation.

i Note

For the `emailAddress` field, the following requirements apply:

- The content of the field must be a valid and well-formed e-mail address according to the rules set forth in [IETF RFC 2822](#) .
- The content of the field is validated internally by SAP IoT with the help of the e-mail validator provided by the Hibernate framework.

As a consequence, the following applies: Although the technical field length is defined as 255 characters, neither the mailbox part (before the @ sign) nor the domain name (after the @ sign, but before the dot ".") may exceed a maximum length of 64 characters.

For more information, see the [Hibernate documentation](#) .

External ID

In the payload, there is a special field that needs some additional explanation: `externalID`. This field is intended to hold an identifying string other than the purely technical `businessPartnerID` field, which the system needs for reasons of database consistency. In contrast to that, the `externalID` field can be used for providing an additional semantic identifier that users may be accustomed to from their daily business experience. For an organization, this field could be used to hold the number under which a company has been registered in the commercial register of the responsible authority. Or, if a company is listed at a stock exchange, you might want to enter the ticker symbol into that field.

i Note

The following limitations apply:

- Although the `externalIDs` field has been implemented as an array, the system currently supports the assignment of no more than one external ID (or none).
- On database level, the `externalIDs` field is managed as a common attribute of both persons and organizations. Therefore, the values entered for this field must be unique not only within a tenant, but also across persons and organizations. In other words, it is not allowed to use a value for the `externalIDs` field of a person that has already been used for an organization and vice versa.

Access Authorization for Organizations

Objects of type `Organization` are subject to the instance-based authorization concept that is implemented in SAP IoT. For more information, see [Object Instance-Based Authorization \[page 204\]](#). To grant access to an organization, a capability has to be derived from the predefined `CapabilityType` object for organizations. For more information on the `CapabilityType` payload needed for this purpose, see [Payload of CapabilityType "Organization" \[page 48\]](#).

Related Information

[Onboarding Organizations \[page 292\]](#)

[Business Partner \[page 29\]](#)

2.1.1 Create an Organization

With this method, you create a new business partner of type organization. The system automatically assigns a unique ID to the new organization.

To access, create change and delete organizations you need to have the respective authorization. This instance authorization is realized through hierarchical ObjectGroups and ObjectGroupCapabilities for the object type `com.sap.appcore.organization`.

Also, you may decide that the new organization is assigned to a tenant different to the one where you are currently logged on. To accomplish this, you need to explicitly specify that tenant during creation of the organization. Note, however, that such a cross-tenant operation is possible only for top-level organizations, that is, an organization that acts as a cloud platform provider.

If the organization is successfully created, the server sends HTTP response code 201. Any other code indicates an error.

Request

URI: `/Organizations`

HTTP Method: `POST`

Permissions:

`<bp>.c`

`<bp>.r`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token

Request Fields

Name	Required	Type	Description	Send As
organizationName	Yes	string	Semantic name of the organization	JSON
emailAddress	Yes	string	An email address used to get in contact with the organization.	JSON
tenant	No	string	If omitted, tenant of currently logged on user is used.	JSON

Request Example

```
/Organizations
```

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32 },
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" },
  "organizationName"  : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
  },
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true },
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"  : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"         : { "type": "string", "maxLength": 255 },
  "houseNumber"        : { "type": "string", "maxLength": 10 },
  "cityName"           : { "type": "string", "maxLength": 255 },
  "postalCode"         : { "type": "string", "maxLength": 10 },
  "country"            : { "type": "string", "maxLength": 2 },
  "countryDescription"  : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"             : { "type": "string", "maxLength": 3 },
  "regionDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "longitude"          : { "type": "number" },
  "latitude"           : { "type": "number" }
  },
  "objectGroup"        : { "type": "string", "maxLength": 32, "required":
true },
  "externalIDs"        : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false"}]
  }
}
```

Note

For the `emailAddress` field, the following requirements apply:

- The content of the field must be a valid and well-formed e-mail address according to the rules set forth in [IETF RFC 2822](#).
- The content of the field is validated internally by SAP IoT with the help of the e-mail validator provided by the Hibernate framework.

As a consequence, the following applies: Although the technical field length is defined as 255 characters, neither the mailbox part (before the @ sign) nor the domain name (after the @ sign, but before the dot ".") may exceed a maximum length of 64 characters.

For more information, see the [Hibernate documentation](#).

Response

Format: [JSON](#)

Response Header Fields

Name	Type	Description
Location	string	Path to the newly created Organization

Response Status and Error Codes

Code	Reason
201	Organization created successfully

Related Information

[Organization](#) [page 32]

2.1.2 Read an Organization

Retrieves a specified organization from the database

With this method, you send a request to the server to retrieve a particular organization specified by its ID.

If the organization is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: `/Organizations('<businessPartnerID>')`

HTTP Method: [GET](#)

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Request Parameters

Name	Required	Type	Description	Send As
businessPartnerID	Yes	string	ID of the organization	Path parameter

Request Example

```
/Organizations('2c08c0b71187498498b113bf340186f8')
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	Organization retrieved successfully

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData" : {
  "businessPartnerID" : { "type": "string", "maxLength": 32 },
  "tenant" : { "type": "string", "maxLength": 36, "required":
true },
  "etag" : { "type": "string" },
  "organizationName" : {
    "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
    "organizationName2" : { "type": "string", "maxLength": 255 }
  },
  "communicationData" : {
    "emailAddress" : { "type": "string", "maxLength": 255, "required":
true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber" : { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName" : { "type": "string", "maxLength": 255 },
    "houseNumber" : { "type": "string", "maxLength": 10 },
    "cityName" : { "type": "string", "maxLength": 255 },
    "postalCode" : { "type": "string", "maxLength": 10 },
    "country" : { "type": "string", "maxLength": 2 },
    "countryDescription" : { "type": "string", "maxLength": 60, "readOnly" :
true },
    "region" : { "type": "string", "maxLength": 3 },
    "regionDescription" : { "type": "string", "maxLength": 60, "readOnly" :
true },
    "longitude" : { "type": "number" },

```

```

    "latitude"          : { "type": "number" }
  },
  "objectGroup"        : { "type": "string", "maxLength": 32, "required":
"true" },
  "externalIDs"        : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false"}]
  }
}

```

Related Information

[Organization \[page 32\]](#)

2.1.3 Read all Organizations

Retrieves a list of organizations from the database

With this method, you send a request to the server to retrieve a subset of all organizations, according to the filter criteria provided. For a collective request for a set of organizations, you have these options:

- You can restrict the set of organizations to be retrieved by filter criteria based on the organization name.
- You can define that the set of matching organizations shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

If the list of organizations is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/Organizations`

HTTP Method: *GET*

Permissions:

<bp>.r

<bp>.tenant.r

Query String Parameters

Name	Required	Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order
\$filter	No	string	Filter condition to be applied; valid fields are basicData/tenant, organizationName/organizationName1, organizationName/organizationName2, objectGroup, and roleCategory
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
basicData/tenant, organizationName/organizationName1, organizationName/organizationName2, objectGroup, roleCategory	eq, ne

Request Example

```
/Organizations
```

Retrieves all organizations that are available in the database. Note that this formally unrestricted request is still implicitly restricted to Organization objects in the current tenant for which the logged on user has an instance-based access authorization.

```
/Organizations?$top=25&$orderby='organizationName.organizationName1'
```

Retrieves the first 25 organizations. Data is retrieved in page mode to reduce network load and response times, and the retrieved organizations are sorted by their name in ascending order.

```
/Organizations?$skip=10&$top=20
```

Retrieves 20 organizations from the database where the first 10 organizations are omitted. That is, the retrieved organizations are those with sequence numbers 11 through 30.

```
/Organizations?$filter=organizationName/organizationName1 eq 'SAP SE'
```

Retrieves all organizations from the database where the first of the two name fields holds the string 'SAP SE'.

Response

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	Organization or Organizations retrieved successfully

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32},
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" }
},
  "organizationName" : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
},
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true},
  "mobileDestinationLocation":{ "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"   : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"          : { "type": "string", "maxLength": 255 },
  "houseNumber"         : { "type": "string", "maxLength": 10 },
  "cityName"            : { "type": "string", "maxLength": 255 },
  "postalCode"          : { "type": "string", "maxLength": 10 },
  "country"             : { "type": "string", "maxLength": 2 },
  "countryDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"              : { "type": "string", "maxLength": 3 },
  "regionDescription"    : { "type": "string", "maxLength": 60, "readOnly" :
true},
  "longitude"           : { "type": "number" },
  "latitude"            : { "type": "number" }
},
  "objectGroup"        : { "type": "string", "maxLength": 32, "required":
"true" },
  "externalIDs"         : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false"}]
  }
}
```


Related Information

[Organization \[page 32\]](#)

2.1.4 Read all Matching Organizations

Retrieves a list of `Organization` objects matching the filter criteria provided

With this method, you send a request to the server to retrieve a subset of all organizations, according to the filter criteria provided. This method offers an advanced filter functionality that goes beyond the standard filters used for collective requests of most of the other services available in the SAP IoT Application Services platform. Here, you can define a filter criterion that consists of a comma-separated list of individual organization IDs. The method then returns a collection of data sets for each `Organization` object specified in the request. This method is especially useful for administrative tasks affecting many users or things that are assigned to different organizations in the SAP IoT Application Services platform. For example, you might want to assign new expiration dates for the users assigned to all persons that belong to certain organizations.

Request

URI: `/Organizations`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Parameter	Required	Data Type	Description
<code>listFilterID</code>	Yes	string	comma-separated list of IDs referring to the <code>businessPartnerID</code> attribute of a <code>Organization</code>

Request Example

```
/Organizations?
listFilterID=2c08c0b71187498498b113bf340186f8,2c08c0b71187498498b113bf340186f9,2c
08c0b71187498498b113bf340186fa
```

Retrieves three `Organization` objects with the specified IDs from the database.

Response

Response Status and Error Codes

Code	Description
200	List of organizations retrieved successfully
400	Bad request (for example, invalid filter)
403	Forbidden (user not authorized to access organizations)

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method is an array of multiple occurrences of the following structure (one for each retrieved organization):

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32 },
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" }
},
  "organizationName" : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
},
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true },
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"  : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"         : { "type": "string", "maxLength": 255 },
  "houseNumber"        : { "type": "string", "maxLength": 10 },
  "cityName"           : { "type": "string", "maxLength": 255 },
  "postalCode"         : { "type": "string", "maxLength": 10 },
  "country"            : { "type": "string", "maxLength": 2 },
  "countryDescription"  : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"             : { "type": "string", "maxLength": 3 },
  "regionDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "longitude"          : { "type": "number" },
  "latitude"           : { "type": "number" }
},
  "objectGroup"       : { "type": "string", "maxLength": 32, "required":
true },
  "externalIDs"        : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false" }]
  }
}
```

Related Information

[Organization \[page 32\]](#)

2.1.5 Update an Organization

With this method, you modify an organization with the specified ID

In the payload of the request, you assign values to those fields that you want to modify. For example, to add an organization name in addition to the mandatory `<organizationName1>`, you may pass a value for `<organizationName2>` in the payload of the service request. You could use this secondary name, for example, to differentiate between different departments within the same company.

Request

URI: `/Organizations(<businessPartnerID>)`

HTTP Method: *PUT*

Permissions:

`<bp>.r`

`<bp>.u`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token
If-Match	Yes	Check if cached version matches server version of the organization

Request Parameters

Name	Required	Type	Description	Send As
businessPartnerID	Yes	string	ID of the organization	Path parameter

Request Example

```
/Organizations('2c08c0b71187498498b113bf340186f8')
```

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32 },
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" }
},
  "organizationName" : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
},
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true },
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"   : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"          : { "type": "string", "maxLength": 255 },
  "houseNumber"         : { "type": "string", "maxLength": 10 },
  "cityName"            : { "type": "string", "maxLength": 255 },
  "postalCode"          : { "type": "string", "maxLength": 10 },
  "country"             : { "type": "string", "maxLength": 2 },
  "countryDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"              : { "type": "string", "maxLength": 3 },
  "regionDescription"    : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "longitude"           : { "type": "number" },
  "latitude"            : { "type": "number" }
},
  "objectGroup"      : { "type": "string", "maxLength": 32, "required":
true },
  "externalIDs"       : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false" }]
  }
}
```

Response

Format: [JSON](#)

Response Header Fields

Name	Type	Description
ETag	string	Identifier of the updated Organization instance version

Response Status and Error Codes

Code	Reason
200	Organization updated successfully

Related Information

[Organization \[page 32\]](#)

2.1.6 Delete an Organization

With this method, you delete an Organization with the specified ID.

With this method, you delete the organization with the specified ID from the system. If an organization is deleted, all assigned relationships to other business partners remain untouched, thus leaving the system in an inconsistent state. To prevent such inconsistencies, choose one of the following approaches:

- Before deleting an organization, check whether any relationships to other objects exist. Start with deleting these relationships, and then delete the organization.
- Use the onboarding services for organizations instead. These services are specially designed to handle not only the organization object, but also its relationships to other objects. For details, see [Delete Organization Assignment \[page 298\]](#).

i Note

Deleting an organization is done in the form of a logical deletion only. That is, from a user's perspective, the deleted organization is no longer visible and cannot be accessed by the user. However, the physical organization object in the database remains untouched and can be retrieved by administrators, if necessary. This can be important, for example, for auditing purposes.

If the organization is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: `/Organizations('<businessPartnerID>')`

HTTP Method: `DELETE`

Permissions:

`<bp>.d`

`<bp>.r`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the organization

Request Parameters

Name	Required	Type	Description	Send As
businessPartnerID	Yes	string	technical ID of the Organization	Path parameter

Request Example

```
/Organizations('2c08c0b71187498498b113bf340186f8')
```

Response

Response Status and Error Codes

Code	Reason
204	Organization deleted successfully

Related Information

[Organization \[page 32\]](#)

[DeletedOrganization \[page 52\]](#)

2.1.7 Payload of CapabilityType "Organization"

Presents the payload structure of CapabilityType "Organization"

The payload of the CapabilityType service consists of two main parts:

- **vocabulary:** This part mirrors the payload elements of the `Organization` service. Any values that you enter here limit the scope of objects to those organizations that match the passed values.
- **actions:** This part defines which of the three possible types of action (read, write delete) shall be allowed for the `Organization` objects specified in the `vocabulary`.

Payload

```
{
  "ID": "FFFFFFFFF00000000FFFFFFFFF0002",
  "name": "bp:organization",
  "vocabulary": {
    "attributes": [
      {
        "path": {
          "field": "cityName",
          "dimension": "root"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "country",
          "dimension": "root"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "postalCode",
          "dimension": "root"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "organizationName1",
          "dimension": "root"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "latitude",
          "dimension": "root"
        },
        "valueType": {
          "type": "NumericDecimal",
          "precision": 10,
          "scale": 3
        }
      },
      {
        "path": {
          "field": "mobileDestinationLocation",
          "dimension": "root"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      }
    ]
  }
}
```

```

    },
    {
      "path": {
        "field": "emailAddress",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "landlineDestinationLocation",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "houseNumber",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "longitude",
        "dimension": "root"
      },
      "valueType": {
        "type": "NumericDecimal",
        "precision": 10,
        "scale": 3
      }
    },
    {
      "path": {
        "field": "district",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "landlinePhoneNumberExtension",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "objectGroup",
        "dimension": "root"
      },
    },

```



```

        "valueType": {
            "type": "HierarchyAssignment"
        }
    },
    {
        "path": {
            "field": "organizationName2",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "streetName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "region",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "ID",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    }
]
},
"actions": {
    "actions": [
        {
            "name": "Read"
        },
        {
            "name": "Write"
        },
        {
            "name": "Delete"
        }
    ]
}
}

```

Related Information

[CapabilityType \[page 220\]](#)

2.1.8 DeletedOrganization

A `DeletedOrganization` object is a physical backup for a logically deleted `Organization` object.

Whenever a user deletes an `Organization` object from an IoT scenario, this deletion is a logical rather than a physical deletion. That is, from a user's perspective, the deleted organization is no longer available in the system and cannot be accessed anymore. However, in the background, the system takes several steps to ensure that the deleted organization can still be restored, if need be. Here are some use cases where access to a previously deleted organization may be required:

- Restoring an organization that has accidentally been deleted
- Retrieving an organization for auditing purposes
- Retrieving an organization in the context of a lawsuit

Due to the special nature of the `DeletedOrganization` object, access to objects of this kind is limited to system administrators with special authorizations. Moreover, a `DeletedOrganization` object has a restricted set of methods that can be accessed via the SAP IoT API. For example, there is no `Create` method available, nor can it be modified. This is to make sure that a `DeletedOrganization` objects can only be created in the system according to certain predefined and hard-coded rules. These rules enforce that `DeletedOrganization` objects can only exist under well-defined circumstances laid down in legal frameworks that are relevant for operating an IoT scenario.

Write access to `DeletedOrganization` objects residing in a tenant other than the one to which a user is logged on is only allowed for users who are acting in the role of a cloud platform provider.

Base URI:

- Formal description: `https://<server address>[:<port number>]/[<path>]/DeletedOrganizations`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/DeletedOrganizations`

Methods

HTTP Method	Action	URI	Scopes
<i>GET</i>	Read a DeletedOrganization [page 54]	<code>/DeletedOrganizations ('<businessPartnerID>')</code>	<code><bp>.pd</code>
<i>GET</i>	Read all DeletedOrganizations [page 56]	<code>/DeletedOrganizations</code>	<code><bp>.pd</code>
<i>DELETE</i>	Delete a DeletedOrganization [page 57]	<code>/DeletedOrganizations ('<businessPartnerID>')</code>	<code><bp>.pd</code>

i Note

As already mentioned above, the `DeletedOrganization` object has neither a POST nor a PUT method:

- There is no way of explicitly creating a `DeletedOrganization` object by a method call via the interface. Instead, a `DeletedOrganization` object is created automatically by the system whenever an `Organization` object is deleted.
- Once the system has created a `DeletedOrganization` object, there is no way of modifying its field values, neither explicitly nor implicitly. This is due to the strict legal requirements that are applicable in the use cases outlined above.

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData"      : {
  "businessPartnerID" : { "type": "string", "maxLength": 32},
  "tenant"            : { "type": "string", "maxLength": 36, "required":
true },
  "etag"              : { "type": "string" }
},
  "organizationName" : {
  "organizationName1" : { "type": "string", "maxLength": 255, "required":
true },
  "organizationName2" : { "type": "string", "maxLength": 255 }
},
  "communicationData" : {
  "emailAddress"      : { "type": "string", "maxLength": 255, "required":
true},
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber"   : { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber" : { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName"          : { "type": "string", "maxLength": 255 },
  "houseNumber"         : { "type": "string", "maxLength": 10 },
  "cityName"            : { "type": "string", "maxLength": 255 },
  "postalCode"          : { "type": "string", "maxLength": 10 },
  "country"             : { "type": "string", "maxLength": 2 },
  "countryDescription"   : { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region"              : { "type": "string", "maxLength": 3 },
  "regionDescription"    : { "type": "string", "maxLength": 60, "readOnly" :
true},
  "longitude"           : { "type": "number" },
  "latitude"            : { "type": "number" }
},
  "objectGroup"        : { "type": "string", "maxLength": 32, "required":
"true" },
  "externalIDs"         : {
    value: [{ "type": "string", "maxLength": 60,
"required": "false"}]
  }
}
```

Related Information

[Organization \[page 32\]](#)

[Business Partner \[page 29\]](#)

2.1.8.1 Read a DeletedOrganization

Retrieves the specified DeletedOrganization object from the database

With this method, you send a request to the server to retrieve a particular DeletedOrganization object specified by its ID.

If the DeletedOrganization object is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: /DeletedOrganizations('businessPartnerID')

HTTP Method: *GET*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
If-Match	No	Check if cached version matches server version of the organization

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	Technical ID of the DeletedOrganization object	Path

Request Example

```
/DeletedOrganizations('84c8c41dcf8e4e139ce03d337ee14f8a')
```

Response

Format

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	DeletedOrganization retrieved successfully

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant" : { "type": "string", "maxLength": 36 },
    "etag" : { "type": "string" }
  },
  "personName": {
    "formOfAddress" : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" : true },
    "familyName" : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup" : { "type": "string", "maxLength": 32 }
}
```

Related Information

[DeletedOrganization \[page 52\]](#)

2.1.8.2 Read all DeletedOrganizations

Retrieves a list of deleted organizations from the database

With this method, you send a request to the server to retrieve a subset of all deleted organizations, according to the filter criteria provided. For a collective request for a set of deleted organizations, you have these options:

- You can define that the set of matching deleted organizations shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /DeletedOrganizations

HTTP Method: *GET*

Permissions: <bp>.pd

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending order
\$filter	No	string	Filter condition to be applied; valid fields are basicData/tenant, organizationName/organizationName1, organizationName/organizationName2, objectGroup, and roleCategory
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
basicData/tenant, organizationName/organizationName1, organizationName/organizationName2, objectGroup, roleCategory	eq, ne

Request Example

```
/DeletedOrganizations
```

Retrieves all deleted organizations that are available in the database.

```
/DeletedOrganizations?$top=25&$orderby='organizationName.organizationName1'
```

Retrieves the first 25 deleted organizations. Data is retrieved in page mode to reduce network load and response times, and the retrieved deleted organizations are sorted by their name in ascending order.

```
/DeletedOrganizations?$skip=10&$top=20
```

Retrieves 20 deleted organizations from the database where the first 10 deleted organizations are omitted. That is, the retrieved deleted organizations are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Deleted organizations retrieved successfully

Related Information

[DeletedOrganization](#) [page 52]

2.1.8.3 Delete a DeletedOrganization

With this method, you physically delete an organization with the specified ID.

Although "deleting a deleted organization" may sound strange at first glance, this is exactly the purpose of this method. The `DeletedOrganization` concept represents an organization that has played an active part in the system in the past, but has been logically deleted. As opposed to the logical deletion of an `Organization` object, deleting a `DeletedOrganization` object means:

- **explicit** physical deletion of the `DeletedOrganization` object, and
- **implicit** physical deletion of the `Organization` object that is represented by the corresponding `DeletedOrganization` object

In other words, deleting a `DeletedOrganization` object is the ultimate and irreversible way of removing all information about a particular organization from the system.

i Note

Be very careful before executing this method. Since it is the very purpose of the `DeletedOrganization` concept for you to be able to reconstruct the information stored for an organization even after that organization has been deleted from the system, we highly recommend that you make yourself aligned with all the relevant departments in your company before you delete a `DeletedOrganization` object.

Request

URI: /DeletedOrganizations('<businessPartnerID>')

HTTP Method: *DELETE*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the DeletedOrganization object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	technical ID of the DeletedOrganization object	Path

Request Example

```
/DeletedOrganizations('84c8c41dcf8e4e139ce03d337ee14f8a')
```

Response

Response Status and Error Codes

Code	Reason
204	DeletedOrganization deleted successfully

Related Information

[DeletedOrganization \[page 52\]](#)

[Delete an Organization \[page 47\]](#)

2.2 Person

A Person represents a business partner of type person that is assigned to one tenant.

Persons are used to model representations of human beings who are involved in designing, operating, or monitoring an IoT services infrastructure. For persons, SAP provides the following predefined roles:

- Employee
- Contact person

It is obvious that these predefined roles are very abstract and generic. For productive use, it might be recommendable to define additional roles that describe the responsibilities of a particular person more precisely. Here is a list of some examples of potential roles for persons involved in an IoT scenario:

- System administrator
- Machine operator
- Quality manager
- Service technician

The tenant is an attribute of the person that must be provided upon creation of a person. That is, to create a person with a reference to a given tenant, the tenant name must be valid, and the tenant must already exist in the system.

To identify a person, the `familyName`, the `givenName`, and the `emailAddress` attributes are required. For the name fields, it is obvious that there can be no unique values required, since people with the same name are a normal everyday phenomenon. Given that, of the three required fields only the `emailAddress` attribute must be unique within the scope of the tenant to which the person belongs.

i Note

There is one specialty with respect to the `emailAddress` field. As already mentioned, the e-mail address must be unique within the scope of a tenant. However, the same e-mail address can be assigned to more than one person as long as there is only one undeleted person in the system with that address. If an e-mail address has been used by one or more persons in the past but these persons have all been logically deleted, then the e-mail address is available again for assigning it to a different person. For example, this mechanism allows for assigning different employees to a permanent, non-individual, generic e-mail address like `support@company.com`.

The same generic e-mail address can also be assigned to the organization to which that person belongs. That is, the requirement for e-mail addresses to be unique within a tenant is a bit relaxed in that respect that it is allowed to use the same e-mail address for one person **and** one organization within the same tenant (resulting in two occurrences of the same e-mail address in one tenant).

If a person is deleted, the system automatically deletes all assigned relationships between that person and other objects.

i Note

The Person services described here are focused on the isolated entity of a single person. This is fine for accessing or modifying certain fields and attributes of a person. However, for onboarding a person (that is, creating a new person and setting up relationships to associated objects), we recommend using the services described in the [Onboarding Persons \[page 300\]](#) section.

Prerequisites

Base URI:

- Formal description: `https://<server address>[:<port number>]/[path]/Persons`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/Persons`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create a Person [page 63]	<code>/Persons</code>	<code><bp>.c</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read a Person [page 66]	<code>/Persons ('<ID>')</code>	<code><bp>.c</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read all Persons [page 68]	<code>/Persons</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read all Matching Persons [page 71]	<code>/Persons</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>PUT</i>	Update a Person [page 73]	<code>/Persons ('<ID>')</code>	<code><bp>.u</code> <code><bp>.r</code> <code><bp>.tenant.r</code>
<i>DELETE</i>	Delete a Person [page 76]	<code>/Persons ('<ID>')</code>	<code><bp>.r</code> <code><bp>.d</code> <code><bp>.tenant.r</code>

Payload

Format: *JSON*

For PUT, POST, and GET requests, only the media type JSON is supported. The JSON for these methods has the following structure:

```
{"basicData" : {  
  "businessPartnerID": { "type": "string", "maxLength": 32 },
```

```

    "tenant"          : { "type": "string", "maxLength": 36, "required": true },
    "etag"            : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30,
"readOnly" : true },
    "familyName"        : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60,
"readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
  "externalIDs": {
    value: [{ "type": "string", "maxLength": 60, "required":
"false"}]
  }
}

```

Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

Note

A special mechanism has been implemented for the fields dealing with phone numbers in the communication data block of the payload with respect to the preceding numeric country code. Unlike manual dialing with a phone, the country code is **not** given as the standardized number for a country (for

example, 1 for USA, 49 for Germany). Instead, the system expects the alphabetical ISO country code as a prefix (for example, "US" for USA, "DE" for Germany). The following fields are affected:

- `mobileDestinationLocation`
- `landlineDestinationLocation`

This mechanism is in effect for the service request types POST, GET, and PUT. You may look up the required ISO country codes in the [Country Codes \[page 1583\]](#) section of this documentation.

i Note

For the `emailAddress` field, the following requirements apply:

- The content of the field must be a valid and well-formed e-mail address according to the rules set forth in [IETF RFC 2822](#) .
- The content of the field is validated internally by SAP IoT with the help of the e-mail validator provided by the Hibernate framework.

As a consequence, the following applies: Although the technical field length is defined as 255 characters, neither the mailbox part (before the @ sign) nor the domain name (after the @ sign, but before the dot ".") may exceed a maximum length of 64 characters.

For more information, see the [Hibernate documentation](#) .

External ID

In the payload, there is a special field that needs some additional explanation: `externalID`. This field is intended to hold an identifying string other than the purely technical `businessPartnerID` field, which the system needs for reasons of database consistency. In contrast to that, the `externalID` field can be used for providing an additional semantic identifier that users may be accustomed to from their daily business experience. For a person, this field could be used to hold the employee ID that a company has assigned to that person during the hiring process.

i Note

The following limitations apply:

- Although the `externalIDs` field has been implemented as an array, the system currently supports the assignment of no more than one external ID (or none).
- On database level, the `externalIDs` field is managed as a common attribute of both persons and organizations. Therefore, the values entered for this field must be unique not only within a tenant, but also across persons and organizations. In other words, it is not allowed to use a value for the `externalIDs` field of a person that has already been used for an organization and vice versa.

Access Authorization for Persons

Objects of type `Person` are subject to the instance-based authorization concept that is implemented in SAP IoT. For more information, see [Object Instance-Based Authorization \[page 204\]](#). To grant access to a Person instance, a capability has to be derived from the predefined `CapabilityType` object for persons. For more information on the `CapabilityType` payload needed for this purpose, see [Payload of CapabilityType "Person" \[page 77\]](#).

Related Information

[Onboarding Persons \[page 300\]](#)

[Business Partner \[page 29\]](#)

2.2.1 Create a Person

With this method, you create a new business partner of type Person. The system automatically assigns a unique ID to the new person.

To access, create change and delete persons you need to have the respective authorization. This instance authorization is realized through hierarchical ObjectGroups and ObjectGroupCapabilities for the object type `com.sap.appcore:person`.

A user can only operate on persons that are assigned to the same tenant to which the user is logged on. Only a user acting as the cloud platform provider has the permission to access persons in other tenants through capabilities that are inherited from the root node.

If the person is successfully created, the server sends HTTP response code 201. Any other code indicates an error.

Request

URI: `/Persons`

HTTP Method: `POST`

Permissions:

`<bp>.c`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token

Request Fields

Parameter	Required	Data Type	Description	Send As
tenant	Yes	string	If omitted, tenant of currently logged on user is used.	JSON
familyName	Yes	string	Last name of the person to be created.	JSON

Parameter	Required	Data Type	Description	Send As
givenName	Yes	string	First name of the person to be created.	JSON
emailAddress	Yes	string	An email address used to get in contact with the person.	JSON

Request Example

```
/Persons
```

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant" : { "type": "string", "maxLength": 36, "required": true },
    "etag" : { "type": "string" }
  },
  "personName": {
    "formOfAddress" : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30,
    "readOnly" : true },
    "familyName" : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60,
    "readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
    "readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
    true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
  "externalIDs": {
```

```

    value: [{ "type": "string", "maxLength": 60, "required":
"false"}}]
    }
}

```

i Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

i Note

For the `emailAddress` field, the following requirements apply:

- The content of the field must be a valid and well-formed e-mail address according to the rules set forth in [IETF RFC 2822](#) .
- The content of the field is validated internally by SAP IoT with the help of the e-mail validator provided by the Hibernate framework.

As a consequence, the following applies: Although the technical field length is defined as 255 characters, neither the mailbox part (before the @ sign) nor the domain name (after the @ sign, but before the dot ".") may exceed a maximum length of 64 characters.

For more information, see the [Hibernate documentation](#) .

Response

Response Header Fields

Name	Type	Description
Location	string	Path to the newly created Person
ETag	string	Entity tag of the newly created Person instance

Response Status and Error Codes

Code	Reason
201	Person successfully created

Related Information

[Person \[page 59\]](#)

2.2.2 Read a Person

Retrieves a specified person from the database

With this method, you send a request to the server to retrieve a particular Person object specified by its ID.

If the person is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: `/Persons (<ID>')`

HTTP Method: *GET*

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
If-Match	Yes	Check if cached version matches server version of the person

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPa rtnerID	Yes	string	Technical ID of the Person object	Path

Request Example

```
/Persons ('adbb2c0fdb0a4b9e99327a52c41fc720')
```

Response

Format

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	Person retrieved successfully

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{ "basicData" : {
  "businessPartnerID": { "type": "string", "maxLength": 32 },
  "tenant"           : { "type": "string", "maxLength": 36, "required": true },
  "etag"            : { "type": "string" }
},
"personName": {
  "formOfAddress"      : { "type": "string", "maxLength": 10 },
  "formOfAddressDescription": { "type": "string", "maxLength": 30,
"readOnly" : true },
  "familyName"         : { "type": "string", "maxLength": 255, "required": true },
  "additionalFamilyName": { "type": "string", "maxLength": 255 },
  "familyNamePrefix"   : { "type": "string", "maxLength": 10 },
  "middleName"         : { "type": "string", "maxLength": 255 },
  "givenName"          : { "type": "string", "maxLength": 255, "required": true },
  "initials"           : { "type": "string", "maxLength": 10 },
  "academicTitle"       : { "type": "string", "maxLength": 4 },
  "academicTitleDescription": { "type": "string", "maxLength": 60,
"readOnly" : true },
  "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
  "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
},
"communicationData" : {
  "emailAddress": { "type": "string", "maxLength": 255, "required": true },
  "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
  "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
  "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
  "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
  "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  "streetName": { "type": "string", "maxLength": 255 },
  "houseNumber": { "type": "string", "maxLength": 10 },
  "cityName": { "type": "string", "maxLength": 255 },
  "postalCode": { "type": "string", "maxLength": 10 },
  "country": { "type": "string", "maxLength": 2 },
  "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
  "region": { "type": "string", "maxLength": 3 },
  "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
},
"objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
"externalIDs": {
  value: [{ "type": "string", "maxLength": 60, "required":
"false"}]
}
}
```

Related Information

[Person \[page 59\]](#)

2.2.3 Read all Persons

Retrieves a list of persons from the database

With this method, you send a request to the server to retrieve a subset of all persons, according to the filter criteria provided. For a collective request for a set of persons, you have these options:

- You can restrict the set of persons to be retrieved by filter criteria based on the person name. In fact, defining filter criteria is mandatory. The system does not accept an unrestricted request for a list of all persons in the database.
- You can define that the set of matching persons shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/Persons`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Name	Required	Type	Description
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set
<code>\$top</code>	No	integer	Number of records to include in the result set

Name	Required	Type	Description
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order; valid fields are: basicData.businessPartnerID, basicData.etag, personName.formOfAddressDescription, personName.familyName, personName.additionalFamilyName, personName.familyNamePrefix, personName.middleName, personName.givenName, personName.initials, personName.academicTitleDescription, personName.additionalAcademicTitleDescription, communicationData.emailAddress, communicationData.streetName, communicationData.houseNumber, communicationData.cityName, communicationData.postalCode, communicationData.country, communicationData.region
\$filter	No	string	Filter condition to be applied; valid fields are personName/familyName, personName/ givenName, communicationData/ emailAddress, basicData/ businessPartnerID, objectGroup, and roleCategory
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
personName/familyName, personName/ givenName, communicationData/emailAddress, basicData/businessPartnerID, objectGroup, and roleCategory	eq, ne

Request Example

```
/Persons
```

Retrieves all persons that are available in the database. Note that this formally unrestricted request is still implicitly restricted to Person objects in the current tenant for which the logged on user has an instance-based access authorization.

```
/Persons?$top=25&$orderby='personName.familyName' desc
```

Retrieves the first 25 persons. Data is retrieved in page mode to reduce network load and response times, and the retrieved persons are sorted by their family name in descending order.

```
/Persons?$skip=10&$top=20
```

Retrieves 20 persons from the database where the first 10 persons are omitted. That is, the retrieved persons are those with sequence numbers 11 through 30.

```
/Persons?$filter=personName/familyName eq 'Smith'
```

Retrieves all persons from the database whose family name is "Smith".

Response

Response Status and Error Codes

Code	Reason
200	Persons retrieved successfully

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant"           : { "type": "string", "maxLength": 36, "required": true },
    "etag"             : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30,
    "readOnly" : true },
    "familyName"         : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix"   : { "type": "string", "maxLength": 10 },
    "middleName"         : { "type": "string", "maxLength": 255 },
    "givenName"          : { "type": "string", "maxLength": 255, "required": true },
    "initials"           : { "type": "string", "maxLength": 10 },
    "academicTitle"      : { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60,
    "readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
    "readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
  }
}
```

```

    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
  "externalIDs": {
    value: [{ "type": "string", "maxLength": 60, "required":
"false"}]
  }
}

```

Related Information

[Person \[page 59\]](#)

2.2.4 Read all Matching Persons

Retrieves a list of `Person` objects matching the filter criteria provided

With this method, you send a request to the server to retrieve a subset of all persons, according to the filter criteria provided. This method offers an advanced filter functionality that goes beyond the standard filters used for collective requests of most of the other services available in the SAP IoT platform. Here, you can define a filter criterion that consists of a comma-separated list of individual person IDs. The method then returns a collection of data sets for each `Person` object specified in the request. This method is especially useful to populate a data table with all the relevant data available for a given selection of persons. For example, you might want to use this method to provide person data for an administrative user interface application.

Request

URI: `/Persons`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Parameter	Required	Data Type	Description
listFilterID	Yes	string	comma-separated list of IDs referring to the businessPartnerID attribute of a Person

Request Example

```
/Persons?  
listFilterID=adbb2c0fdb0a4b9e99327a52c41fc720,adbb2c0fdb0a4b9e99327a52c41fc721,ad  
bb2c0fdb0a4b9e99327a52c41fc722
```

Retrieves three `Person` objects with the specified IDs from the database.

Response

Response Status and Error Codes

Code	Description
200	List of persons retrieved successfully
400	Bad request (for example, invalid filter)
403	Forbidden (user not authorized to access persons)

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method is an array of multiple occurrences of the following structure (one for each retrieved person):

```
{ "basicData" : {  
  "businessPartnerID": { "type": "string", "maxLength": 32 },  
  "tenant"           : { "type": "string", "maxLength": 36, "required": true },  
  "etag"             : { "type": "string" }  
},  
  "personName": {  
    "formOfAddress"           : { "type": "string", "maxLength": 10 },  
    "formOfAddressDescription": { "type": "string", "maxLength": 30,  
    "readOnly" : true },  
    "familyName"              : { "type": "string", "maxLength": 255, "required": true },  
    "additionalFamilyName": { "type": "string", "maxLength": 255 },  
    "familyNamePrefix": { "type": "string", "maxLength": 10 },  
    "middleName": { "type": "string", "maxLength": 255 },  
    "givenName": { "type": "string", "maxLength": 255, "required": true },  
    "initials": { "type": "string", "maxLength": 10 },  
    "academicTitle": { "type": "string", "maxLength": 4 },  
    "academicTitleDescription": { "type": "string", "maxLength": 60,  
    "readOnly" : true },  
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },  
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,  
    "readOnly" : true }  
  }
```

```

    },
    "communicationData" : {
      "emailAddress": { "type": "string", "maxLength": 255, "required": true },
      "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
      "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
      "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
      "streetName": { "type": "string", "maxLength": 255 },
      "houseNumber": { "type": "string", "maxLength": 10 },
      "cityName": { "type": "string", "maxLength": 255 },
      "postalCode": { "type": "string", "maxLength": 10 },
      "country": { "type": "string", "maxLength": 2 },
      "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
      "region": { "type": "string", "maxLength": 3 },
      "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
    },
    "objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
    "externalIDs": {
      value: [{ "type": "string", "maxLength": 60, "required":
"false"}]
    }
  }
}

```

Related Information

[Person \[page 59\]](#)

2.2.5 Update a Person

With this method, you modify a person with the specified ID

In the payload of the request, you assign values to those fields that you want to modify. For example, to add the birth name of a married female person in addition to the mandatory `<familyName>`, you may pass a value for `<additionalFamilyName>` in the payload of the service request. With that, you could differentiate between different persons who, at first sight, have the same name.

Request

URI: `/Persons('<businessPartnerID>')`

HTTP Method: *PUT*

Permissions:

`<bp>.u`

`<bp>.r`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the person

Request Parameters

Name	Required	Type	Description	Send As
businessPa rtnerID	Yes	string	ID of the person	Path parameter

Request Example

```
/Persons ('adbb2c0fdb0a4b9e99327a52c41fc720')
```

Payload

Format: [JSON](#)

For PUT, POST, and GET requests, only the media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant"           : { "type": "string", "maxLength": 36, "required": true },
    "etag"             : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30,
"readOnly" : true },
    "familyName"         : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix"   : { "type": "string", "maxLength": 10 },
    "middleName"         : { "type": "string", "maxLength": 255 },
    "givenName"          : { "type": "string", "maxLength": 255, "required": true },
    "initials"           : { "type": "string", "maxLength": 10 },
    "academicTitle"      : { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60,
"readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
  }
}
```



```

    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup": { "type": "string", "maxLength": 32, "required": "true" },
  "externalIDs": {
    value: [{ "type": "string", "maxLength": 60, "required":
"false"}]
  }
}

```

Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

Response

Format

Format: *JSON*

Response Header Fields

Name	Type	Description
Etag	string	Identifies the updated Person instance

Response Status and Error Codes

Code	Reason
200	Person updated successfully

Related Information

[Person \[page 59\]](#)

2.2.6 Delete a Person

With this method, you delete a Person with the specified ID.

With this method, you delete the person with the specified ID from the system. If a person is deleted, all assigned relationships to other business partners remain untouched, thus leaving the system in an inconsistent state. To prevent such inconsistencies, choose one of the following approaches:

- Before deleting a person, check whether any relationships to other objects exist. Start with deleting these relationships, and then delete the person.
- Use the onboarding services for persons instead. These services are specially designed to handle not only the person object, but also its relationships to other objects.

i Note

Deleting a person is done in the form of a logical deletion only. That is, from a user's perspective, the deleted person is no longer visible and cannot be accessed by the user. However, the physical Person object in the database remains untouched and can be retrieved by administrators, if necessary. This can be important, for example, for auditing purposes.

From a technical perspective, calling this method results in the following behavior: The system creates a new instance of a DeletedPerson object and copies all field values of the deleted Person object to the new DeletedPerson object. That is, the Person is cloned into a DeletedPerson. The DeletedPerson object can be retrieved by an administrator with special authorizations.

If the person is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: /Persons('<businessPartnerID>')

HTTP Method: *DELETE*

Permissions:

<bp>.r

<bp>.d

<bp>.tenant.r

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the person

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPa rtnerID	Yes	string	technical ID of the Person object	Path

Request Example

```
/Persons ('adbb2c0fdb0a4b9e99327a52c41fc720')
```

Response

Response Status and Error Codes

Code	Reason
204	Person deleted successfully

Related Information

[Person \[page 59\]](#)

[DeletedPerson \[page 81\]](#)

2.2.7 Payload of CapabilityType "Person"

Presents the payload structure of CapabilityType "Person"

The payload of the `CapabilityType` service consists of two main parts:

- `vocabulary`: This part mirrors the payload elements of the `Person` service. Any values that you enter here limit the scope of objects to those persons that match the passed values.
- `actions`: This part defines which of the three possible types of action (read, write delete) shall be allowed for the `Person` objects specified in the `vocabulary`.

Payload

```
{
  "ID": "FFFFFFFFF00000000FFFFFFFFF0001",
  "name": "bp:person",
  "vocabulary": {
    "attributes": [
      {
```

```

        "path": {
            "field": "cityName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "familyNamePrefix",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "country",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "additionalFamilyName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "postalCode",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "latitude",
            "dimension": "root"
        },
        "valueType": {
            "type": "NumericDecimal",
            "precision": 10,
            "scale": 3
        }
    },
    {
        "path": {
            "field": "formOfAddress",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    }
}

```

```

    },
    {
      "path": {
        "field": "initials",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "mobileDestinationLocation",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "emailAddress",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "landlineDestinationLocation",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "familyName",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "houseNumber",
        "dimension": "root"
      },
      "valueType": {
        "type": "String",
        "length": 127
      }
    },
    {
      "path": {
        "field": "longitude",
        "dimension": "root"
      },
      "valueType": {

```

```

        "type": "NumericDecimal",
        "precision": 10,
        "scale": 3
    },
    {
        "path": {
            "field": "district",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "landlinePhoneNumberExtension",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "objectGroup",
            "dimension": "root"
        },
        "valueType": {
            "type": "HierarchyAssignment"
        }
    },
    {
        "path": {
            "field": "middleName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "givenName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "streetName",
            "dimension": "root"
        },
        "valueType": {
            "type": "String",
            "length": 127
        }
    },
    {
        "path": {
            "field": "region",
            "dimension": "root"
        }
    }

```

```

    },
    "valueType": {
      "type": "String",
      "length": 127
    }
  },
  {
    "path": {
      "field": "ID",
      "dimension": "root"
    },
    "valueType": {
      "type": "String",
      "length": 127
    }
  }
]
},
"actions": {
  "actions": [
    {
      "name": "Read"
    },
    {
      "name": "Write"
    },
    {
      "name": "Delete"
    }
  ]
}
}

```

Related Information

[CapabilityType \[page 220\]](#)

2.2.8 DeletedPerson

A `DeletedPerson` object is a physical backup for a logically deleted `Person` object.

Whenever a user deletes a `Person` object from an IoT scenario, this deletion is a logical rather than a physical deletion. That is, from a user's perspective, the deleted person is no longer available in the system and cannot be accessed anymore. However, in the background, the system takes several steps to ensure that the deleted person can still be restored, if need be. Here are some use cases where access to a previously deleted person may be required:

- Restoring a person that has accidentally been deleted
- Retrieving a person for auditing purposes
- Retrieving a person in the context of a lawsuit

Due to the special nature of the `DeletedPerson` object, access to objects of this kind is limited to system administrators with special authorizations. Moreover, a `DeletedPerson` object has a restricted set of methods that can be accessed via the SAP IoT API. For example, there is no `Create` method available, nor can it be modified. This is to make sure that a `DeletedPerson` objects can only be created in the system according to

certain predefined and hard-coded rules. These rules enforce that `DeletedPerson` objects can only exist under well-defined circumstances laid down in legal frameworks that are relevant for operating an IoT scenario.

Write access to `DeletedPerson` objects residing in a tenant other than the one to which a user is logged on is only allowed for users who are acting in the role of a cloud platform provider.

Base URI: `/DeletedPersons ('<businessPartnerID>')`

Permissions: `<bp>.pd`

Base URI:

- Formal description: `https://<server address>[:<port number>]/<path>/DeletedPersons`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/DeletedPersons`

Methods

HTTP Method	Action	URI	Scopes
<i>GET</i>	Read a DeletedPerson [page 83]	<code>/DeletedPersons ('<businessPartnerID>')</code>	<code><bp>.pd</code>
<i>GET</i>	Read all DeletedPersons [page 85]	<code>/DeletedPersons</code>	<code><bp>.pd</code>
<i>DELETE</i>	Delete a DeletedPerson [page 88]	<code>/DeletedPersons ('<businessPartnerID>')</code>	<code><bp>.pd</code>

Note

As already mentioned above, the `DeletedPerson` object has neither a POST nor a PUT method:

- There is no way of explicitly creating a `DeletedPerson` object by a method call via the interface. Instead, a `DeletedPerson` object is created automatically by the system whenever a `Person` object is deleted.
- Once the system has created a `DeletedPerson` object, there is no way of modifying its field values, neither explicitly nor implicitly. This is due to the strict legal requirements that are applicable in the use cases outlined above.

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for these methods has the following structure:

```
{ "basicData" : {  
  "businessPartnerID": { "type": "string", "maxLength": 32 },
```



```

    "tenant"          : { "type": "string", "maxLength": 36 },
    "etag"            : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" :
true },
    "familyName"         : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup"      : { "type": "string", "maxLength": 32 }
}

```

Related Information

[Person \[page 59\]](#)

[Business Partner \[page 29\]](#)

2.2.8.1 Read a DeletedPerson

Retrieves the specified DeletedPerson object from the database

With this method, you send a request to the server to retrieve a particular DeletedPerson object specified by its ID.

If the DeletedPerson object is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: /DeletedPersons('<businessPartnerID>')

HTTP Method: [GET](#)

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
If-Match	No	Check if cached version matches server version of the person

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	Technical ID of the DeletedPerson object	Path

Request Example

```
/DeletedPersons('84c8c41dcf8e4e139ce03d337ee14f8a')
```

Response

Format

Format: [JSON](#)

Response Status and Error Codes

Code	Reason
200	DeletedPerson retrieved successfully

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant"           : { "type": "string", "maxLength": 36 },
    "etag"             : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },

```

```

    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" :
true },
    "familyName" : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
},
"communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
},
"objectGroup" : { "type": "string", "maxLength": 32 }
}

```

Related Information

[DeletedPerson \[page 81\]](#)

2.2.8.2 Read all DeletedPersons

Retrieves a list of deleted persons from the database

With this method, you send a request to the server to retrieve a subset of all deleted persons, according to the filter criteria provided. For a collective request for a set of deleted persons, you have these options:

- You can define that the set of matching deleted persons shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /DeletedPersons

HTTP Method: *GET*

Permissions: <bp>.pd

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending order
\$filter	No	string	Filter condition to be applied; valid fields are personName/familyName, personName/givenName, communicationData/emailAddress, basicData/businessPartnerID, objectGroup, and roleCategory
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
personName/familyName, personName/givenName, communicationData/emailAddress, basicData/businessPartnerID, objectGroup, roleCategory	eq, ne

Request Example

```
/DeletedPersons
```

Retrieves all deleted persons that are available in the database.

```
/DeletedPersons?$top=25&$orderby='familyName'
```

Retrieves the first 25 deleted persons. Data is retrieved in page mode to reduce network load and response times, and the retrieved deleted persons are sorted by their family name in ascending order.

```
/DeletedPersons?$skip=10&$top=20
```

Retrieves 20 deleted persons from the database where the first 10 deleted persons are omitted. That is, the retrieved deleted persons are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Deleted persons retrieved successfully

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant"           : { "type": "string", "maxLength": 36 },
    "etag"             : { "type": "string" }
  },
  "personName": {
    "formOfAddress"      : { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" : true },
    "familyName"         : { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup"      : { "type": "string", "maxLength": 32 }
}
```

Related Information

[DeletedPerson \[page 81\]](#)

2.2.8.3 Delete a DeletedPerson

With this method, you physically delete a Person with the specified ID.

Although "deleting a deleted person" may sound strange at first glance, this is exactly the purpose of this method. The DeletedPerson concept represents a person who has played an active part in the system in the past, but has been logically deleted. As opposed to the logical deletion of a Person object, deleting a DeletedPerson object means:

- **explicit** physical deletion of the DeletedPerson object, and
- **implicit** physical deletion of the Person object that is represented by the corresponding DeletedPerson object

In other words, deleting a DeletedPerson object is the ultimate and irreversible way of removing all information about a particular person from the system.

Note

Be very careful before executing this method. Since it is the very purpose of the DeletedPerson concept for you to be able to reconstruct the information stored for a person even after that person has been deleted from the system, we highly recommend that you make yourself aligned with all the relevant departments in your company before you delete a DeletedPerson object.

Request

URI: /DeletedPersons ('<businessPartnerID>')

HTTP Method: *DELETE*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the DeletedPerson object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	technical ID of the DeletedPerson object	Path

Request Example

```
/DeletedPersons ('84c8c41dcf8e4e139ce03d337ee14f8a')
```

Response

Response Status and Error Codes

Code	Reason
204	DeletedPerson deleted successfully

Related Information

[DeletedPerson \[page 81\]](#)

[Delete a Person \[page 76\]](#)

2.3 Retrieving Enriched Person Data

Describes how to retrieve person and user data simultaneously

Whenever new tenants are to be onboarded to the SAP IoT platform, the responsible system administrator must usually handle a high number of data related to persons as well as system users for these persons. For example, when it comes to set up an administrative user interface for managing persons and users, the desire for a simultaneous access to both types of data arises. The standard "Read" methods of the basic entities in the data model cannot be used for this. Therefore, an additional type of "Read" methods has been implemented for certain services offering advanced filters, which, in combination with other services, help you fulfill the demand described above.

The following service methods are available for this use case:

- [Read all Matching Persons \[page 71\]](#)
- [Read all Matching Organizations \[page 43\]](#)
- [Read all Matching BPUserRelationships \[page 127\]](#)
- [Read all Matching Locations](#)

Usage Suggestions

Here is a collection of high-level examples of how you can proceed to implement a solution for the use case described above with the help of the enhanced read methods:

Retrieve enriched person data using an organization ID as a starting point

1. Get all PersonIDs for the Organization (`/BPRelationships?$filter=businessPartner1ID eq <OrgID> or businessPartner2ID eq <OrgID> and relationshipType eq com.sap.appcore:BUR010`)
2. Create an ID list from the result retrieved in (1)
3. Get all Person Details for IDs from the list created in (2) (`Persons?listFilterID=<ID1>,<ID2>,<ID3>...`)
4. Get all users for IDs from the list created in (2) (`BPUserRelationships?listFilterID=<ID1>,<ID2>,<ID3>...`)

Note

For performance reasons, we recommend having the system process the previous two calls in parallel.

5. Get all user groups assigned to the users retrieved in (4). To accomplish this, you need to send a call to the identity provider. Currently, a GET request for a single usergroup is available (`service/um/<USERNAME>`).

Retrieve enriched person data using a tenant as a starting point

1. Get all Person details for persons in tenant (`Persons?$filter=basicData/tenant eq <tenantName>`)
2. Create an ID list from the result retrieved in (1)
3. Get all users for the list created in (2) (`BPUserRelationships?listFilterID=<ID1>,<ID2>,<ID3>...`)
4. Get all user groups assigned to the users retrieved in (3). To accomplish this, you need to send a call to the identity provider. Currently, a GET request for a single usergroup is available (`service/um/<USERNAME>`).

Retrieve enriched person data using user group as a starting point

1. Get all users for a user group (POST service on endpoint `service/um` with body `{ "group_name": "UserGroupName" }`)
2. Create a user name list from the result retrieved in (1)
3. Get all IDs for the list created in (2) (`BPUserRelationships?listFilterUserName=<Name1>,<Name2>,<Name3> ...`)
4. Create an ID list from the result retrieved in (3)
5. Get all person details for IDs from the list created in (4) (`Persons?listFilterID=<ID1>,<ID2>,<ID3>...`)
6. Only if you need additional user groups: Get all user groups assigned to the users retrieved in (2). For this, the identity provider has to be called. Currently, a GET request for a single usergroup is available (`service/um/<USERNAME>`).

Related Information

[Tenant \[page 287\]](#)

[Organization \[page 32\]](#)

[Person \[page 59\]](#)

[BPUserRelationship \[page 120\]](#)

[Location](#)

2.4 BPRelationship

Describes the relationship between two business partners

A BPRelationship object describes the relationship of one business partner (organization or person) to another business partner. Here are some examples of relationships between business partners:

- A is employee of B
- A is customer of B
- A is supplier of B

To fully describe the relationship between two business partners, the following data needs to be submitted:

- both business partners
- type of the relationship
- flag indicating whether a relationship is the default relationship

It is possible to set up more than one relationship between two business partners. For example, it can easily happen that two companies are connected to each other in a way where both companies act in the role as a supplier **and** a customer at the same time, but with regard to different products or services. In that case, it may be relevant for certain use cases to decide which of these relationships is most relevant. To make this clear, use the `isDefault` flag.

Authorization

Write access to BPRelationship objects implies also changes to the business partner objects that are connected to each other via the relationship. These implicit changes are carried out automatically by the system. Therefore, for accessing a BPRelationship, a user needs the respective capabilities for the involved Person or Organization objects.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/BPRelationships`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/BPRelationships`

Payload

For GET and POST requests, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "relationshipID"      : { "type": "string", "maxLength": 32 },
  "tenant"              : { "type": "string", "maxLength": 36 },
  "businessPartner1ID"  : { "type": "string", "minLength": 32, "maxLength":
32, "required": true },
  "businessPartner2ID"  : { "type": "string", "minLength": 32, "maxLength":
32, "required": true },
  "relationshipType"     : { "type": "string", "maxLength": 50, "required":
true },
  "oneToTwoDescription" : { "type": "string", "maxLength": 60 },
  "twoToOneDescription" : { "type": "string", "maxLength": 60 },
  "isDefault"           : { "type": "integer", "maxLength": 1 }
}
```

Field Explanation

Name	Description
relationshipID	Unique identifier of the relationship (automatically generated by the system)
tenant	Tenant to which all involved objects belong
businessPartner1ID, businessPartner2ID	IDs of the two related business partners
relationshipType	Type of the relationship. The following relationship types are available: - com.sap.appcore: BUR010: Is Employee - com.sap.appcore: IOT001: Is Onboarding Organization - com.sap.appcore: BUR001: Is Contact Person
oneToTwoDescription, twoToOneDescription	Semantic description of the relationship (one for each business partner's perspective/read only)
isDefault	Indicates whether the relationship is the default relationship (in case additional relationships exist for the two business partners involved)

Methods

HTTP Method	Action	URI	Scopes
POST	Create a BPRelationship [page 93]	/BPRelationships	<bp>.c <bp>.tenant.r

HTTP Method	Action	URI	Scopes
GET	Read a BPRelationship [page 95]	/BPRelationships('<relationshipID>')	<bp>.r <bp>.tenant.r
GET	Read all BPRelationships [page 96]	/BPRelationships	<bp>.r <bp>.tenant.r
DELETE	Delete a BPRelationship [page 99]	/BPRelationships('<relationshipID>')	<bp>.d <bp>.tenant.r

Note

There is no method available for modifying the values of an already existing relationship. If changes are necessary, you can accomplish this by deleting the current relationship and create it anew with the changed field values.

Related Information

[Business Partner \[page 29\]](#)

[Organization \[page 32\]](#)

[Person \[page 59\]](#)

2.4.1 Create a BPRelationship

With this method, you create a new relationship between two business partners

To create a new relationship, you need to provide the IDs of the two business partners, the relationship type and an indication whether the new relationship is the default relationship for the two business partners. All of these data must be provided via the respective payload fields of this method.

Request

URI: /BPRelationships

HTTP Method: *POST*

Permissions:

<bp>.c

<bp>.tenant.r

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

None.

Request Example

```
/BPRelationships
```

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "relationshipID"      : { "type": "string", "maxLength": 32 },
  "tenant"             : { "type": "string", "maxLength": 36 },
  "businessPartner1ID" : { "type": "string", "minLength": 32, "maxLength":
32, "required": true },
  "businessPartner2ID" : { "type": "string", "minLength": 32, "maxLength":
32, "required": true },
  "relationshipType"    : { "type": "string", "maxLength": 50, "required":
true },
  "oneToTwoDescription" : { "type": "string", "maxLength": 60 },
  "twoToOneDescription" : { "type": "string", "maxLength": 60 },
  "isDefault"           : { "type": "integer", "maxLength": 1 }
}
```

Field Explanation

Name	Description
relationshipID	Unique identifier of the relationship
tenant	Tenant to which all involved objects belong
businessPartner1ID, businessPartner2ID	IDs of the two related business partners
relationshipType	Type of the relationship. The following relationship types are available: - com.sap.appcore: BUR010: Is Employee - com.sap.appcore: IOT001: Is Onboarding Organization - com.sap.appcore: BUR001: Is Contact Person
oneToTwoDescription, twoToOneDescription	Semantic description of the relationship (one for each business partner's perspective)

Name	Description
<code>isDefault</code>	Indicates whether the relationship is the default relationship (in case additional relationships exist for the business partners involved)

Response

Response Header Fields

Name	Description
<code>Location</code>	Path to the the newly created relationship

Response Status and Error Codes

Code	Description
201	Relationship created successfully

Related Information

[BPRelationship \[page 91\]](#)

2.4.2 Read a BPRelationship

Retrieves a specified relationship from the database

With this method, you send a request to the server to retrieve a particular BPRelationship object specified by its ID.

Request

URI: `/BPRelationships('<relationshipID>')`

HTTP Method: [GET](#)

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
relationships ipID	Yes	string	Technical identifier of the relationship	Path

Request Example

```
/BPRelationships('95bf365108dc49a78e9ce4c173e3acd6')
```

Response

Response Status and Error Codes

Code	Description
200	Relationship retrieved successfully

Related Information

[BPRelationship \[page 91\]](#)

2.4.3 Read all BPRelationships

Retrieves a list of relationships from the database

With this method, you send a request to the server to retrieve a subset of all BPRelationships, according to the filter criteria provided. For a collective request for a set of relationships, you have these options:

- You can restrict the set of relationships to be retrieved by filter criteria based on the business partners involved.
- You can define that the set of matching relationships shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

i Note

For this service method, the `$filter` parameter supports additional features compared to the same parameter available for most of the other services. You can combine several filter conditions with the help of the logical operators `AND` and `OR`. With that, you can search for a given business partner without having to know on which side of a relationship that business partner has been assigned. Also, it is possible to combine the search for a particular business partner with a restriction to a certain type of relationship (for example, "is employee of").

i Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/BPRelationships`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Name	Required	Data Type	Description
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set
<code>\$top</code>	No	integer	Number of records to include in the result set
<code>\$filter</code>	No	string	Filter condition to be applied; valid fields are <code>businessPartner1ID</code> , <code>businessPartner2ID</code> , and <code>relationshipType</code>
<code>\$count</code>	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

i Note

Although from a technical perspective all the query parameters listed above are **not** mandatory, we still recommend restricting the result set of elements.

i Note

If you want to use the restriction to a certain `relationshipType` in the filter condition, make sure that a restriction based on that field must be passed to the service either at the beginning or at the end of the entire filter condition. Any other position of this condition part will cause a parser error.

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
businessPartner1ID, businessPartner2ID, relationshipType	eq, ne

Request Example

```
/BPRelationships
```

Retrieves all relationships that are available in the database.

```
/BPRelationships?$top=25
```

Retrieves the first 25 relationships. Data is retrieved in page mode to reduce network load and response times.

```
/BPRelationships?$filter=businessPartner1ID eq '95bf365108dc49a78e9ce4c173e3acd6'
```

Retrieves all relationships where the business partner with the ID 95bf365108dc49a78e9ce4c173e3acd6 is mentioned as the first of the two involved business partners.

```
/BPRelationships?$filter=businessPartner1ID eq '95bf365108dc49a78e9ce4c173e3acd6'
or
'95bf365108dc49a78e9ce4c173e3acd6' and
                                businessPartner2ID eq
                                relationshipType eq 'com.sap.appcore:BUR010'
```

Retrieves all relationships where the business partner with the ID 95bf365108dc49a78e9ce4c173e3acd6 is assigned to either side of a relationship, as long as the relationship type is "is employee".

Response

Response Status and Error Codes

Code	Description
200	List of relationships retrieved successfully
400	Bad request (for example, invalid filter)
403	Forbidden (user not authorized to access relationships)

Related Information

[BPRelationship \[page 91\]](#)

2.4.4 Delete a BPRelationship

With this method, you delete a BPRelationship with the specified ID.

Deleting a relationship is always necessary when you plan to delete one of the two business partners that are connected via that relationship. Otherwise, the remaining business partner would continue to carry the information about being related to the now deleted business partner, thus bringing the system into an inconsistent state. There is no automatic cascading of delete information to the affected objects.

Request

URI: /BPRelationships('<relationshipID>')

HTTP Method: *DELETE*

Permissions:

<bp>.d

<bp>.tenant.r

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

None.

Request Example

```
/BPRelationships('95bf365108dc49a78e9ce4c173e3acd6')
```

Response

Response Status and Error Codes

Code	Description
204	Relationship deleted successfully

Related Information

[BPRelationship \[page 91\]](#)

2.4.5 DeletedBPRelationship

A DeletedBPRelationship object is a physical backup for a logically deleted BPRelationship object.

Whenever a user deletes a relationship between two business partners from an IoT scenario, this deletion is a logical rather than a physical deletion. That is, from a user's perspective, the deleted relationship is no longer available in the system and cannot be accessed anymore. However, in the background, the system takes several steps to ensure that the deleted relationship can still be restored, if need be. Here are some use cases where access to a previously deleted relationship may be required:

- Restoring a relationship that has accidentally been deleted
- Retrieving a relationship for auditing purposes
- Retrieving a relationship in the context of a lawsuit

Due to the special nature of the DeletedBPRelationship object, access to objects of this kind is limited to system administrators with special authorizations. Moreover, a DeletedBPRelationship object has a restricted set of methods that can be accessed via the SAP IoT API. For example, there is no Create method available, nor can it be modified. This is to make sure that a DeletedBPRelationship objects can only be created in the system according to certain predefined and hard-coded rules. These rules enforce that DeletedBPRelationship objects can only exist under well-defined circumstances laid down in legal frameworks that are relevant for operating an IoT scenario.

Write access to DeletedBPRelationship objects residing in a tenant other than the one to which a user is logged on is only allowed for users who are acting in the role of a cloud platform provider.

Base URI: /DeletedBPRelationship('<relationshipID>')

Permissions: <bp>.pd

Base URI:

- Formal description: `https://<server address>[:<port number>]/[<path>]/DeletedBPRelationships`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/DeletedBPRelationships`

Methods

HTTP Method	Action	URI	Scopes
GET	Read a DeletedBPRelationship [page 102]	/DeletedBPRelationships('<relationshipID>')	<bp>.pd
GET	Read all DeletedBPRelationships [page 103]	/DeletedBPRelationships	<bp>.pd

HTTP Method	Action	URI	Scopes
DELETE	Delete a DeletedBPRelationship [page 105]	/DeletedBPRelationships('<relationshipID>')	<bp>.pd

i Note

As already mentioned above, the DeletedBPRelationship object has neither a POST nor a PUT method:

- There is no way of explicitly creating a DeletedBPRelationship object by a method call via the interface. Instead, a DeletedBPRelationship object is created automatically by the system whenever a BPRelationship object is deleted.
- Once the system has created a DeletedBPRelationship object, there is no way of modifying its field values, neither explicitly nor implicitly. This is due to the strict legal requirements that are applicable in the use cases outlined above.

Payload

Only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "relationshipID"      : { "type": "string", "maxLength": 32 },
  "tenant"              : { "type": "string", "maxLength": 36 },
  "businessPartner1ID"  : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "businessPartner2ID"  : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "relationshipType"     : { "type": "string", "maxLength": 50, "required": true },
  "oneToTwoDescription" : { "type": "string", "maxLength": 60 },
  "twoToOneDescription" : { "type": "string", "maxLength": 60 },
  "isDefault"           : { "type": "integer", "maxLength": 1 }
}
```

Field Explanation

Name	Description
relationshipID	Unique identifier of the relationship (automatically generated by the system)
tenant	Tenant to which all involved objects belong
businessPartner1ID, businessPartner2ID	IDs of the two related business partners
relationshipType	Type of the relationship. The following relationship types are available: • com.sap.appcore: BUR010: Is Employee • com.sap.appcore: IOT001: Is Onboarding Organization • com.sap.appcore: BUR001: Is Contact Person

Name	Description
oneToTwoDescription, twoToOneDescription	Semantic description of the relationship (one for each business partner's perspective/read only)
isDefault	Indicates whether the relationship is the default relationship (in case additional relationships exist for the two business partners involved)

Related Information

[Read a DeletedBPRelationship \[page 102\]](#)

[Read all DeletedBPRelationships \[page 103\]](#)

[Delete a DeletedBPRelationship \[page 105\]](#)

2.4.5.1 Read a DeletedBPRelationship

Retrieves the specified DeletedBPRelationship object from the database

With this method, you send a request to the server to retrieve a particular DeletedBPRelationship object specified by its ID.

If the DeletedBPRelationship object is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: /DeletedBPRelationships('<relationshipID>')

HTTP Method: [GET](#)

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
If-Match	No	Check if cached version matches server version of the relationship

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	Technical ID of the DeletedBPRelationship object	Path

Request Example

```
/DeletedBPRelationships('9828317b1aee41e391aeb5cdd3b4fb6d')
```

Response

Format

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	DeletedBPRelationship retrieved successfully

Related Information

[DeletedBPRelationship \[page 100\]](#)

2.4.5.2 Read all DeletedBPRelationships

Retrieves a list of deleted relationships between business partners from the database

With this method, you send a request to the server to retrieve a subset of all deleted relationships between business partners (persons or organizations), according to the filter criteria provided. For a collective request for a set of deleted relationships, you have these options:

- You can define that the set of matching deleted relationships shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /DeletedBPRelationships

HTTP Method: *GET*

Permissions: <bp>.pd

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending order
\$filter	No	string	Filter condition to be applied; valid fields are businessPartner1ID, businessPartner2ID, and relationshipType
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
businessPartner1ID, businessPartner2ID, relationshipType	eq, ne

Request Example

```
/DeletedBPRElationships
```

Retrieves all deleted business partner relationships that are available in the database.

```
/DeletedBPRElationships?$top=25&$orderby='relationshipType'
```

Retrieves the first 25 deleted relationships. Data is retrieved in page mode to reduce network load and response times, and the retrieved deleted relationships are sorted by type.

```
/DeletedBPRElationships?$skip=10&$top=20
```

Retrieves 20 deleted relationships from the database where the first 10 deleted relationships are omitted. That is, the retrieved deleted relationships are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Deleted relationships retrieved successfully

Related Information

[DeletedBPRelationship \[page 100\]](#)

2.4.5.3 Delete a DeletedBPRelationship

With this method, you physically delete a relationship with the specified ID.

Although "deleting a deleted relationship" may sound strange at first glance, this is exactly the purpose of this method. The DeletedBPRelationship concept represents a relationship between business partners that has played an active part in the system in the past, but has been logically deleted. As opposed to the logical deletion of a BPRelationship object, deleting a DeletedBPRelationship object means:

- **explicit** physical deletion of the DeletedBPRelationship object, and
- **implicit** physical deletion of the BPRelationship object that is represented by the corresponding DeletedBPRelationship object

In other words, deleting a DeletedBPRelationship object is the ultimate and irreversible way of removing all information about a particular relationship from the system.

Note

Be very careful before executing this method. Since it is the very purpose of the DeletedBPRelationship concept for you to be able to reconstruct the information stored for a relationship even after that relationship has been deleted from the system, we highly recommend that you make yourself aligned with all the relevant departments in your company before you delete a DeletedBPRelationship object.

Request

URI: /DeletedBPRelationships('<relationshipID>')

HTTP Method: *DELETE*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the DeletedBPRelationship object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	technical ID of the DeletedBPRElationship object	Path

Request Example

```
/DeletedBPRElationships('9828317b1aee41e391aeb5cdd3b4fb6d')
```

Response

Response Status and Error Codes

Code	Reason
204	DeletedBPRElationship deleted successfully

Related Information

[DeletedBPRElationship \[page 100\]](#)

2.5 BPRole

Describes a business partner's role within the SAP IoT platform.

This service lets you assign or unassign a predefined role to a business partner (person as well as organization). One business partner can have any number of roles assigned. The role categories that are currently available fall into two groups:

- Cloud platform roles describe the roles that are relevant for operating the cloud platform that provides SAP IoT services.
- Business partner roles describe the roles of the business partners from a business perspective.

The authorization needed for BPRoles is derived from the authorization of the involved business partner. This means that the user needs to have the write capability on the business partner to assign or unassign a role. This is because the business partner is changed with those requests. Also, to see the assignment, the read capability for the business partner is required.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/BPRoles`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/BPRoles`

Payload

For PUT and GET requests, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "roleID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "roleCategory" : { "type": "string", "maxLength": 50, "required": true },
  "roleCategoryDescription": { "type": "string", "maxLength": 60, "readOnly": true }
}
```

Field Explanation

Name	Description
roleID	Unique identifier of the role (automatically defined by the system)
businessPartnerID	Business partner to which the role is assigned
roleCategory	Coded type of the role. The following role categories are available: - com.sap.appcore:CLD001 - com.sap.appcore:CLD002 - com.sap.appcore:CLD003 - com.sap.appcore:BUP000 - com.sap.appcore:BUP001 - com.sap.appcore:BUP003
roleCategoryDescription	Semantic description of the role category - Cloud Platform Provider - Cloud Platform Consumer - Cloud Platform Sub-Consumer - Vendor - Contact Person - Employee

Methods

HTTP Method	Action	URI	Scopes
POST	Create a BPRole [page 108]	/BPRoles	<bp>.c <bp>.tenant.r

HTTP Method	Action	URI	Scopes
<i>GET</i>	Read a BPRole [page 110]	<code>/BPRoles ('<roleID>')</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read all BPRoles [page 112]	<code>/BPRoles</code>	<code><bp>.r</code> <code><bp>.tenant.r</code>
<i>DELETE</i>	Delete a BPRole [page 113]	<code>/BPRoles ('<roleID>')</code>	<code><bp>.d</code> <code><bp>.tenant.r</code>

i Note

There is no method available for modifying the values of an already existing role assignment. If changes are necessary, you can accomplish this by deleting the current role assignment and create it anew with the changed field values.

Related Information

[Business Partner \[page 29\]](#)

[Organization \[page 32\]](#)

[Person \[page 59\]](#)

2.5.1 Create a BPRole

With this method, you create a new role assignment for a business partner

To create a new role assignment, you need to provide the ID of the business partner and the technical ID of the desired role category. This data must be provided via the respective payload fields of this method.

Request

URI: `/BPRoles`

HTTP Method: *POST*

Permissions:

`<bp>.c`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

None.

Request Example

```
/BPRoles
```

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "roleID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "roleCategory" : { "type": "string", "maxLength": 50, "required": true },
  "roleCategoryDescription": { "type": "string", "maxLength": 60, "readOnly": true }
}
```

Field Explanation

Name	Description
roleID	Unique identifier of the role (automatically defined by the system)
businessPartnerID	Business partner to which the role is assigned
roleCategory	Coded type of the role. The following role categories are available: - com.sap.appcore:CLD001 - com.sap.appcore:CLD002 - com.sap.appcore:CLD003 - com.sap.appcore:BUP000 - com.sap.appcore:BUP001 - com.sap.appcore:BUP003

Name	Description
roleCategoryDescription	Semantic description of the role category (inserted automatically by the system) • Cloud Platform Provider • Cloud Platform Consumer • Cloud Platform Sub-Consumer • Vendor • Contact Person • Employee

Response

Response Header Fields

Name	Description
Location	Path to the the newly created role

Response Status and Error Codes

Code	Description
201	Role assigned successfully

Related Information

[BPRole \[page 106\]](#)

2.5.2 Read a BPRole

Retrieves a specified business partner role assignment from the database

With this method, you send a request to the server to retrieve a particular BPRole object specified by its ID.

Request

URI: `/BPRoles('<roleID>')`

HTTP Method: [GET](#)

Permissions:

<bp>.r

<bp>.tenant.r

Query String Parameters

Name	Required	Data Type	Description	Parameter Type
roleID	Yes	string	Technical identifier of the role assignment	Path

Request Example

```
/BPRoles('2CED0EAF62B4140A61F1404C2C5FBA9')
```

Response

Response Status and Error Codes

Code	Description
200	Role assignment retrieved successfully

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "roleID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "roleCategory" : { "type": "string", "maxLength": 50, "required": true },
  "roleCategoryDescription": { "type": "string", "maxLength": 60, "readOnly": true }
}
```

Related Information

[BPRole \[page 106\]](#)

2.5.3 Read all BPRoles

Retrieves a list of role assignments from the database

With this method, you send a request to the server to retrieve a subset of all BPRoles, according to the filter criteria provided. For a collective request for a set of roles, you have these options:

- You can restrict the set of roles to be retrieved by filter criteria based on the business partner involved. In fact, defining filter criteria is mandatory. The system does not accept an unrestricted request for a list of all business partner roles in the database.
- You can define that the set of matching roles shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

i Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/BPRoles`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Name	Required	Data Type	Description
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set
<code>\$top</code>	No	integer	Number of records to include in the result set
<code>\$filter</code>	Yes	string	Filter condition to be applied; valid field: <code>businessPartnerID</code>
<code>\$count</code>	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
businessPartnerID	eq, ne

Request Example

```
/BPRoles
```

Retrieves all roles that are available in the database. Note that this unrestricted request is not supported due to unacceptable system load.

```
/BPRoles?$top=5&$filter=businessPartnerID eq 'd45add8e7f343588e4a504a3a2fcc70'
```

Retrieves the first 5 role assignments for the specified business partner.

```
/BPRoles?$filter=businessPartnerID eq 'd45add8e7f343588e4a504a3a2fcc70'
```

Retrieves all role assignments for business partner with ID 'd45add8e7f343588e4a504a3a2fcc70'.

Response

Response Status and Error Codes

Code	Description
200	Role assignments retrieved successfully

Related Information

[BPRole \[page 106\]](#)

2.5.4 Delete a BPRole

With this method, you delete a BPRole object with the specified ID.

From a business perspective, it is normally not desired to have a business partner without role information in the system. Therefore, we recommend ensuring that each business partner has at least one role assigned.

Request

URI: `/BPRoles('<roleID>')`

HTTP Method: `DELETE`

Permissions:

<bp>.d

<bp>.tenant.r

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
roleID	Yes	string	Technical identifier of the role	Path

Request Example

```
/BPRoles('2CED0EAF62B4140A61F1404C2C5FBA9')
```

Response

Response Status and Error Codes

Code	Description
204	Role assignment deleted successfully

Related Information

[BPRole \[page 106\]](#)

[DeletedBPRole \[page 114\]](#)

2.5.5 DeletedBPRole

A DeletedBPRole object is a physical backup for a logically deleted DeletedBPRole object.

Whenever a user deletes a business partner role, this deletion is a logical rather than a physical deletion. That is, from a user's perspective, the deleted role is no longer available in the system and cannot be accessed anymore. However, in the background, the system takes several steps to ensure that the deleted role can still be restored, if need be. Here are some use cases where access to a previously deleted role may be required:

- Restoring a role that has accidentally been deleted
- Retrieving a role for auditing purposes

- Retrieving a role in the context of a lawsuit

Due to the special nature of the `DeletedBPRole` object, access to objects of this kind is limited to system administrators with special authorizations. Moreover, a `DeletedBPRole` object has a restricted set of methods that can be accessed via the SAP IoT API. For example, there is no `Create` method available, nor can it be modified. This is to make sure that a `DeletedBPRole` object can only be created in the system according to certain predefined and hard-coded rules. These rules enforce that `DeletedBPRole` objects can only exist under well-defined circumstances laid down in legal frameworks that are relevant for operating an IoT scenario.

Write access to `DeletedBPRole` objects residing in a tenant other than the one to which a user is logged on is only allowed for users who are acting in the role of a cloud platform provider.

Base URI:

- Formal description: `https://<server address>[:<port number>]/<path>/DeletedBPRoles`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/DeletedBPRoles`

Permissions: `<bp>.pd`

Methods

HTTP Method	Action	URI	Scopes
<i>GET</i>	Read a DeletedBPRole [page 117]	<code>/DeletedBPRoles('<roleID>')</code>	<code><bp>.pd</code>
<i>GET</i>	Read all DeletedBPRoles [page 118]	<code>/DeletedBPRoles</code>	<code><bp>.pd</code>
<i>DELETE</i>	Delete a DeletedBPRole [page 119]	<code>/DeletedBPRoles('<roleID>')</code>	<code><bp>.pd</code>

i Note

As already mentioned above, the `DeletedBPRole` object has neither a `POST` nor a `PUT` method:

- There is no way of explicitly creating a `DeletedBPRole` object by a method call via the interface. Instead, a `DeletedBPRole` object is created automatically by the system whenever a `BPRole` object is deleted.
- Once the system has created a `DeletedBPRole` object, there is no way of modifying its field values, neither explicitly nor implicitly. This is due to the strict legal requirements that are applicable in the use cases outlined above.

Payload

For PUT and GET requests, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "roleID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32, "required": true },
  "roleCategory" : { "type": "string", "maxLength": 50, "required": true },
  "roleCategoryDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
}
```

Field Explanation

Name	Description
roleID	Unique identifier of the role (automatically defined by the system)
businessPartnerID	Business partner to which the role is assigned
roleCategory	Coded type of the role. The following role categories are available: - com.sap.appcore:CLD001 - com.sap.appcore:CLD002 - com.sap.appcore:CLD003 - com.sap.appcore:BUP000 - com.sap.appcore:BUP001 - com.sap.appcore:BUP003
roleCategoryDescription	Semantic description of the role category - Cloud Platform Provider - Cloud Platform Consumer - Cloud Platform Sub-Consumer - Vendor - Contact Person - Employee

Related Information

[BPRole \[page 106\]](#)

[Delete a BPRole \[page 113\]](#)

2.5.5.1 Read a DeletedBPRole

Retrieves the specified DeletedBPRole object from the database

With this method, you send a request to the server to retrieve a particular DeletedBPRole object specified by its ID.

If the DeletedBPRole object is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: /DeletedBPRoles('<roleID>')

HTTP Method: *GET*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
If-Match	No	Check if cached version matches server version of the role

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
roleID	Yes	string	Technical ID of the DeletedBPRole object	Path

Request Example

```
/DeletedBPRoles('a325e746f0e749f38d3a451525a09a13')
```

Response

Format

Format: *JSON*

Response Status and Error Codes

Code	Reason
200	DeletedBPRole retrieved successfully

Related Information

[DeletedBPRole \[page 114\]](#)

2.5.5.2 Read all DeletedBPRoles

Retrieves a list of deleted business partner roles from the database

With this method, you send a request to the server to retrieve a subset of all deleted business partner roles, according to the filter criteria provided. For a collective request for a set of deleted roles, you have these options:

- You can define that the set of matching deleted roles shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /DeletedBPRoles

HTTP Method: *GET*

Permissions: <bp>.pd

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending order
\$filter	Yes	string	Filter condition to be applied; valid field: businessPartnerID
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
businessPartnerID	eq, ne

Request Example

```
/DeletedBPRoles
```

Retrieves all deleted business partner roles that are available in the database.

```
/DeletedBPRoles?$top=25&$orderby='roleID'
```

Retrieves the first 25 deleted roles. Data is retrieved in page mode to reduce network load and response times, and the retrieved deleted roles are sorted by their ID.

```
/DeletedBPRoles?$skip=10&$top=20
```

Retrieves 20 deleted roles from the database where the first 10 deleted roles are omitted. That is, the retrieved deleted roles are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Deleted roles retrieved successfully

Related Information

[DeletedBPRole \[page 114\]](#)

2.5.5.3 Delete a DeletedBPRole

With this method, you physically delete a role with the specified ID.

Although "deleting a deleted role" may sound strange at first glance, this is exactly the purpose of this method. The DeletedBPRole concept represents a business partner role that has played an active part in the system in the past, but has been logically deleted. As opposed to the logical deletion of a BPRole object, deleting a DeletedBPRole object means:

- **explicit** physical deletion of the DeletedBPRole object, and
- **implicit** physical deletion of the BPRole object that is represented by the corresponding DeletedBPRole object

In other words, deleting a DeletedBPRole object is the ultimate and irreversible way of removing all information about a particular role from the system.

Note

Be very careful before executing this method. Since it is the very purpose of the DeletedBPRole concept for you to be able to reconstruct the information stored for a role even after that role has been deleted from the system, we highly recommend that you make yourself aligned with all the relevant departments in your company before you delete a DeletedBPRole object.

Request

URI: /DeletedBPRoles('<roleID>')

HTTP Method: *DELETE*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the DeletedBPRole object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
roleID	Yes	string	technical ID of the DeletedBPRole object	Path

Request Example

```
/DeletedBPRoles('a325e746f0e749f38d3a451525a09a13')
```

Response

Response Status and Error Codes

Code	Reason
204	DeletedBPRole deleted successfully

Related Information

[DeletedBPRole \[page 114\]](#)

2.6 BPUserRelationship

Describes the relationship of a user to a business partner

A BPUserRelationship object describes the relationship between a user and a business partner. While the concept of the business partner deals with the business-oriented perspective on an actor in a particular

business scenario, the user is a technical entity that is needed for a business partner to actually log on to the SAP IoT platform. Although the business partner concept comprises both organizations as well as persons, a user is normally associated only with business partners of type person.

To fully define the relationship between a user and a business partner, the user ID and the business partner ID must be provided. The technical ID of the relationship itself is automatically calculated and assigned by the system upon creation.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/BPUserRelationships`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/BPUserRelationships`

Payload

For POST and GET, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "relationshipID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32,
    "required": true },
  "userNameID" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": true }
}
```

Field Explanation

Name	Description
relationshipID	Unique identifier of the relationship (automatically defined by the system)
businessPartnerID	Business partner to which the user is related
userNameID	User to which the business partner is related

Methods

HTTP Method	Action	URI	Scope
POST	Create a BPUserRelationship [page 122]	/BPUserRelationships	<bp>.c <bp>.tenant.r
GET	Read a BPUserRelationship [page 124]	/BPUserRelationships('<relationshipID>')	<bp>.r <bp>.tenant.r

HTTP Method	Action	URI	Scope
<i>GET</i>	Read all BPUserRelationships [page 125]	/BPUserRelationships	<bp>.r <bp>.tenant.r
<i>GET</i>	Read all Matching BPUserRelationships [page 127]	/BPUserRelationships	<bp>.r <bp>.tenant.r
<i>DELETE</i>	Delete a BPUserRelationship [page 129]	/BPUserRelationships('<relationshipID>')	<bp>.d <bp>.tenant.r

Note

There is no method available for modifying the values of an already existing relationship between a business partner and a user. If changes are necessary, you can accomplish this by deleting the current relationship and create it anew with the changed field values.

Related Information

[Business Partner \[page 29\]](#)

[Person \[page 59\]](#)

2.6.1 Create a BPUserRelationship

With this method, you create a new relationship between business partner and a user

To create a new relationship, you need to provide the IDs of the business partner and the user. This data must be provided via the respective payload fields of this method.

Request

URI: /BPUserRelationships

HTTP Method: *POST*

Permissions:

<bp>.c

<bp>.tenant.r

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

None.

Request Example

```
/BPUserRelationships
```

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "relationshipID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32,
    "required": true },
  "userNameID" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": true }
}
```

Response

Response Header Fields

Name	Description
Location	Path to the the newly created relationship

Response Status and Error Codes

Code	Description
201	Relationship created successfully

Related Information

[BPUserRelationship](#) [page 120]

2.6.2 Read a BPUserRelationship

Retrieves a specified relationship from the database

With this method, you send a request to the server to retrieve a particular BPUserRelationship object specified by its ID.

Request

URI: /BPUserRelationships('<relationshipID>')

HTTP Method: *GET*

Permissions:

<bp>.r

<bp>.tenant.r

Query String Parameters

Name	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	Technical identifier of the relationship	Path

Request Example

```
/BPUserRelationship('2CED0EAFC62B4140A61F1404C2C5FBA9')
```

Response

Response Status and Error Codes

Code	Description
200	Relationship retrieved successfully

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "relationshipID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32,
    "required": true },
  "userID" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": true }
```

```
}
```

Related Information

[BPUserRelationship](#) [page 120]

2.6.3 Read all BPUserRelationships

Retrieves a list of relationships between users and business partners from the database

With this method, you send a request to the server to retrieve a subset of all BPUserRelationships, according to the filter criteria provided. For a collective request for a set of user relationships, you have these options:

- You can restrict the set of relationships to be retrieved by filter criteria based on the business partner or the user.
- You can define that the set of matching relationships shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/BPUserRelationships`

HTTP Method: `GET`

Permissions:

`<bp>.r`

`<bp>.tenant.r`

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$filter	No	string	Filter condition to be applied; valid fields are <code>businessPartnerID</code> and <code>userNameID</code>
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Note

Although from a technical perspective all the query parameters listed above are **not** mandatory, we still recommend restricting the result set of elements.

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
<code>businessPartnerID</code> , <code>userNameID</code>	<code>eq</code> , <code>ne</code>

Request Example

```
/BPUserRelationships
```

Retrieves all relationships that are available in the database.

```
/BPUserRelationships?$top=25
```

Retrieves the first 25 relationships. Data is retrieved in page mode to reduce network load and response times.

```
/BPUserRelationships?$filter=businessPartnerID eq  
'8ab31cdfel1a44ee0a33cc2cae9d2c27f'
```

Retrieves all relationships for business partner `8ab31cdfel1a44ee0a33cc2cae9d2c27f`.

Response

Response Status and Error Codes

Code	Description
200	Relationships retrieved successfully

Related Information

[BPUserRelationship](#) [page 120]

2.6.4 Read all Matching BPUserRelationships

Retrieves a list of BPUserRelationship objects matching the filter criteria provided

With this method, you send a request to the server to retrieve a subset of all relationships between business partners and users, according to the filter criteria provided. This method offers an advanced filter functionality that goes beyond the standard filters used for collective requests of most of the other services available in the SAP IoT platform. Here, you can choose between two different approaches to define a filter criterion:

- A comma-separated list of individual person IDs
- A comma-separated list of individual user names

The method then returns a collection of data sets for each element specified in the request. This method is especially useful for all kinds of administrative tasks dealing with the relationship between onboarded persons and users. For example, you could set up a list of persons and find out which of these persons has no user assigned yet.

Request

URI: /BPUserRelationships

HTTP Method: [GET](#)

Permissions:

<bp>.r

<bp>.tenant.r

Query String Parameters

Parameter	Required	Data Type	Description
listFilterID	No	string	comma-separated list of IDs referring to the businessPartnerID attribute of a Person
listFilterUserName	No	string	comma-separated list of IDs referring to the userNameID attribute of a BPUserRelationship

Request Example

```
/BPUserRelationships?  
listFilterID=adbb2c0fdb0a4b9e99327a52c41fc720,adbb2c0fdb0a4b9e99327a52c41fc721,ad  
bb2c0fdb0a4b9e99327a52c41fc722
```

Retrieves three `BPUserRelationship` objects with the specified person IDs from the database. This lets you determine the user names that have been assigned to these persons.

```
/BPUserRelationships?listFilterUserName=user01,user02,user47
```

Retrieves three `BPUserRelationship` objects with the specified user names from the database. This lets you determine the persons to which these users have been assigned.

Response

Response Status and Error Codes

Code	Description
200	List of relationships retrieved successfully
400	Bad request (for example, invalid filter)
403	Forbidden (user not authorized to access relationships)

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method is an array of multiple occurrences of the following structure (one for each retrieved relationship):

```
{
  "relationshipID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32,
    "required": true },
  "userNameID" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": true }
}
```

Related Information

[BPUserRelationship \[page 120\]](#)

2.6.5 Delete a BPUserRelationship

With this method, you disconnect a business partner from its user

As a consequence of disconnecting a business partner from its user, that business partner can no longer access objects for which he or she has been granted any access rights based on the UserGroup to which the user belongs.

Request

URI: /BPUserRelationships('<relationshipID>')

HTTP Method: *DELETE*

Permissions:

<bp>.d

<bp>.tenant.r

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token

Query String Parameters

Name	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	Technical identifier of the relationship	Path

Request Example

```
/BPUserRelationship('2CED0EAF62B4140A61F1404C2C5FBA9')
```

Response

Response Status and Error Codes

Code	Description
204	Relationship deleted successfully

Related Information

[BPUserRelationship \[page 120\]](#)

[DeletedBPUserRelationship \[page 130\]](#)

2.6.6 DeletedBPUserRelationship

A `DeletedBPUserRelationship` object is a physical backup for a logically deleted `BPUserRelationship` object.

Whenever a user deletes a relationship between a business partner and a user object as defined by the identity provider service from an IoT scenario, this deletion is a logical rather than a physical deletion. That is, from a user's perspective, the deleted relationship is no longer available in the system and cannot be accessed anymore. However, in the background, the system takes several steps to ensure that the deleted relationship can still be restored, if need be. Here are some use cases where access to a previously deleted relationship may be required:

- Restoring a relationship that has accidentally been deleted
- Retrieving a relationship for auditing purposes
- Retrieving a relationship in the context of a lawsuit

Due to the special nature of the `DeletedBPUserRelationship` object, access to objects of this kind is limited to system administrators with special authorizations. Moreover, a `DeletedBPUserRelationship` object has a restricted set of methods that can be accessed via the SAP IoT API. For example, there is no `Create` method available, nor can it be modified. This is to make sure that a `DeletedBPUserRelationship` objects can only be created in the system according to certain predefined and hard-coded rules. These rules enforce that `DeletedBPUserRelationship` objects can only exist under well-defined circumstances laid down in legal frameworks that are relevant for operating an IoT scenario.

Write access to `DeletedBPUserRelationship` objects residing in a tenant other than the one to which a user is logged on is only allowed for users who are acting in the role of a cloud platform provider.

Base URI:

- Formal description: `https://<server address>[:<port number>]/[<path>]/DeletedBPUserRelationships`
- Example for a base URI in a cloud foundry environment: `https://business-partner.cfapps.eu10.hana.ondemand.com/DeletedBPUserRelationships`

Permissions: `<bp>.pd`

Methods

HTTP Method	Action	URI	Scopes
<i>GET</i>	Read a DeletedBPUserRelationship [page 132]	/DeletedBPUserRelationships('<relationshipID>')	<bp>.pd
<i>GET</i>	Read all DeletedBPUserRelationships [page 133]	/DeletedBPUserRelationships()	<bp>.pd
<i>DELETE</i>	Delete a DeletedBPUserRelationship [page 134]	/DeletedBPUserRelationships('<relationshipID>')	<bp>.pd

i Note

As already mentioned above, the DeletedBPUserRelationship object has neither a POST nor a PUT method:

- There is no way of explicitly creating a DeletedBPUserRelationship object by a method call via the interface. Instead, a DeletedBPUserRelationship object is created automatically by the system whenever a BPUserRelationship object is deleted.
- Once the system has created a DeletedBPUserRelationship object, there is no way of modifying its field values, neither explicitly nor implicitly. This is due to the strict legal requirements that are applicable in the use cases outlined above.

Payload

Only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "relationshipID" : { "type": "string", "maxLength": 32 },
  "businessPartnerID" : { "type": "string", "minLength": 32, "maxLength": 32,
    "required": true },
  "userNameID" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": true }
}
```

Field Explanation

Name	Description
relationshipID	Unique identifier of the relationship (automatically defined by the system)
businessPartnerID	Business partner to which the user is related
userNameID	User to which the business partner is related

Related Information

[BPUserRelationship \[page 120\]](#)

[Delete a BPUserRelationship \[page 129\]](#)

2.6.6.1 Read a DeletedBPUserRelationship

Retrieves the specified DeletedBPUserRelationship object from the database

With this method, you send a request to the server to retrieve a particular DeletedBPUserRelationship object specified by its ID.

If the DeletedBPUserRelationship object is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: `/DeletedBPUserRelationships('<relationshipID>')`

HTTP Method: [GET](#)

Permissions: `<bp>.pd`

Request Header Fields

Name	Required	Description
If-Match	No	Check if cached version matches server version of the relationship

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	Technical ID of the DeletedBPUser-Relationship object	Path

Request Example

```
/DeletedBPUserRelationships('b474687b75de4afa97d7bc92f79c3531')
```

Response

Format

Format: [JSON](#)

Response Status and Error Codes

Code	Reason
200	DeletedBPUserRelationship retrieved successfully

Related Information

[DeletedBPUserRelationship \[page 130\]](#)

2.6.6.2 Read all DeletedBPUserRelationships

Retrieves a list of deleted relationships between business partners and system users from the database

With this method, you send a request to the server to retrieve a subset of all deleted relationships between business partners (persons or organizations) and system users provided by the identity provider service, according to the filter criteria provided. For a collective request for a set of deleted relationships, you have these options:

- You can define that the set of matching deleted relationships shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /DeletedBPUserRelationships

HTTP Method: [GET](#)

Permissions: <bp>.pd

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending order
\$filter	No	string	Filter condition to be applied; valid fields are businessPartnerID and userNameID
\$count	No	integer	Returns the number of entries in the database, with filter conditions taken into account (if applicable)

Allowed Combinations of Fields and Operators in Filter Conditions

Fields	Operators
businessPartnerID, userNameID	eq, ne

Request Example

```
/DeletedBPUserRelationships
```

Retrieves all deleted relationships between business partner and users that are available in the database.

```
/DeletedBPUserRelationships?$top=25&$orderby='userID'
```

Retrieves the first 25 deleted relationships. Data is retrieved in page mode to reduce network load and response times, and the retrieved deleted relationships are sorted by the ID of the identity provider user.

```
/DeletedBPUserRelationships?$skip=10&$top=20
```

Retrieves 20 deleted relationships from the database where the first 10 deleted relationships are omitted. That is, the retrieved deleted relationships are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Deleted relationships retrieved successfully

Related Information

[DeletedBPUserRelationship](#) [page 130]

2.6.6.3 Delete a DeletedBPUserRelationship

With this method, you physically delete a relationship with the specified ID.

Although "deleting a deleted relationship" may sound strange at first glance, this is exactly the purpose of this method. The DeletedBPUserRelationship concept represents a relationship between business partners that has played an active part in the system in the past, but has been logically deleted. As opposed to the logical deletion of a BPUserRelationship object, deleting a DeletedBPUserRelationship object means:

- **explicit** physical deletion of the DeletedBPUserRelationship object, and
- **implicit** physical deletion of the BPUserRelationship object that is represented by the corresponding DeletedBPUserRelationship object

In other words, deleting a DeletedBPUserRelationship object is the ultimate and irreversible way of removing all information about a particular relationship from the system.

Note

Be very careful before executing this method. Since it is the very purpose of the DeletedBPUserRelationship concept for you to be able to reconstruct the information stored for a relationship even after that relationship has been deleted from the system, we highly recommend that you make yourself aligned with all the relevant departments in your company before you delete a DeletedBPUserRelationship object.

Request

URI: /DeletedBPUserRelationships('<relationshipID>')

HTTP Method: *DELETE*

Permissions: <bp>.pd

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the DeletedBPUserRelationship object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
relationshipID	Yes	string	technical ID of the DeletedBPUserRelationship object	Path

Request Example

```
/DeletedBPUserRelationships('b474687b75de4afa97d7bc92f79c3531')
```

Response

Response Status and Error Codes

Code	Reason
204	DeletedBPUserRelationship deleted successfully

Related Information

[DeletedBPUserRelationship \[page 130\]](#)

3 Geolocation

A Geolocation is a geographical location of a device or an object.

The Geolocation services enable you to locate a specific object or device based on the geographical coordinates. A Geolocation has the following attributes:

- Geo-coordinates representing a point or an area
- Space representing Geolocation metadata

Geolocation services provide two types of Geolocations:

- Point of Interest (POI)
- Area of Interest (AOI)

Point of Interest (POI)

A POI represents a geographical location on a map that can be associated to a Thing or to other business data, for example, Business Partner. A Point of Interest is a geographical location represented in terms of longitude and latitude. A Point of Interest can be a dealer location, store, building, etc.

You can use this data in a map by adding it as a point of interest layer, or by creating a map filter to shortlist the locations within the vicinity of another point of interest in the map.

Area of Interest (AOI)

An AOI represents a geographical region on a map that can be used to analyze the Things or other business data, for example, Business Partner. You can use the geolocation services to analyze with reference to business data. An Area of Interest contains an array of coordinates, which is a polygon (three or more points). An Area of Interest can be a factory site, service center, highway, shipyard, etc.

3.1 Managing Geolocation Semantics

It provides you with information about the various operations that you can perform using geolocation semantics such as Spaces, Geometry types, GeoTest, Space Hierarchies, Location Hierarchies, and Locales.

A Geolocation can be represented in the form of a point or polygon using the geo-coordinates represented by longitude and latitude. You must add a space to a geolocation in order to define the GeoLocation geometry and enable the categorization and tagging of the related location accurately. Therefore, you must perform the following:

- Add a space to the geolocation.
- Define the geometry of the geolocation.
- Enable the categorization and tagging of the related location.

For example, Asia, India, Bangalore, Coffee Day Whitefield, Café 5.

Example Geolocation and Space

Geolocation	Space
Asia	Continent
India	Country
Bangalore	City
Coffee Day Whitefield	Café
Café 5	Canteen

Related Information

[Geolocation Spaces \[page 141\]](#)

[Geometry Types \[page 139\]](#)

[Locales \[page 138\]](#)

[Managing Geolocations \[page 150\]](#)

3.2 Locales

It provides you with information about the various operations that you can perform using the locale descriptions.

Internationalization

Geolocation services support only geolocation descriptions or texts. If no language is selected, then by default the the locales are retrieved in English language.

Localization

Geolocation services support only geolocation descriptions or texts. If no language is selected, then by default the locales are retrieved in English language.

3.2.1 Retrieve the list of Localized descriptions

This method allows you to retrieve the list of locale descriptions or texts in the geolocations service. It supports only geolocation descriptions. If no language is selected, then by default the locales are retrieved in English language.

Base URI: `https://<server address>/geolocation/v1/Locales`

Request

URI: /geolocation/v1/Locales

HTTP: *GET*

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

None

Request Example

```
/geolocation/v1/Locales
```

Response

Format: **JSON**

Sample Response:

≡ Output Code

```
[
  {
    "Code": "string",
    "Language": "string"
  }
]
```

Response Status and Error Codes

Code	Description
200	Retrieved the list of locales successfully

3.3 Geometry Types

It provides you with the information on the various operations that you can perform using geometry types.

The Geolocation services support two types of geometries:

- Point of Interest (POI) - The geographical point that you select on the map in Longitude and Latitude.
- Area of Interest (AOI) - The geographical region that you select on the map should be a Polygon, which is three or more points (an array of coordinates).

Related Information

[Retrieve the list of Geometry types \[page 140\]](#)

3.3.1 Retrieve the list of Geometry types

This method allows you to retrieve the list of geometry types in the geolocation service.

Base URI: `https://<server address>/geolocation/v1/Geometries`

Request

URI: `/geolocation/v1/Geometries`

HTTP: *GET*

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

None

Request Example

```
/geolocation/v1/Geometries
```

Response

Format: **JSON**

Sample Response:

≡ Output Code

```
[
  {
    "Type": "string"
  }
]
```

Code	Description
200	Retrieved the list of geometry types successfully

3.4 Geolocation Spaces

A Geolocation Space represents the semantics such as geometry, related geolocations, and hierarchy of a geolocation. A geolocation space should be assigned to a geolocation. For example, a Manufacturing Plant as a geolocation space can be associated to a location Xyz Manufacturing Plant, Mumbai, India. A geolocation space is represented by a unique label and a geometry type. The geolocation services allow you to list the geolocations associated with a geolocation space. You can also see the various operations that you can perform using geolocation spaces.

Resource Path: `http://<server address>/geolocation/v1/Spaces`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
<i>POST</i>	Create a Space [page 141]	<code>/geolocation/v1/Spaces</code>	<code><geoloca- tion>.c</code>
<i>GET</i>	Retrieve the list of Spaces [page 144]	<code>/geolocation/v1/Spaces</code>	<code><geolocation>.r</code>
<i>GET</i>	Retrieve a Space [page 146]	<code>/geolocation/v1/Spaces/{SpaceId}</code>	<code><geolocation>.r</code>
<i>PUT</i>	Update a Space [page 148]	<code>/geolocation/v1/Spaces/{SpaceId}</code>	<code><geoloca- tion>.u</code>
<i>DELETE</i>	Delete a Space [page 149]	<code>/geolocation/v1/Spaces/{SpaceId}</code>	<code><geoloca- tion>.d</code>

3.4.1 Create a Space

This method allows you to create a geolocation space. A space is associated to a geometry, which can be a point or polygon. The geolocations of a specific geometry can be associated only to those spaces of the respective geometries.

Base URI: `https://<server address>/geolocation/v1/Spaces`

Request

URI: /geolocation/v1/Spaces

HTTP: *POST*

Roles Required: Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

None.

Request Example

```
/geolocation/v1/Spaces
```

Payload

Format: JSON

i Note

JSON is the only media type that is supported.

Request Properties

Name	Data Type	Required	Maximum Length	Description
Space Name	string	Yes	100	The unique name of the geolocation space.
Descriptions	array	No	-	The description of the geolocation space.
Geometry Type	string	No	30	The geometry type of the geolocation space. For example, Point or Polygon.
ParentSpaceId	string	No	36	The parent space ID.

Descriptions

Name	Data Type	Required	Maximum Length	Description
Label	string	Yes	200	The label name of the geolocation space.
Locale	string	Yes	2	The locale of the geolocation space. For example, EN.

Geometry

Name	Data Type	Required	Maximum Length	Description
Type	string	Yes	20	The geometry type of the geolocation space. For example, Point or Polygon.

The JSON for this method has the following structure:

Code Syntax

```
[
  {
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "Geometry": {
      "Type": "string"
    },
    "ParentSpaceId": "string",
    "SpaceName": "string"
  }
]
```

Response

Response Status and Error Codes

Code	Description
201	New resource is returned in Location header
400	Invalid request. Wrong format or structure of the provided request body
403	Access denied. You did not have the required permissions to access the resource.
409	Conflict. Geolocation space already exists.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.4.2 Retrieve the list of Spaces

This method allows you to retrieve the list of geolocation spaces. You can filter or categorize the spaces by using geometry, name, or parent ID. This method also lets you filter geolocations by using multiple IDs. The geolocation spaces are pagination enabled by default.

Base URI: `https://<server address>/geolocation/v1/Spaces`

Request

URI: `/geolocation/v1/Spaces`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
\$skip	Optional	integer	The number of entities to be skipped. The default value is 0.
\$top	Optional	integer	The number of entities to be returned. The default value is 10.
SpaceName	Optional	string	The name of the geolocation space to be returned.
Geometry	Optional	string	The geometry name of the geolocation space to be returned.
ParentSpaceId	Optional	string	The Parent Space ID to be returned.
Note To filter root spaces, i.e., the spaces which do not have a parent, you have to search with the ParentSpaceId value as None.			
SpaceId	Optional	array[string]	The Space ID to be returned. It supports multiple IDs.

Name	Required	Data Type	Description
OrderBy	Optional	string	The property on which ordering can be applied. Currently, only supported value is "SpaceName". Both ascending and descending directions are supported.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Spaces
```

Note

Sample Request with OrderBy:

```
<server_address>/geolocation/v1/Spaces?OrderBy=SpaceName desc
```

Response

Format: **JSON**

Sample Response:

Output Code

```
[
  {
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "Geometry": {
      "Type": "string"
    },
    "ParentSpaceId": "string",
    "SpaceId": "string",
    "SpaceName": "string"
  }
]
```

Response Headers

The geolocation spaces are pagination enabled by default. If you have to go to the next page or previous page, you have to use the following Link Headers: `</products/pages/1>; rel="previous"`, `</products/pages/3>; rel="next"`.

❖ Example

- Link: `<v1/Spaces?page=6>; rel="next"`, `<v1/Spaces?page=4>; rel="previous"`
- Link: `<v1/Spaces?page=6&size=10>; rel="next"`, `<v1/Spaces?page=4&size=10>; rel="previous"`

Response Status and Error Codes

Code	Description
200	Retrieved the list of Geolocation spaces successfully.
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space IDs not found.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.4.3 Retrieve a Space

This method allows you to retrieve a particular geolocation space.

Base URI: `https://<server address>/geolocation/v1/Spaces/{SpaceId}`

Request

URI: `/geolocation/v1/Spaces/{SpaceId}`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the Geolocation space to be returned.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Spaces/{SpaceId}
```

Response

Format: **JSON**

Sample Response:

Output Code

```
{
  "Descriptions": [
    {
      "Label": "string",
      "Locale": "string"
    }
  ],
  "Geometry": {
    "Type": "string"
  },
  "ParentSpaceId": "string",
  "SpaceId": "string",
  "SpaceName": "string"
}
```

Response Status and Error Codes

Code	Description
200	Retrieved the Geolocation space successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space ID not found.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.4.4 Update a Space

This method allows you to update an existing geolocation space with a new geolocation space.

Base URI: `https://<server address>/geolocation/v1/Spaces/{SpaceId}`

Request

URI: `/geolocation/v1/Spaces/{SpaceId}`

HTTP: *PUT*

Roles Required: Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the Geolocation space to be updated.

Request Example

```
/geolocation/v1/Spaces/{SpaceId}
```

Payload

Format: **JSON**

i Note

JSON is the only media type that is supported.

The JSON for this method has the following structure:

Code Syntax

```
[
  {
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "Geometry": {
      "Type": "string"
    }
  },
]
```

```
    "ParentSpaceId": "string",  
    "SpaceName": "string"  
  }  
]
```

Response

Format: **JSON**

Response Status and Error Codes

Code	Description
204	Updated the Geolocation Space successfully
400	Invalid request. Wrong format or structure of the provided request body
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space ID not found.
409	Conflict. Geolocation space already exists.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.4.5 Delete a Space

This method allows you to delete an existing geolocation space.

Base URI: `https://<server address>/geolocation/v1/Spaces/{SpaceId}`

Request

URI: `/geolocation/v1/Spaces/{SpaceId}`

HTTP: `DELETE`

Roles Required: `Geolocation_Super_Editor`

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the Geolocation space to be deleted.

Request Example

```
/geolocation/v1/Spaces/{SpaceId}
```

Response

Response Status and Error Codes

Code	Description
204	Deleted the Geolocation Space successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space ID not found.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5 Managing Geolocations

Managing Geolocations provides you with information about the various operations that you can perform using Geolocations. It allows you to create, retrieve, update, and delete Geolocations based on your requirements.

Resource Path: `http://<server address>/geolocation/v1/GeoLocations`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
<i>POST</i>	Create a Geolocation [page 151]	/geolocation/v1/GeoLocations	<geoloca- tion>.c
<i>GET</i>	Retrieve the List of Geolocations [page 157]	/geolocation/v1/GeoLocations	<geolocation>.r

HTTP Method	Operation	URI	Scopes
<i>GET</i>	Retrieve a Geolocation [page 160]	/geolocation/v1/GeoLocations/{GeoLocationId}	<geolocation>.r
<i>PUT</i>	Update a Geolocation (PUT) [page 163]	/geolocation/v1/GeoLocations/{GeoLocationId}	<geoloca- tion>.u
<i>PUT</i>	Update a Geolocation (PATCH) [page 165]	/geolocation/v1/GeoLocations	<geoloca- tion>.u
<i>DELETE</i>	Delete a Geolocation [page 169]	/geolocation/v1/GeoLocations/{GeoLocationId}	<geoloca- tion>.d

3.5.1 Create a Geolocation

This method allows you to create a geolocation entry with details such as Name, Address, Description, Geometry, and Space. You can create single or multiple geolocations in the same call, and this method lets you create upto 20 geolocations in a single call.

Geolocation services support two Geometry Types:

- Point
- Polygon

For more information, see [Geometry Types \[page 139\]](#)

Base URI: `https://<server address>/geolocation/v1/GeoLocations`

Request

URI: `/geolocation/v1/GeoLocations`

HTTP: *POST*

Roles Required: Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

None.

Request Example

```
/geolocation/v1/GeoLocations
```

Payload

Format: JSON

Note

JSON is the only media type that is supported.

Request Properties

Properties

Property	Data Type	Required	Maximum Length	Description
SpaceId	string	Yes	36	The space ID of the geolocation.
ExternalId	string	No	60	The external ID of the geolocation.
GeoLocation-Name	string	Yes	100	The unique name of the geolocation.
ParentGeolocationId	string	No	36	The parent geolocation ID.
Descriptions	array	No	-	The description of the geolocation.
Addresses	array	No	-	The address of the geolocation.
BusinessObjectType	string	No	100	If the location is associated with a business object: Business object type of the geolocation.
BusinessObjectGuid	string	No	36	ID of the associated business object
BusinessObjectDisplayName	string	No	100	Name of the business object used for display purposes.

Descriptions

Property	Data Type	Required	Maximum Length	Description
Label	string	Yes	200	The description label of the geolocation.
Locale	string	Yes	2	The locale of the geolocation. For example, EN.

Addresses

Property	Data Type	Required	Maximum Length	Description
Address	array	Yes	-	The address of the geolocation.

Property	Data Type	Required	Maximum Length	Description
Locale	string	Yes	2	The locale of the geolocation. For example, EN.

Address

Property	Data Type	Required	Maximum Length	Description
House	string	Optional	10	The house number of the geolocation.
Street	string	Optional	40	The street details of the geolocation.
CityDistrict	string	Optional	40	The city district of the geolocation.
City	string	Optional	40	The city of the geolocation.
District	string	Optional	40	The district of the geolocation.
RegionCode	string	Optional	3	The region code of the geolocation.
Region	string	Optional	40	The region of the geolocation.
CountryCode	string	Optional	3	The country code of the geolocation.
Country	string	Optional	40	The country of the geolocation.
PostalCode	string	Optional	10	The postal code of the geolocation.

Geometry

Property	Data Type	Required	Maximum Length	Description
type	string	Yes	20	The geometry type of the geolocation. For example, Point or Polygon.
coordinates	GeoJSON	Yes	-	The coordinates of the geolocation, which is longitude and latitude. For example, {"type": "Point", "coordinates": [longitude, latitude]}.

The JSON for this method has the following structure:

```
⌵ Output Code
```

```
[
```

```

{
  "Geometry": {
    "type": "string",
    "coordinates": [ ]
  },
  "Properties": {
    "Addresses": [
      {
        "Address": {
          "City": "string",
          "CityDistrict": "string",
          "Country": "string",
          "CountryCode": "string",
          "District": "string",
          "House": "string",
          "PostalCode": "string",
          "Region": "string",
          "RegionCode": "string",
          "Street": "string"
        },
        "Locale": "string"
      }
    ],
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "ExternalId": "string",
    "GeoLocationId": "string",
    "GeoLocationName": "string",
    "ParentGeoLocationId": "string",
    "SpaceId": "string",
    "SpaceName": "string",
    "BusinessObjectType": "string",
    "BusinessObjectGuid": "string",
    "BusinessObjectDisplayName": "string"
  },
  "Type": "string"
  "SensitivityCategory": "com.sap.appiot.security:spi"
}
]

```

Sample Request for 'Point' Geometry

Sample Code

```

[
  {
    "Type": "Feature",
    "Properties": {
      "ParentGeoLocationId": null,
      "ParentGeoLocationName": null,
      "ExternalId": null,
      "SpaceId": "54fffl0d-ce64-43ad-8f33-fa9e6d0470b9",
      "GeoLocationName": "SAP Labs Bangalore",
      "BusinessObjectType": null,
      "BusinessObjectGuid": null,
      "BusinessObjectDisplayName": null,
      "IsGeoFence": false,
      "HasChild": false,
      "Descriptions": [
        {
          "Locale": "en",
          "Label": "SAP Labs Bangalore"
        }
      ]
    }
  }
]

```



```

    },
    "Addresses": [{
      "Locale": "en",
      "Address": {
        "House": "526",
        "Street": "EPIP Zone",
        "CityDistrict": "Bangalore Urban",
        "City": "Bangalore",
        "District": "Bangalore",
        "RegionCode": "S",
        "Region": "South",
        "CountryCode": "IN",
        "Country": "India",
        "PostalCode": "560066"
      }
    }
  ],
  "Geometry": {
    "type": "Point",
    "coordinates": [
      77.7156384,
      12.9792691
    ]
  },
  "SensitivityCategory": "com.sap.apptot.security:spi"
}
]

```

Sample Request for 'Polygon' Geometry

Sample Code

```

[
  {
    "Type": "Feature",
    "Properties": {
      "ParentGeoLocationId": null,
      "ParentGeoLocationName": null,
      "ExternalId": null,
      "SpaceId": "9b346c2a-50ea-49fd-88ef-c9d5a46bd9a5",
      "GeoLocationName": "Office",
      "BusinessObjectType": null,
      "BusinessObjectGuid": null,
      "BusinessObjectDisplayName": null,
      "IsGeoFence": false,
      "HasChild": false,
      "Descriptions": [
        {
          "Locale": "en",
          "Label": "Office"
        }
      ]
    },
    "Addresses": [
      {
        "Locale": "en",
        "Address": {
          "House": "138",
          "Street": "Whitefield Road",
          "CityDistrict": "Bangalore",
          "City": "Bangalore",
          "District": "Bangalore",
          "RegionCode": "KA",
          "Region": "Whitefield",
          "CountryCode": "IND",
          "Country": "India",

```

```

        "PostalCode": "560066"
      }
    ]
  },
  "Geometry": {
    "type": "Polygon",
    "coordinates": [
      [
        [
          77.61515413038433,
          13.131169443950057
        ],
        [
          77.61517120152712,
          13.131206072866917
        ],
        [
          77.6151138599962,
          13.131217673420906
        ],
        [
          77.61457614041865,
          13.131861632689834
        ],
        [
          77.61515413038433,
          13.131169443950057
        ]
      ]
    ]
  },
  "SensitivityCategory": "com.sap.apptot.security:spi"
}
]

```

Response

Format: **JSON**

Response Status and Error Codes

Code	Description
201	New resource is returned in Location header
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You did not have the required permissions to access the resource.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5.2 Retrieve the List of Geolocations

This method allows you to retrieve the list of existing geolocations. You can filter or categorize the geolocations by using Space, Geometry, Name, External ID, or Parent ID. This method also lets you filter geolocations by using multiple IDs.

Base URI: `https://<server address>/geolocation/v1/GeoLocations`

Request

URI: `/geolocation/v1/GeoLocations`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
\$skip	No	integer	The number of entities to be skipped. The default value is 0.
\$top	No	integer	The number of entities to be returned. The default value is 10.
SpaceName	No	string	The name of the space to be returned.
Geometry	No	string	The name of the geometry to be returned.
GeoLocationName	No	string	The name of the geolocation to be returned.
ExternalId	No	string	The External ID of the geolocation to be returned.

Name	Required	Data Type	Description
ParentGeoLocationId	No	string	The Parent geolocation ID to be returned.
GeoLocationId	No	array[string]	The geolocation ID to be returned. It supports multiple IDs.
SpaceId	No	array[string]	The space ID to be returned. It supports multiple IDs.
BusinessObjectType	No	array[string]	List of business object types.
BusinessObjectGuid	No	array[string]	List of business object IDs.
BusinessObjectDisplay Name	No	array[string]	List of business object names.

Note

To filter root geolocations, which are geolocations that do not have a parent, you have to search with the ParentGeoLocationId value as *none*.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/GeoLocations
```

Response

Format: JSON

Sample Response:

Output Code

```
[
  {
    "Geometry": {
      "type": "string",
      "coordinates": [ ]
    },
    "Properties": {
```

```

    "Addresses": [
      {
        "Address": {
          "City": "string",
          "CityDistrict": "string",
          "Country": "string",
          "CountryCode": "string",
          "District": "string",
          "House": "string",
          "PostalCode": "string",
          "Region": "string",
          "RegionCode": "string",
          "Street": "string"
        },
        "Locale": "string"
      }
    ],
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "ExternalId": "string",
    "GeoLocationId": "string",
    "GeoLocationName": "string",
    "ParentGeoLocationId": "string",
    "SpaceId": "string",
    "SpaceName": "string",
    "BusinessObjectType": "string",
    "BusinessObjectGuid": "string",
    "BusinessObjectDisplayName": "string"
  },
  "Type": "string"
  "SensitivityCategory": "com.sap.apptot.security:spi"
}
]

```

Response Headers

The geolocation spaces are pagination enabled by default. If you have to go to the next page or previous page, you must use the following Link Headers: `</products/pages/1>; rel="previous"`, `</products/pages/3>; rel="next"`.

❖ Example

- Link: `<v1/GeoLocations?page=6>; rel="next"`, `<v1/GeoLocations?page=4>; rel="previous"`
- Link: `<v1/GeoLocations?page=6&size=10>; rel="next"`, `<v1/GeoLocations?page=4&size=10>; rel="previous"`

Response Status and Error Codes

Code	Description
200	Retrieved the list of Geolocations successfully
400	Invalid request. Wrong format or structure of the provided request.

Code	Description
403	Access denied. You do not have the required permissions to access the resource.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5.3 Retrieve a Geolocation

This method allows you to retrieve the list of existing geolocations. You can filter or categorize the geolocations by using Space, Geometry, Name, External ID, or Parent ID. This method also lets you filter geolocations by using multiple IDs.

Base URI: `https://<server address>/geolocation/v1/GeoLocations`

Request

URI: `/geolocation/v1/GeoLocations`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
\$skip	No	integer	The number of entities to be skipped. The default value is 0.
\$top	No	integer	The number of entities to be returned. The default value is 10.
SpaceName	No	string	The name of the space to be returned.
Geometry	No	string	The name of the geometry to be returned.
GeoLocationName	No	string	The name of the geolocation to be returned.

Name	Required	Data Type	Description
ExternalId	No	string	The External ID of the geolocation to be returned.
ParentGeoLocationId	No	string	The Parent geolocation ID to be returned.
i Note To filter root geolocations, which are geolocations that do not have a parent, you have to search with the ParentGeoLocationId value as <i>none</i>.			
GeoLocationId	No	array[string]	The geolocation ID to be returned. It supports multiple IDs.
SpaceId	No	array[string]	The space ID to be returned. It supports multiple IDs.
BusinessObjectType	No	string	If the location is associated with a business object: Business object type of the geolocation.
BusinessObjectGuid	No	string	ID of the associated business object
BusinessObjectDisplay Name	No	string	Name of the business object used for display purposes.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/GeoLocations
```

Response

Format: **JSON**

Sample Response:

Output Code

```
[
  {
    "Geometry": {
      "type": "string",
      "coordinates": [ ]
    },
    "Properties": {
      "Addresses": [
        {
          "Address": {
            "City": "string",
            "CityDistrict": "string",
            "Country": "string",
            "CountryCode": "string",
            "District": "string",
            "House": "string",
            "PostalCode": "string",
            "Region": "string",
            "RegionCode": "string",
            "Street": "string"
          },
          "Locale": "string"
        }
      ],
      "Descriptions": [
        {
          "Label": "string",
          "Locale": "string"
        }
      ],
      "ExternalId": "string",
      "GeoLocationId": "string",
      "GeoLocationName": "string",
      "ParentGeoLocationId": "string",
      "SpaceId": "string",
      "SpaceName": "string",
      "BusinessObjectType": "string",
      "BusinessObjectGuid": "string",
      "BusinessObjectDisplayName": "string"
    },
    "Type": "string"
  },
  "SensitivityCategory": "com.sap.apptot.security:spi"
]
```

Response Headers

The geolocation spaces are pagination enabled by default. If you have to go to the next page or previous page, you must use the following Link Headers: `</products/pages/1>; rel="previous"`, `</products/pages/3>; rel="next"`.

Example

- Link: `<v1/GeoLocations?page=6>; rel="next"`, `<v1/GeoLocations?page=4>; rel="previous"`
- Link: `<v1/GeoLocations?page=6&size=10>; rel="next"`, `<v1/GeoLocations?page=4&size=10>; rel="previous"`

Response Status and Error Codes

Code	Description
200	Retrieved the list of Geolocations successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5.4 Update a Geolocation (PUT)

This method allows you to update an existing geolocation with a new geolocation, but you are not allowed to change the Geometry Type.

Base URI: `https://<server address>/geolocation/v1/GeoLocations/{GeoLocationId}`

Request

URI: `/geolocation/v1/GeoLocations/{GeoLocationId}`

HTTP: *PUT*

Roles Required: Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
GeoLocationId	Yes	string	ID of the Geolocation to be updated

Request Example

```
/geolocation/v1/GeoLocations/{GeoLocationId}
```

Payload

Format: **JSON**

Note

JSON is the only media type that is supported.

The JSON for this method has the following structure:

Code Syntax

```
[
  {
    "Geometry": {
      "type": "string",
      "coordinates": [ ]
    },
    "Properties": {
      "Addresses": [
        {
          "Address": {
            "City": "string",
            "CityDistrict": "string",
            "Country": "string",
            "CountryCode": "string",
            "District": "string",
            "House": "string",
            "PostalCode": "string",
            "Region": "string",
            "RegionCode": "string",
            "Street": "string"
          },
          "Locale": "string"
        }
      ],
      "Descriptions": [
        {
          "Label": "string",
          "Locale": "string"
        }
      ],
      "ExternalId": "string",
      "GeoLocationName": "string",
      "ParentGeoLocationId": "string",
      "SpaceId": "string",
      "SpaceName": "string"
    },
    "Type": "string"
  },
  "SensitivityCategory": "com.sap.apptot.security:spi"
]
```

Response

Format: **JSON**

Response Status and Error Codes

Code	Description
204	Updated the Geolocation successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	RequestAccess denied. You did not have the required permissions to access the resource.
404	Geolocation ID not found.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5.5 Update a Geolocation (PATCH)

This method allows you to update a geolocation entry with details such as Name, Address, Description, Geometry, and Space. You can update single or multiple geolocations in the same call, and this method lets you update upto 20 geolocations in a single call.

Geolocation services support two Geometry Types:

- Point
- Polygon

For more information, see [Geometry Types \[page 139\]](#)

Base URI: `https://<server address>/geolocation/v1/GeoLocations`

Request

URI: `/geolocation/v1/GeoLocations`

HTTP: `POST`

Roles Required: Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

None.

Request Example

```
/geolocation/v1/GeoLocations
```

Payload

Format: **JSON**

i Note

JSON is the only media type that is supported.

Request Properties

Properties

Property	Data Type	Required	Maximum Length	Description
GeoLocationId	string	Yes	36	The ID of the geolocation.
SpaceId	string	Optional	36	The space ID of the geolocation.
ExternalId	string	Optional	60	The external ID of the geolocation. i Note The value can be null.
GeoLocation-Name	string	Optional	100	The unique name of the geolocation.
ParentGeolocationId	string	Optional	36	The parent geolocation ID. i Note The value can be null.
Descriptions	array	Optional	-	The description of the geolocation. i Note The value can be null.
Addresses	array	Optional	-	The address of the geolocation. i Note The value can be null.
BusinessObjectType	string	No	100	If the location is associated with a business object: Business object type of the geolocation.
BusinessObjectGuid	string	No	36	ID of the associated business object
BusinessObjectDisplayName	string	No	100	Name of the business object used for display purposes.

Descriptions

Property	Data Type	Required	Maximum Length	Description
Label	string	Yes	200	The description label of the geolocation.
Locale	string	Yes	2	The locale of the geolocation. For example, EN.

Addresses

Property	Data Type	Required	Maximum Length	Description
Address	array	Yes	-	The address of the geolocation.
Locale	string	Yes	2	The locale of the geolocation. For example, EN.

Address

Note

The values of the following properties can be set to null. But, all the field values cannot be null at the same time. If all the values are set to null then the update request would not be successful.

Property	Data Type	Required	Maximum Length	Description
House	string	Optional	10	The house number of the geolocation.
Street	string	Optional	40	The street details of the geolocation.
CityDistrict	string	Optional	40	The city district of the geolocation.
City	string	Optional	40	The city of the geolocation.
District	string	Optional	40	The district of the geolocation.
RegionCode	string	Optional	3	The region code of the geolocation.
Region	string	Optional	40	The region of the geolocation.
CountryCode	string	Optional	3	The country code of the geolocation.
Country	string	Optional	40	The country of the geolocation.
PostalCode	string	Optional	10	The postal code of the geolocation.

Geometry

Property	Data Type	Required	Maximum Length	Description
type	string	Yes	20	The geometry type of the geolocation. For example, Point or Polygon.
coordinates	GeoJSON	Yes	-	The coordinates of the geolocation, which is longitude and latitude. For example, {"type": "Point", "coordinates": [longitude, latitude]}.

The JSON for this method has the following structure:

Output Code

```
[
  {
    "Geometry": {
      "type": "string",
      "coordinates": [ ]
    },
    "Properties": {
      "Addresses": [
        {
          "Address": {
            "City": "string",
            "CityDistrict": "string",
            "Country": "string",
            "CountryCode": "string",
            "District": "string",
            "House": "string",
            "PostalCode": "string",
            "Region": "string",
            "RegionCode": "string",
            "Street": "string"
          },
          "Locale": "string"
        }
      ],
      "Descriptions": [
        {
          "Label": "string",
          "Locale": "string"
        }
      ],
      "ExternalId": "string",
      "GeoLocationId": "string",
      "GeoLocationName": "string",
      "ParentGeoLocationId": "string",
      "SpaceId": "string",
      "SpaceName": "string",
      "BusinessObjectType": "string",
      "BusinessObjectGuid": "string",
      "BusinessObjectDisplayName": "string"
    },
    "Type": "string"
  },
  "SensitivityCategory": "com.sap.apptot.security:spi"
]
```

Response

Format: **JSON**

Response Status and Error Codes

Code	Description
204	Updated the Geolocation successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You did not have the required permissions to access the resource.
500	Internal server error. The operation you requested led to an error during execution.

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.5.6 Delete a Geolocation

This method allows you to delete an existing geolocation. You can enter the ID of the geolocation that you want to delete, and you can request for deletion of the geolocation. If the geolocation does not have any dependencies, only then the geolocation gets deleted.

Base URI: `https://<server address>[:<port number>][<path>]/geolocation/v1/GeoLocations/{GeoLocationId}`

Request

URI: `/geolocation/v1/GeoLocations/{GeoLocationId}`

HTTP: `DELETE`

Roles Required: `Geolocation_Super_Editor`

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
GeoLocationId	Yes	string	ID of the Geolocation to be deleted

Request Example

```
/geolocation/v1/GeoLocations/{GeoLocationId}
```

Response

Format: **JSON**

Response Status and Error Codes

Code	Description
204	Deleted the geolocation successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation ID not found.

|

For more information on the error response structures, see [Error Response Structures \[page 190\]](#)

3.6 Match Geolocations

Perform geofencing tests on geo-coordinates or geolocation geometries.

This service is used to perform geofencing tests on geo-coordinates or geolocation geometries. You can check things like the geolocations within the vicinity of a geolocation, or if any other geolocation is within the vicinity of a geolocation or geoposition, or if a geolocation is within a specified distance from a geoposition.

Resource Path: `http://<server address>/geolocation/v1/GeoTest/Check/Within/GeoLocation`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
GET	Match Geolocations within a Geolocation [page 171]	/geolocation/v1/GeoTest/Check/Within/GeoLocation	<geolocation>.r
GET	Match Geolocations within a Geoposition [page 173]	/geolocation/v1/Spaces	<geolocation>.r
GET	Search Geolocations in close vicinity to another Geolocation [page 174]	/geolocation/v1/Spaces/{SpaceId}	<geolocation>.r
GET	Search Geolocations within a specified distance from a Geoposition [page 177]	/geolocation/v1/Spaces/{SpaceId}	<geolocation>.r

Related Information

[Role Template and Scopes \[page 189\]](#)

3.6.1 Match Geolocations within a Geolocation

This method allows you to search for other geolocations within the vicinity of a particular geolocation using the geolocation ID. If distance is not provided, then it checks for geolocations considering the distance value as 0. The maximum distance that you can search for a geolocation is 20,000 meters.

Base URI: `https://<server address>/geolocation/v1/GeoTest/Check/Within/GeoLocation`

Request

URI: /geolocation/v1/GeoTest/Check/Within/GeoLocation

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
GeoLocationId1	Yes	string	ID of the geolocation to be matched

Name	Required	Data Type	Description
GeoLocationId2	Yes	string	ID of the geolocation that contains the previous geolocation
Distance	Optional	double	Distance in meters. For example, 10. The default value is 0.

Request Example

```
/geolocation/v1/GeoTest/Check/Within/GeoLocation
```

Response

Format: **JSON**

Sample Response:

≡, Output Code

```
{
  "Distance": 0,
  "GeoLocationId1": "string",
  "GeoLocationId2": "string",
  "Within": true
}
```

Response Status and Error Codes

Code	Description
200	Matched geolocations within the vicinity of a geolocation successfully
400	Invalid request. Wrong format or structure of the provided request body
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation ID not found.

3.6.2 Match Geolocations within a Geoposition

This method allows you to match the geolocations within the vicinity of a Geoposition.

If distance is not provided, then it checks for geolocations considering the distance value as 0. The maximum distance that you can search for a geolocation is 20,000 metres.

Note

If the geoposition and the geolocation have the exact same coordinates, the geoposition check service shows that the geolocation is not in the vicinity of the geoposition. This issue occurs due to the precision while storing the geolocation geometries. To overcome this limitation and get an exact match, make sure you search with 1 or greater than 1 as the default value in the distance parameter.

Base URI: `https://<server address>/geolocation/v1/GeoTest/Check/Within/GeoPosition`

Request

URI: `/geolocation/v1/GeoTest/Check/Within/GeoPosition`

HTTP: *GET*

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
Latitude	Yes	double	Latitude in degrees, ranges from -ve 90 to +ive 90. For example, 13.1217
Longitude	Yes	double	Longitude in degrees, ranges from -ve 180 to +ive 180. For example, 77.5804
GeoLocationId	Yes	string	ID of the geolocation. For example, WARD_2, POI_WARD_2
Distance	Optional	double	Distance in meters. For example, 10. The default value is 0.

Request Example

```
/geolocation/v1/GeoTest/Check/Within/GeoPosition
```

Response

Format: **JSON**

Sample Response:

≡ Output Code

```
{
  "Distance": 0,
  "GeoLocationId": "string",
  "Point": [
    long,
    lat
  ],
  "Within": true
}
```

Response Status and Error Codes

Code	Description
200	Matched the geolocations within the vicinity of a geoposition successfully
400	Invalid request. Wrong format or structure of the provided request body
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation ID not found

3.6.3 Search Geolocations in close vicinity to another Geolocation

This method allows you to search for other geolocations within the vicinity of a geolocation using the geolocation ID. You can get the list of geolocations in close vicinity to the required geolocation. The maximum distance that you can search for a geolocation is 20,000 meters.

Base URI: `https://<server address>/geolocation/v1/GeoTest/Search/Within/GeoLocation`

Request

URI: `/geolocation/v1/GeoTest/Search/Within/GeoLocation`

HTTP: *GET*

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
GeoLocationId	Yes	string	ID of the geolocation to be searched.
Distance	Optional	double	Distance in meters. For example, 10. The default value is 0.
SpaceId	Optional	string	ID of the geolocation space to be searched. The default value is ALL.
\$skip	Optional	integer	The number of entities to be skipped. The default value is 0.
\$top	Optional	integer	The number of entities to be returned. The default value is 10.

Request Header

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accept language header

Request Example

```
/geolocation/v1/GeoTest/Search/Within/GeoLocation
```

Response

Format: JSON

Sample Response

≡ Output Code

```
[
  {
    "GeoLocationId": "string",
    "GeoLocations": {
      "Features": [
        {
          "Geometry": {
```

```

        "type": "string"
      "coordinates": [...],
    },
    "Properties": {
      "Addresses": [
        {
          "Address": {
            "City": "string",
            "CityDistrict": "string",
            "Country": "string",
            "CountryCode": "string",
            "District": "string",
            "House": "string",
            "PostalCode": "string",
            "Region": "string",
            "RegionCode": "string",
            "Street": "string"
          },
          "Locale": "string"
        }
      ],
      "Descriptions": [
        {
          "Label": "string",
          "Locale": "string"
        }
      ],
      "ExternalId": "string",
      "GeoLocationId": "string",
      "Name": "string",
      "ParentGeoLocationId": "string",
      "SpaceId": "string",
      "SpaceName": "string"
    },
    "Type": "string"
  },
  "Type": "string"
},
"Space": "string"
]

```

Response Status and Error Codes

Code	Description
200	Retrieved the geolocations in close vicinity to another geolocation successfully.
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You did not have the required permissions to access the resource.
500	Internal server error. The operation you requested led to an error during execution.

3.6.4 Search Geolocations within a specified distance from a Geoposition

This method allows you to search for geolocations within the specified distance from a geoposition. The maximum distance that you can search for a geolocation is 20,000 meters.

Base URI: `https://<server address>/geolocation/v1/GeoTest/Search/Within/GeoPosition`

Request

URI: `/geolocation/v1/GeoTest/Search/Within/GeoPosition`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
Latitude	Yes	double	Latitude in degrees, ranges from -ve 90 to +ive 90. For example, 13.1217
Longitude	Yes	double	Longitude in degrees, ranges from -ve 180 to +ive 180. For example, 77.5804
Distance	Optional	double	Distance in meters. For example, 10. The default value is 0.
SpaceId	Optional	string	ID of the geolocation space to be searched. The default value is ALL.
\$skip	Optional	integer	The number of entities to be skipped. The default value is 0.
\$top	Optional	integer	The number of entities to be returned. The default value is 10.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accept language header

Request Example

```
/geolocation/v1/GeoTest/Search/Within/GeoPosition
```

Response

Format: JSON

Sample Response

≡ Output Code

```
[
  {
    "GeoLocations": {
      "Features": [
        {
          "Geometry": {
            "type": "string"
            "coordinates": [....]
          },
          "Properties": {
            "Addresses": [
              {
                "Address": {
                  "City": "string",
                  "CityDistrict": "string",
                  "Country": "string",
                  "CountryCode": "string",
                  "District": "string",
                  "House": "string",
                  "PostalCode": "string",
                  "Region": "string",
                  "RegionCode": "string",
                  "Street": "string"
                },
                "Locale": "string"
              }
            ],
            "Descriptions": [
              {
                "Label": "string",
                "Locale": "string"
              }
            ],
            "ExternalId": "string",
            "GeoLocationId": "string",
            "Name": "string",
            "ParentGeoLocationId": "string",
            "SpaceId": "string",
            "SpaceName": "string"
          },
          "Type": "string"
        }
      ]
    }
  }
]
```



```

    ],
    "Type": "string"
  },
  "Point": [
    long,
    lat
  ],
  "Space": "string"
}
]

```

Response Status and Error Codes

Code	Description
200	Retrieved the geolocations within specified distance from a geoposition
400	Invalid request. Wrong format or structure of the provided request body
403	Access denied. You did not have the required permissions to access the resource.
500	Internal server error. The operation you requested led to an error during execution.

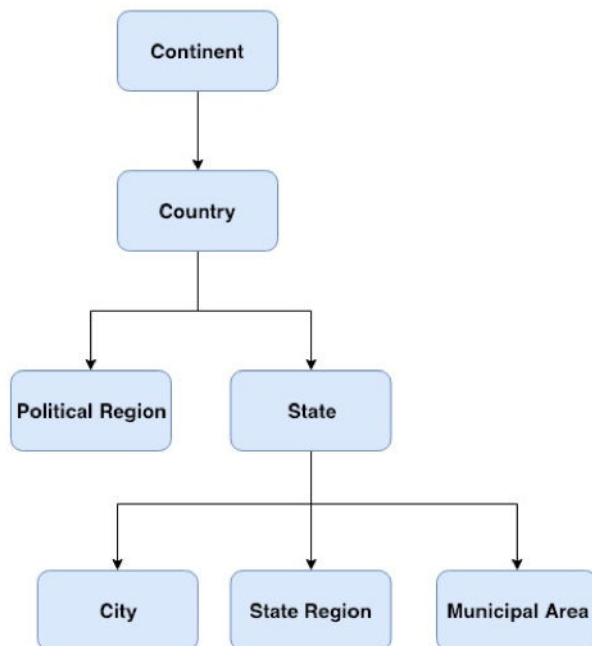
3.7 Space Hierarchies and Location Hierarchies

Space Hierarchies

A mechanism that helps in building locations hierarchy based on a reference space hierarchy representation. Space hierarchy can be built only for spaces with geometry type as polygon. Space hierarchies have the following criteria:

- A space can be present only in one space hierarchy and it can't be a part of multiple space hierarchies.
- A space can have only one parent space.
- A space can have multiple children spaces.
- You can create any number of levels for your space hierarchies.

For example, you can see the Continent Space Hierarchy:

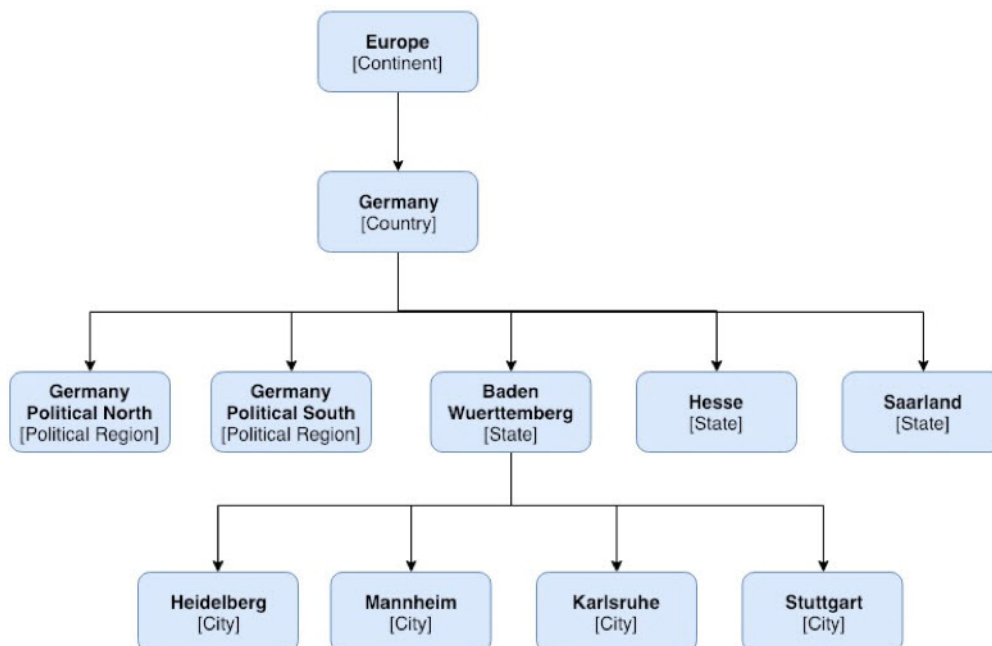


Location Hierarchies

A mechanism that helps in organizing hierarchy based on the space hierarchy. This mechanism of organizing the locations based on a space hierarchy, enables us to maintain and follow the semantic hierarchy. Location hierarchies have the following criteria:

- A location can refer to a specific node of a space hierarchy based on the association of space with the location.
- To make a location as a part of a specific space hierarchy, you must:
 - Associate a space to a location
 - Specify the parent location of the current location
- Specifying a parent location is optional. But, if the parent location is not specified, then the location is not a part of any location hierarchy.
- To select a parent location, make sure that the parent location is associated to a space, which is the parent space of the space associated with the current location. For example, in the following diagram, the Assembly Line Drawbar is associated with the Space [_Assembly Line_], therefore the parent location of this location should have been associated to the Space [_Plant_] as per the space hierarchy that is modeled.

For example, you can see the Continent Location Hierarchy:



Related Information

[Role Template and Scopes \[page 189\]](#)

3.7.1 Retrieve the List of Hierarchies of Spaces

This method allows you to retrieve the list of hierarchies of spaces. It also lets you filter geolocations by using multiple IDs.

Base URI: `https://<server address>/geolocation/v1/Hierarchies/Spaces`

Request

URI: `/geolocation/v1/Hierarchies/Spaces`

HTTP: *GET*

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
\$skip	Optional	integer	The number of entities to be skipped. The default value is 0.
\$top	Optional	integer	The number of entities to be returned. The default value is 10.
SpaceId	Optional	array[string]	The hierarchies of the specified Space IDs to be returned. It supports multiple IDs.

Note

Regardless of the level of the given space ID, the full hierarchy starting from the root node is returned.

Request Header

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Hierarchies/Spaces
```

Response

Format: JSON

Sample Response:

≡ Output Code

```
[
  {
    "Children": [
      {
        "Children": [
          {}
        ],
        "Descriptions": [
```

```

    {
      "Label": "string",
      "Locale": "string"
    }
  ],
  "ParentSpaceId": "string",
  "SpaceId": "string",
  "SpaceName": "string"
}
],
"Descriptions": [
  {
    "Label": "string",
    "Locale": "string"
  }
],
"ParentSpaceId": "string",
"SpaceId": "string",
"SpaceName": "string"
}
]

```

Response Status and Error Codes

Code	Description
200	Retrieved the list of Hierarchies for Spaces successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.

3.7.2 Retrieve a Hierarchy of Spaces

This method allows you retrieve the hierarchy of geolocation spaces using the Space ID.

Base URI: `https://<server address>/geolocation/v1/Hierarchies/Spaces/{SpaceId}`

Request

URI: `/geolocation/v1/Hierarchies/Spaces/{SpaceId}`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the root node of space

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Hierarchies/Spaces/{SpaceId}
```

Response

Format: **JSON**

Sample Response:

Output Code

```
{
  "Children": [
    {}
  ],
  "Descriptions": [
    {
      "Label": "string",
      "Locale": "string"
    }
  ],
  "ParentSpaceId": "string",
  "SpaceId": "string",
  "SpaceName": "string"
}
```

Response Status and Error Codes

Code	Description
200	Retrieved the Hierarchy of the Space successfully
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space IDs not found.

Code	Description
500	Internal server error. The operation you requested led to an error during execution.

3.7.3 Retrieve the list of Hierarchies for the Locations of a Space

This method allows you to retrieve the list of hierarchies for the locations of a space using Space ID.

Base URI: `https://<server address>/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations`

Request

URI: `/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Request Parameters

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the root node of space
GeoLocationId	Optional	array[string]	The hierarchies of the specified Geolocation IDs to be returned. It supports multiple IDs.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations
```

Response

Format: JSON

Sample Response:

≡ Output Code

```
[
  {
    "Children": [
      {
        "Children": [
          {}
        ],
        "Geometry": {
          "type": "string",
          "coordinates": [ ]
        },
        "Properties": {
          "Addresses": [
            {
              "Address": {
                "City": "string",
                "CityDistrict": "string",
                "Country": "string",
                "CountryCode": "string",
                "District": "string",
                "House": "string",
                "PostalCode": "string",
                "Region": "string",
                "RegionCode": "string",
                "Street": "string"
              },
              "Locale": "string"
            }
          ],
          "Descriptions": [
            {
              "Label": "string",
              "Locale": "string"
            }
          ],
          "ExternalId": "string",
          "GeoLocationId": "string",
          "GeoLocationName": "string",
          "ParentGeoLocationId": "string",
          "SpaceId": "string",
          "SpaceName": "string"
        },
        "Type": "string"
      }
    ],
    "Geometry": {
      "type": "string",
      "coordinates": [ ]
    },
    "Properties": {
      "Addresses": [
        {
          "Address": {
            "City": "string",
            "CityDistrict": "string",
            "Country": "string",
            "CountryCode": "string",
            "District": "string",
```



```

        "House": "string",
        "PostalCode": "string",
        "Region": "string",
        "RegionCode": "string",
        "Street": "string"
    },
    "Locale": "string"
  },
  "Descriptions": [
    {
      "Label": "string",
      "Locale": "string"
    }
  ],
  "ExternalId": "string",
  "GeoLocationId": "string",
  "GeoLocationName": "string",
  "ParentGeoLocationId": "string",
  "SpaceId": "string",
  "SpaceName": "string"
},
"Type": "string"
}
]

```

Response Status and Error Codes

Code	Description
200	Retrieved the Hierarchies of the Locations of a Space successfully.
400	Invalid request. Wrong format or structure of the provided request.
403	Access denied. You did not have the required permissions to access the resource.
404	Geolocation Space IDs not found.
500	Internal server error. The operation you requested led to an error during execution.

3.7.4 Retrieve a Hierarchy for the Locations of a Space

This method allows you to retrieve a hierarchy for the locations of a space using Space ID and Geolocation ID.

Base URI: `https://<server address>/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations/{GeoLocationId}`

Request

URI: `/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations/{GeoLocationId}`

HTTP: [GET](#)

Roles Required: Geolocation_Viewer, Geolocation_Editor, Geolocation_Super_Editor

For more information on Roles and Permissions, see [Role Template and Scopes \[page 189\]](#)

Name	Required	Data Type	Description
SpaceId	Yes	string	ID of the root node of space
GeoLocationId	Yes	string	Geolocation ID for which a hierarchy shall be returned.

Request Header

Name	Required	Data Type	Description
Accept-Language	Yes	string	Accepted language header

Request Example

```
/geolocation/v1/Hierarchies/Spaces/{SpaceId}/GeoLocations
```

Response

Format: **JSON**

Sample Response:

≡ Output Code

```
{
  "Children": [
    {}
  ],
  "Geometry": {
    "type": "string",
    "coordinates": [ ]
  },
  "Properties": {
    "Addresses": [
      {
        "Address": {
          "City": "string",
          "CityDistrict": "string",
          "Country": "string",
          "CountryCode": "string",
          "District": "string",
          "House": "string",
          "PostalCode": "string",
          "Region": "string",
          "RegionCode": "string",
          "Street": "string"
        },
        "Locale": "string"
      }
    ]
  }
}
```

```

    ],
    "Descriptions": [
      {
        "Label": "string",
        "Locale": "string"
      }
    ],
    "ExternalId": "string",
    "GeoLocationId": "string",
    "GeoLocationName": "string",
    "ParentGeoLocationId": "string",
    "ParentGeoLocationName": "string",
    "SpaceId": "string",
    "SpaceName": "string"
  },
  "Type": "string"
}

```

Response Status and Error Codes

Code	Description
200	Retrieved the Hierarchies for the Location of a Space successfully.
400	Invalid request. Wrong format or structure of the provided request.
404	Geolocation ID or Space ID not found.
500	Internal server error. The operation you requested led to an error during execution.

3.8 Authorization

The Geolocation services ensure that the services that are built on the platform are protected against unauthorized user access. You can secure the services by defining the services that an authenticated user can access, and also by defining the object instances that he or she can access.

Based on the authorization concept, an administrator grants permissions to the employees of an organization. These permissions can differ according to the tasks and responsibilities of a particular user. Granting permissions to users is realized by assigning users to different user groups, where the permissions that are related to a user group are automatically passed on to the members of that user group.

3.8.1 Role Template and Scopes

The Role-based authorization is an access control mechanism defined around roles and privileges. Roles are created for various job functions and the permissions to perform certain operations are assigned only to specific roles. Geolocation services offer a wide range of role templates as well as scopes, and providing (or

revoke) functional authorization can become a significant challenge for administrators who are in charge of assigning proper user profiles for the users of the system. To make this task easier, Geolocation services provide a number of predefined role templates that an administrator can use as a blueprint for setting up individual roles, which are required for a concrete organization. The basic procedure for a role template is as follows:

1. Derive a role from a role template.
2. Assign role (one or many) to a user or user group.

Role templates and scopes have a n:m relationship. That is, one template may contain many scopes, and one scope may be contained in many templates. The following sections show listings of the available role templates and the scopes that are contained in each template. The listings are broken down by the key components of the Geolocation platform services.

Geolocation Service

Role Templates

Role Template	Task Description	Scopes
Geolocation_Viewer	View all resources in geolocation service	<geolocation>.r
Geolocation_Editor	Create and modify geolocation data by performing operations such as Read, Create, and Update.	<geolocation>.r <geolocation>.c <geolocation>.u
Geolocation_Super_Editor	Create, modify, or delete geolocation data by performing operations such as Read, Create, Update, and Delete.	<geolocation>.r <geolocation>.c <geolocation>.u <geolocation>.d

3.9 Error Response Structures

The error response structures for the APIs are as follows:

Output Code

```
400 Bad Request
{
  "error": {
    "code": "400",
    "message": "Invalid resource payload."
  }
}
Descriptive messages to be used in some cases (e.g. deletion of a resource
with active references)
```

```

403 Deletion Forbidden
{
  "error": {
    "code": "403",
    "message": "Resource with ID XXX not found",
    "details": [
      {
        "code": "403",
        "target": "{RESOURCE URI}"
        "message": "Empty result set"
      }
    ]
  }
}

```

3.10 Thing Clustering

Support for visualizing things on a map at large scale.

SAP IoT provides an option to visualize up-to 100,000 things on a map application. The location of the thing is picked from the time series information. To enable thing clustering, you need to save a GeoSemantics configuration. This configuration is required to understand which time series properties and property set types are used to save the latitude and longitude information for a thing type.

3.10.1 Geo-semantics Configuration

Defining latitude longitude properties for Thing Clustering is done via the geo-semantic configuration.

Every Thing Type has one configuration defined. However, you can provide additional configurations for other Thing Types in the same payload.

i Note

If you are using this API in the IoT Template, then this configuration is not required.

Geo-Semantics Configuration API

Base URI:

- Description: `http://<server address>[:<port number>]/geomatch/v1/configuration/GeoSemantics`
- Example for a base URI in a cloud foundry environment: `https://sap-iotaexplore.iot-sap.cfapps.eu10.hana.ondemand.com/geomatch/v1/configuration/GeoSemantics`

API Methods

Method	Operation	URI	Scope
POST	Create Geo-Semantic Configuration for all Thing Types	/geomatch/v1/Configuration/GeoSemantics	<geolocation>.c
PATCH	Update Geo-Semantic Configuration for all Thing Types	/geomatch/v1/Configuration/GeoSemantics	<geolocation>.u
GET	Read Geo-Semantic configuration for all Thing types	/geomatch/v1/Configuration/GeoSemantics	<geolocation>.r
DELETE	Delete Geo-Semantic configuration for all Thing types	/geomatch/v1/Configuration/GeoSemantics	<geolocation>.d
DELETE	Delete Geo-Semantic configuration for single thing type	/geomatch/v1/Configuration/GeoSemantics/<thing_type>	<geolocation>.d

3.10.1.1 Create Geo-semantic Configuration

This API method creates a new Geo-Semantic configuration. The payload of this API call is an array, and each element of this array represents the configuration of separate thing type.

Request

URI: /geomatch/v1/Configuration/GeoSemantics

HTTP Method: [POST](#)

Permissions: <geolocation>.c

Request Header

Request Header Fields

Name	Required	Values
Authorization	Yes	OAuth 2.0 JWT Token

Request Payload

Each Object in the array has the following properties:

Payload Parameters

Name	Required	Type	Description
Thing Type	Yes	String	Fully qualified name of the thing type. For example, "noah.blr30.smart-thing:MyThing".
Latitude	Yes	Object	Described below
Longitude	Yes	Object	Described below

Latitude/Longitude Parameters

Name	Required	Type	Description
PropertySet	Yes	String	The named property set containing the latitude/longitude information
PropertyName	Yes	String	The name of the property containing the value of latitude/longitude

Sample Payload

```
[
  {
    "ThingType": "noah.blr30.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "latitude"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "longitude"
    }
  }
]
```

Request Example

/geomatch/v1/Configuration/GeoSemantics

Response

Response Status and Error Codes

Code	Description
201	GeoSemantics saved successfully

Code	Description
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

3.10.1.2 Read Geo-semantics Configuration

Request

This API can be used to read all the existing geo-semantic configurations for all thing types.

HTTP Method: [GET](#)

Permissions: <geolocation>.r

Request Header

Request Header Fields

Name	Required	Values
Authorization	Yes	OAuth 2.0 JWT Token

Response

Response Status and Error Codes

Code	Description
200	OK
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

3.10.1.3 Update Geo-semantic Configuration

This API can be used to update Geo-semantic configuration in two ways:

- Add configuration for a new thing type
When you use the PATCH call to add configuration for a new thing type, it gets added to the existing geo-semantic configuration.
- Update configuration for existing thing type
When you use the PATCH call to update configuration for an existing thing type, same thing type details need to be provided in the payload.

HTTP Method: *PATCH*

Permissions: <geolocation>.u

Request Header

Request Header Fields

Name	Required	Values
Authorization	Yes	OAuth 2.0 JWT Token

Updating configuration for existing thing type:

For example, you need to update existing configuration for thing type "noah.blr30.smartcooler:Cooler". Consider that the following is maintained as the GeoSemantic configuration.

```
[
  {
    "ThingType": "noah.blr30.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "latitude"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "longitude"
    }
  }
]
```

Request Payload

The PATCH call is made with the following payload:

```
[
  {
    "ThingType": "noah.blr30.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "lat"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",

```

```

        "PropertyName": "lon"
    }
}
]

```

Response

In this case, the property name gets updated from *latitude* to *lat* and from *longitude* to *lon*, since there's already a configuration existing for the thing type given in the payload.

Adding configuration for a new thing type:

PATCH Request Payload

```

[
  {
    "ThingType": "noah.blr30.demo.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "lat"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "lon"
    }
  }
]

```

The configuration gets added in the existing configuration, and the saved configuration looks like below:

```

[
  {
    "ThingType": "noah.blr30.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "latitude"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "longitude"
    }
  },
  {
    "ThingType": "noah.blr30.demo.smartcooler:Cooler",
    "Latitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "lat"
    },
    "Longitude": {
      "PropertySet": "Smart_Cooler_Message_Data",
      "PropertyName": "lon"
    }
  }
]

```

Response

Response Status and Error Codes

Code	Description
201	GeoSemantics saved successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

3.10.1.4 Delete all Geo-semantics Configurations

This API is used to delete all the existing geo-semantic configurations for all thing types.

Request

HTTP Method: *DELETE*

Permissions: <geolocation>.d

Request Header

Request Header Fields

Name	Required	Values
Authorization	Yes	OAuth 2.0 JWT Token

Response

Response Status and Error Codes

Code	Description
200	Configuration deleted successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

3.10.1.5 Delete a Geo-semantics Configuration

This API is used to delete existing geo-semantic configuration for a particular thing type.

Request

HTTP Method: [DELETE](#)

Permissions: `<geolocation>.d`

Request Header

Request Header Fields

Name	Required	Values
Authorization	Yes	OAuth 2.0 JWT Token

Request Example

`/geomatch/v1/Configuration/GeoSemantics/<Thing Type>`

Response

Response Status and Error Codes

Code	Description
200	Configuration deleted successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

3.10.2 Thing Clustering API

Thing Clustering is supported only when the latitude and longitude information comes from time series Property Set Type (PST). Once the geo-semantic configuration is saved, any incoming data for a Thing after this point would be considered for Thing Clustering.

The Thing Clustering API can be used along with the SAP IoT Template which will enable you to easily configure the service and see the Things on the Map Application provided in the landing page of template. However, you can also use the API to integrate in your own Map Application as well.

i Note

If the Thing clustering API is used in the application built using IoT Template, then the instance level authorization on the Things is also applied on the response returned.

i Note

Users who have access to view Things, can only view the clustering result.

Request

Base URI: `http:// <address>[:<port number>]/api/v1/georuntime/clusters?minLat=<minLat>&maxLat=<maxLat>&minLon=<minLon>&maxLon=<maxLon>&zoom=<zoomLevel>&$filter=<OData_filters>`

Sample URI in a cloud foundry environment: `https://sap-iot-noah-live-geo-runtime.cfapps.eu10.hana.ondemand.com/api/v1/georuntime/clusters?minLat=-90&maxLat=90&minLon=-180&maxLon=180&zoom=3&$filter`

Request Parameters

Parameter	Required	Description
minLatitude	Yes	Minimum latitude of the viewport. Default value: -90
maxLatitude	Yes	Maximum latitude of the viewport. Default value: 90
minLongitude	Yes	Minimum longitude of the viewport. Default value: -180
maxLongitude	Yes	Maximum Longitude of the viewport. Default value: 180
zoomLevel	Yes	Current zoom level of the GeoMap Default value: 2
\$filter	No	ODatafilter to apply any master data filtering. maximum PSTs in the filter query: 2 maximum properties in the filter query: 10

This call expects the sap-iot-thingtype as a request header to return the entities specific to the thing type.

Request Header

sap-iot-thingtype: noah.blr30.smartthing:MyThing

HTTP Method: [GET](#)

Permissions: `geo.tc`

Response

The count is returned as 1 when there is only one thing present at a particular location. If the count is 1, the ThingId field is also populated. This can be used to fetch further thing related information using other Thing APIs, like [Read List of Things \[page 1412\]](#) API.

```
[
  {
    "Count": 40
    "ThingId": null
    "Latitude": 56.44534
    "Longitude": -45.6867
  },
  {
    "Count": 32
    "ThingId": null
    "Latitude": 36.44534
    "Longitude": -145.6867
  },
  {
    "Count": 1
    "ThingId": "92B98497566F48E4A0867569941F9CF1"
    "Latitude": 2.345
    "Longitude": -125.66767
  }
]
```

Response Status and Error Codes

Code	Description
200	Clusters returned successfully
400	Invalid request. Wrong format or structure of the provided request body.
403	Access denied. You do not have the required permissions to access the resource.
500	Internal server error. The requested operation has led to an error during execution.

4 Authorization

Introduction into the authorization concept of the SAP IoT platform

Introduction

The authorization concept of the SAP IoT platform ensures that the services that are built on the platform are protected against unauthorized access. This is done by defining the services that an authenticated user may access, and by defining the object instances that he or she may access.

Based on the authorization concept, an administrator grants permissions to the employees of an organization. These permissions may differ according to the tasks and responsibilities of a particular employee. Granting permissions to employees is realized by assigning employees to different user groups, where the permissions that are related to a user group are automatically passed on to the members of that user group.

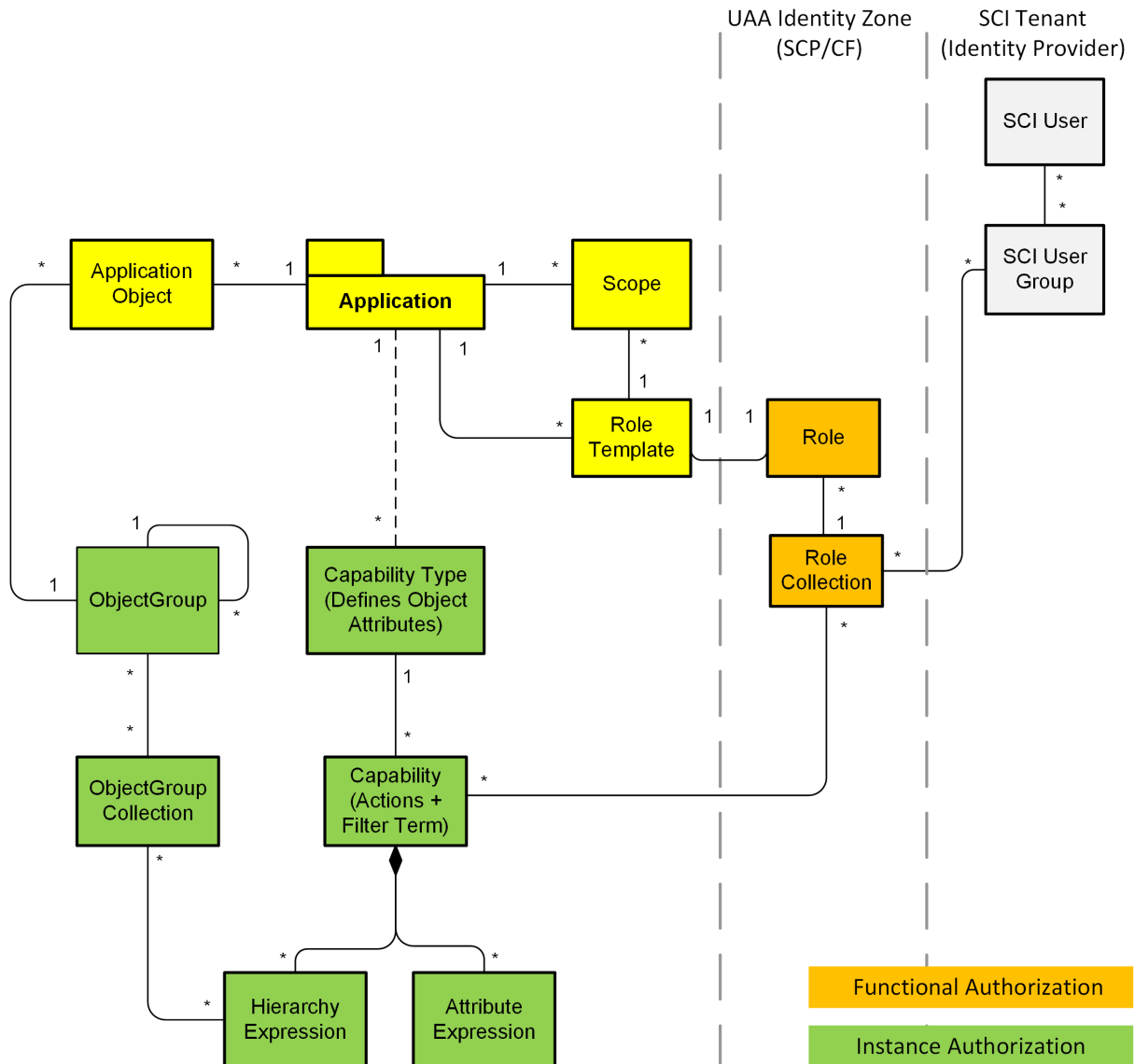
Components of the Authorization Concept

The authorization concept of the SAP IoT platform comprises the following components:

- You need an identity provider (IDP) service for creating users and user groups. For each tenant (that is, for each customer using the platform services), a separate IDP must be provided.
- **SAP User Account and Authentication Service (UAA):** This component is used as an authorization server. For each tenant, a dedicated UAA instance (sometimes referred to as identity zone) is provided. SAP UAA serves the purpose of assigning and checking of functional authorizations. These functional authorizations (also known as UAA scopes) control whether a particular user has the permission to start a given service. They are assigned to roles provided by the UAA service. For easier administration, the roles are then bundled to UAA role collections, which in turn are assigned to user groups provided by the identity provider.
- **IoT Business Partner Services:** With these onboarding services, it is easy to relate an employee of a platform customer with an identity provide user and to assign the employee to a user group.
- **IoT Authorization Services:** With these services, an administrator can define access rights for individual object instances. This kind of authorizations is used to filter the access to single instances of the application-specific objects managed in the SAP IoT platform (for example, a particular welding robot installed at an assembly line of a car manufacturer plant in Munich, Germany). Application objects are assigned to authorization objects (represented by the ObjectGroup services offered by the platform). Object instance authorizations are directly assigned to user groups. As a prerequisite for calling application services, the user groups need the functional authorizations provided by UAA role collections. This concept results in a two-step process of checking whether a user has sufficient authorizations for a particular service request:
 1. Check whether the user is authorized for the desired activity (create/read/update/delete).
 2. If functional authorization is sufficient, check whether the user is authorized to perform the desired activity for a given object.

Overview Diagram

The following diagram illustrates the entities involved in the authorization concept of the SAP IoT platform:



Note

In the above diagram, the term "SCI" has been derived from SAP's identity provider service "SAP Cloud Identity". However, it should be understood as a placeholder for any other identity provider service you may have in use in your system landscape.

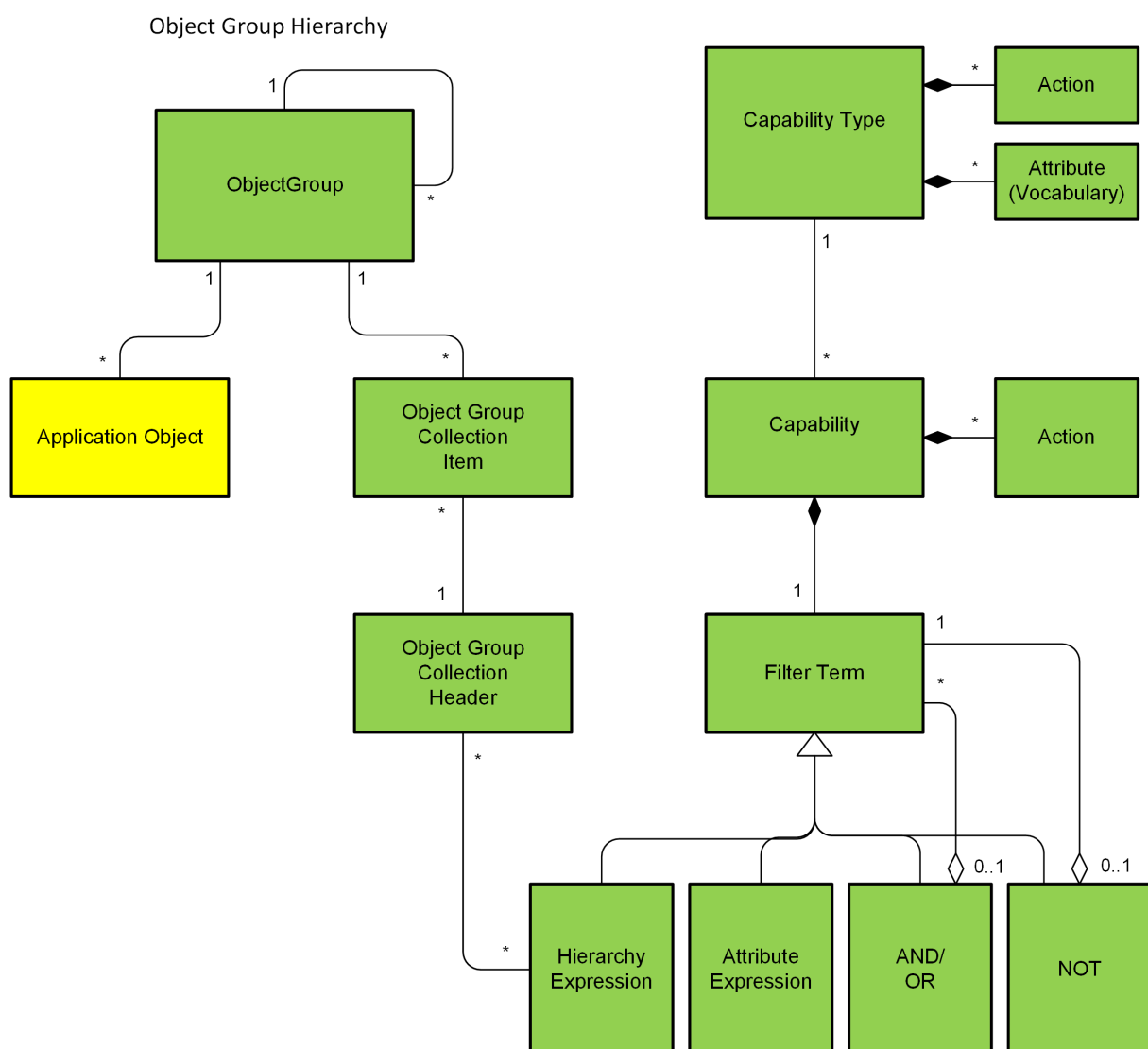
IoT Authorization Services

An administrator uses the IoT Authorization Services to grant access authorizations on object instance level to user groups (and the members of these groups, respectively). Instance authorizations are based on a hierarchy

of authorization groups. These authorization groups are represented by the `ObjectGroup` services offered by the platform. Applications running on the platform set up a relation between the application-specific objects and authorization groups to define who is allowed to access each object, and what kind of operations a user is allowed to perform with respect to an object.

The system administrator grants permission to read, write, or delete objects of a given type to a user group. With that, users are enabled to access object instances of that type. Access rights are inherited along the hierarchy tree of authorization groups. This inheritance is in effect for all subordinate nodes in the hierarchy as long as no new permission is either granted or revoked on a lower level. Once such a new permission has been defined, it remains effective for all subordinate nodes of that node, and so on.

The following diagram shows a detailed overview of the data model used for object instance-based authorizations:



i Note

General disclaimer:

The implementation of the authorization concept is subject to continuous refinement and adjustments to internal architectural revisions. Therefore, it is possible that the list of permissions documented for a particular service method comprises more scopes than actually needed for a particular use case at a particular point in time. However, to be always on the safe side, we strictly recommend to always provide all the scopes that are listed in the documentation. Otherwise, you might run into a situation where an application that used to run fine with a reduced set of authorizations fails in the future due to internal technical changes in the platform backend.

Related Information

[Object Instance-Based Authorization \[page 204\]](#)

[Functional Authorization \[page 263\]](#)

4.1 Object Instance-Based Authorization

Services for managing object instance-based access rights

In this section, you find services for granting or revoking access rights to users who are logged on to the SAP IoT platform. The access rights in question here are assigned to specific objects of a certain type that are managed in SAP IoT. Access rights are generally limited to objects within a particular tenant, thus ensuring that a user can only access the objects that belong to the same tenant to which he or she is assigned. The exception to this rule are users who are acting as administrators on the levels of a Cloud Platform Host or a Cloud Platform Provider (TO). For more information on the different levels, see [Business Partner \[page 29\]](#).

Related Information

[ObjectGroup \[page 205\]](#)

[CapabilityType \[page 220\]](#)

[Capability \[page 224\]](#)

[Filter Terms \[page 236\]](#)

[ObjectGroupCollection \[page 241\]](#)

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.1 ObjectGroup

An ObjectGroup is a technical object used for assigning object-based access authorizations to user groups.

An ObjectGroup is a technical object used for assigning object-based access authorizations (as opposed to function-based authorizations) to user groups. Capabilities for certain user groups and object types are assigned to object groups, granting read, write, or delete authorization for user groups to all objects that are assigned to this object group or to any child object group.

ObjectGroup entity nodes are organized in a mandatory hierarchical structure. This structure is used to control user access to certain object instances.

Note

We highly recommend also reading the chapters dealing with the concept of the root object group. For more information, see [Root Object Group of a Tenant \[page 216\]](#).

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/ObjectGroups`
- Example for a base URI in a cloud foundry environment:
- `https://authorizations.cfapps.eu10.hana.ondemand.com/ObjectGroups`

Cross-Tenant Operations

A user acting as a Cloud Platform Consumer (T1) administrator can only access, create and delete object groups assigned to the tenant to which he or she is logged on. If the tenant is not provided in the payload of a [POST](#) or [PUT](#) request, it is derived from the logon tenant of the user. If the tenant is provided in the payload, but differs from the logon tenant, HTTP status code 403 ("Forbidden") is returned.

Methods

HTTP Method	Action	URI	Scopes
POST	Create an ObjectGroup [page 206]	<code>/ObjectGroups</code>	<code><auth>.c</code>
GET	Read an ObjectGroup [page 208]	<code>/ObjectGroups ('<ID>')</code>	<code><auth>.r</code>
GET	Read all ObjectGroups [page 210]	<code>/ObjectGroups</code>	<code><auth>.r</code>
PUT	Update an ObjectGroup [page 213]	<code>/ObjectGroups ('<ID>')</code>	<code><auth>.u</code>
DELETE	Delete an ObjectGroup [page 215]	<code>/ObjectGroups ('<ID>')</code>	<code><auth>.d</code>

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "objectGroupID"      : { "type": "string", "minLength": 0, "maxLength": 32 },
  "objectGroupParentID": { "type": "string", "minLength": 32, "maxLength": 32,
    "required": "true" },
  "name"               : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": "true" },
  "etag"               : { "type": "string" },
  "tenant"             : { "type": "string", "required": "true" }}
```

Field Explanation

Name	Description
objectGroupID	Unique ID of the ObjectGroup. Note Although this field is mandatory, its minimum length is still defined as 0. This is because the system ensures that the field always contains a proper value.
objectGroupParentID	Unique ID of the superordinate ObjectGroup
name	Descriptive name of the ObjectGroup (for example, "High Pressure Water Pump")
etag	Entity tag used to identify a particular instance of an ObjectGroup
tenant	Name of the tenant to which an ObjectGroup is assigned

Related Information

[UserGroup \[page 314\]](#)

[Root Object Group of a Tenant \[page 216\]](#)

4.1.1.1 Create an ObjectGroup

With this method, you create a new object group.

The system automatically assigns a unique ID to the new object group. It is therefore allowed to omit the `objectGroupID` field from the payload when this method is executed. Since each object group must refer to a superordinate parent object group, you must specify that parent object group by its ID.

The name of an object group may consist of lowercase or uppercase letters, digits, or underscores. It must have a length between 1 and 255 characters. Siblings in the object group hierarchy must not have the same name.

Also, you may decide that the new object group is assigned to a tenant different to the one where you are currently logged on. To accomplish this, you need to explicitly specify that tenant during creation of the object group. For more information on the prerequisites for this kind of operation, see the *Cross-Tenant Operations* section in [ObjectGroup \[page 205\]](#).

If the object group is successfully created, the server sends HTTP response code 201. Any other code indicates an error.

Request

URI: /ObjectGroups

HTTP Method: *POST*

Permissions: <auth>.c

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token

Request Fields

Name	Required	Type	Description	Send As
objectGroupParentID	Yes	string	ID of superordinate ObjectGroup	JSON
name	Yes	string	Semantic name of the ObjectGroup	JSON
tenant	No	string	If omitted, tenant of currently logged on user is used.	JSON

Request Example

```
/ObjectGroups
```

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "objectGroupID"      : { "type": "string", "minLength": 0, "maxLength": 32 },
  "objectGroupParentID": { "type": "string", "minLength": 32, "maxLength": 32,
  "required": "true" },
```

```
"name" : { "type": "string", "minLength": 1, "maxLength": 255,
"required": "true" },
"etag" : { "type": "string" },
"tenant" : { "type": "string", "required": "true" }}
```

Response

Format: *JSON*

Response Header Fields

Name	Type	Description
Location	string	Path to the newly created ObjectGroup
Etag	string	entity tag of the newly created ObjectGroup instance

Response Status and Error Codes

Code	Reason
201	ObjectGroup created successfully
403	Forbidden (user is not authorized to create an object group)
412	Precondition failed

Related Information

[ObjectGroup \[page 205\]](#)

4.1.1.2 Read an ObjectGroup

Retrieves a specified object group from the database

With this method, you send a request to the server to retrieve a particular object group specified by its ID.

If the object group is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: /ObjectGroups ('<objectGroupID>')

HTTP Method: [GET](#)

Permissions: <auth>.r

Request Fields

Name	Required	Type	Description	Send As
objectGroupID	Yes	string	ID of the ObjectGroup	Path parameter

Request Example

```
/ObjectGroups ('94c98d6a5fbe4aa0ad80d000667e4755')
```

Response

Format: [JSON](#)

Response Header Fields

Name	Type	Description
Etag	string	Identifier of the retrieved ObjectGroup instance (applicable only in case of a single ObjectGroup)

Response Fields

Name	Type	Description	Send As
objectGroupID	string	ID of the ObjectGroup	JSON
objectGroupParentID	string	ID of superordinate ObjectGroup	JSON
name	string	Semantic name of the ObjectGroup	JSON
tenant	string	Tenant to which the ObjectGroup is assigned	JSON
etag	string	Entity tag of the returned ObjectGroup instance	JSON

Response Status and Error Codes

Code	Reason
200	ObjectGroup or ObjectGroups retrieved successfully
403	Forbidden (user is not authorized to read an object group)

Code	Reason
404	Not found (wrong objectGroupID)

Payload

Format: *JSON*

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "objectGroupID"      : { "type": "string", "minLength": 0, "maxLength": 32 },
  "objectGroupParentID": { "type": "string", "minLength": 32, "maxLength": 32,
    "required": "true" },
  "name"               : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": "true" },
  "etag"               : { "type": "string" },
  "tenant"             : { "type": "string", "required": "true" }}
```

Related Information

[ObjectGroup \[page 205\]](#)

4.1.1.3 Read all ObjectGroups

Retrieves a list of object groups from the database

With this method, you send a request to the server to retrieve a subset of all object groups, according to the filter criteria provided. For a collective request for a set of object groups, you have these options:

- You can sort and restrict the set of object groups to be retrieved based on the following fields:
 - tenant
 - objectGroupID
 - objectGroupParentID
 - name

Defining filter criteria is **not** mandatory, but recommended because of the typically high number of object group instances.

- The `ObjectGroup` service offers an additional set of filter parameters that allows for retrieving object groups belonging to a certain hierarchy path. This hierarchy-based filter cannot be combined with any other filter criteria. Object groups matching the hierarchy filter criterion are returned as a simple, unsorted list of items that does not offer any chance of restoring the hierarchical relationships between the object groups returned. The object group used as the starting point is **not** part of the returned result. With an additional `MaxDistance` parameter, you can control the number of hierarchy levels that shall be included in the response. Using this parameter is optional. If it is omitted, the entire hierarchy based on the given starting point will be processed.

- You can define that the set of matching object groups shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

You can retrieve the global tenant root object group by calling this service with the following filter criteria:

```
objectGroupParentID eq null
```

If the set of object groups is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/ObjectGroups`

HTTP Method: `GET`

Permissions: `<auth>.r`

Query String Parameters

Name	Required	Type	Description
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set
<code>\$top</code>	No	integer	Number of records to include in the result set
<code>\$orderby</code>	No	string	Field name to be used for sorting the result set.
<code>\$filter</code>	No	string	Filter condition to be applied; valid fields are <code>tenant</code> , <code>name</code> , <code>objectGroupID</code> , and <code>objectGroupParentID</code> Hierarchy filter: Special syntax required, see example below.

Request Example

```
/ObjectGroups
```

Retrieves all object groups that are available in the database. Note that this unrestricted request is not recommended due to high system load.

```
/ObjectGroups?$filter=objectGroupParentID eq null
```

Retrieves all object groups that are defined within the scope of the root object group. Capabilities that are assigned to object groups on this hierarchy level are inherited by lower level object groups as long as there is no concurrent capability assignment made, which would overwrite the root assignments.

```
/ObjectGroups?$top=25&$filter=objectGroupParentID eq  
'94c98d6a5fbe4aa0ad80d000667e4755'&$orderby=name
```

Retrieves the first 25 object groups that are subordinate to the parent object group with the given ID. Data is retrieved in page mode to reduce network load and response times. The list of object groups is sorted by their name in ascending order.

```
/ObjectGroups?$skip=10&$top=20
```

Retrieves 20 object groups from the database where the first 10 object groups are omitted. That is, the retrieved object groups are those with sequence numbers 11 through 30.

```
/ObjectGroups?$filter=$it/  
Aggregation.isdescendant(Hierarchy='ObjectGroup',Node='94c98d6a5fbe4aa0ad80d00066  
7e4755',maxDistance=2),
```

Hierarchy-based filter: Returns a list of object groups that have been defined as sub-object groups of the object group with the specified ID. The result is limited to the first and second hierarchy level below the specified object group.

Response

Response Status and Error Codes

Code	Reason
200	List of ObjectGroups retrieved successfully
400	Bad request (for example, invalid or missing filter)
403	Forbidden (user not authorized to read object groups)

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{  
  "objectGroupID" : { "type": "string", "minLength": 0, "maxLength": 32 },  
}
```

```

"objectGroupParentID" : { "type": "string", "minLength": 32, "maxLength": 32,
"required": "true" },
"name"                : { "type": "string", "minLength": 1, "maxLength": 255,
"required": "true" },
"etag"                : { "type": "string" },
"tenant"              : { "type": "string", "required": "true" }}

```

Related Information

[ObjectGroup \[page 205\]](#)

4.1.1.4 Update an ObjectGroup

With this method, you modify an object group with the specified ID.

In the payload of the request, you assign values to those fields that you want to modify. For example, to attach the specified object group to a new superordinate object group, you pass the ID of the new superordinate object group via the `objectGroupParentID` parameter.

Note

You cannot change the ID of an object group. The ID is automatically generated by the system upon creation of an object group and must remain stable throughout its lifecycle.

If the object group is successfully updated, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI: `/ObjectGroups (<objectGroupID>)`

HTTP Method: *PUT*

Permissions: `<auth>.u`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token
etag	No	Identifier of ObjectGroup instance version
If-Match	No	Check if cached version matches server version of the ObjectGroup

Request Fields

Name	Required	Type	Description	Send As
objectGroupID	Yes	string	ID of the ObjectGroup	Path parameter
objectGroupParentID	Yes	string	ID of superordinate ObjectGroup	JSON
name	Yes	string	Semantic name of the ObjectGroup	JSON
tenant	No	string	If omitted, tenant of currently logged on user is used.	JSON

Request Example

```
/ObjectGroups ('94c98d6a5fbe4aa0ad80d000667e4755')
```

Updates the fields of the specified object group with the values provided with the payload of the request.

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "objectGroupID"      : { "type": "string", "minLength": 0, "maxLength": 32 },
  "objectGroupParentID": { "type": "string", "minLength": 32, "maxLength": 32,
  "required": "true" },
  "name"               : { "type": "string", "minLength": 1, "maxLength": 255,
  "required": "true" },
  "etag"               : { "type": "string" },
  "tenant"             : { "type": "string", "required": "true" }}
```

Response

Format: [JSON](#)

Response Header Fields

Name	Type	Description
Etag	string	Identifier of the updated ObjectGroup instance version

Response Status and Error Codes

Code	Reason
200	ObjectGroup updated successfully

Code	Reason
403	Forbidden
404	Not found
409	Conflict (for example, object instance has been changed)
412	Precondition failed

Related Information

[ObjectGroup \[page 205\]](#)

4.1.1.5 Delete an ObjectGroup

Deletes a specified object group.

With this method, you physically delete the object group with the specified ID from the database.

Deleting of an object group is **not** possible if objects are assigned to the object group or if the object group has children in the object group hierarchy. If an object group is deleted, all assigned object group capabilities are deleted as well.

If the object group is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: `/ObjectGroups ('<objectGroupID>')`

HTTP Method: `DELETE`

Permissions: `<auth>.d`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token
If-Match	Yes	Check if cached version matches server version of the ObjectGroup

Request Fields

Name	Required	Type	Description	Send As
objectGroupID	Yes	string	ID of the ObjectGroup	Path parameter

Request Example

```
/ObjectGroups ('94c98d6a5fbe4aa0ad80d000667e4755')
```

Deletes the object group with the specified ID.

Response

Response Status and Error Codes

Code	Reason
204	ObjectGroup deleted successfully

Related Information

[ObjectGroup \[page 205\]](#)

4.1.2 Root Object Group of a Tenant

This service helps to determine the root ObjectGroup of a tenant.

In each tenant, there is exactly one ObjectGroup instance that serves as the entry point into the object group hierarchy defined for that tenant. This hierarchy root entry stands out of all other ObjectGroup instances by the fact that this is the only instance within a tenant where the `objectGroupParentID` field is empty (although that field is defined as mandatory for all other entries found in the ObjectGroup hierarchy; however, this mandatory requirement is internally overridden for the root ObjectGroup). However, browsing through the list of all ObjectGroup instances that exist in a tenant can be tedious and impose unnecessary load on the system. The `ObjectGroups/TenantRoot` service is a specialized service with the single purpose of determining that particular ObjectGroup instance with one single method call.

Root Object Group Determination

The different scenarios that are covered by this method depend on various preconditions according to the following table:

Root Object Group Determination

Tenant Level	Tenant Onboarding Status	
	Legacy	New Onboarding
T1	<code>objectGroupParentID = <cross-tenant root object group in T0></code>	<code>objectGroupParentID = Null</code>

→ Recommendation

With respect to the different behavior of the `objectGroupParentID` field, we highly recommend always using the root object group service described here for determining the root object group. The service automatically detects whether a tenant is a legacy tenant or a tenant that has been created via the new onboarding strategy. The service then automatically adapts to the nature of the tenant in question and returns the correct root object group.

Base URI:

- Formal description: `http://<server address>[:<port number>][/path]/ObjectGroups/TenantRoot`
- Example for a base URI in a cloud foundry environment: `https://apiot-mds.cfapps.eu10.hana.ondemand.com/ObjectGroups/TenantRoot`

Methods

Due to the highly specialized purpose of this service, only the GET method is supported. Once the root object group has been determined, you can execute the various methods provided by the ObjectGroup service. This, however, should only be done with extra care because of the important role of the root object group.

HTTP Method	Action	URI	Scopes
GET	Read the Root ObjectGroup [page 218]	<code>/ObjectGroups/TenantRoot</code>	<code><auth>.r</code>

Payload

Since the root ObjectGroup has the same structure as any other ObjectGroup instance, its payload is exactly the same as the one of all other object groups:

```
{
  "objectGroupID"      : { "type": "string", "minLength": 0, "maxLength": 32 },
  "objectGroupParentID": { "type": "string", "minLength": 32, "maxLength": 32,
  "required": "true" },
}
```

```

    "name" : { "type": "string", "minLength": 1, "maxLength": 255,
    "required": "true" },
    "etag" : { "type": "string" },
    "tenant" : { "type": "string", "required": "true" }}

```

Related Information

[ObjectGroup \[page 205\]](#)

4.1.2.1 Read the Root ObjectGroup

Returns the root object group of a tenant

With this method, you can determine the root object group of either the current tenant or of a tenant specified via parameter.

Root Object Group Determination

The different scenarios that are covered by this method depend on various preconditions according to the following table:

Root Object Group Determination

Tenant Level	Tenant Onboarding Status	
	Legacy	New Onboarding
T1	objectGroupParentID = <cross-tenant root object group in T0>	objectGroupParentID = Null

→ Recommendation

With respect to the different behavior of the `objectGroupParentID` field, we highly recommend always using the root object group service described here for determining the root object group. The service automatically detects whether a tenant is a legacy tenant or a tenant that has been created via the new onboarding strategy. The service then automatically adapts to the nature of the tenant in question and returns the correct root object group.

For an explanation of the different tenant levels, see section *Business Partner in SAP SAP IoT* in the [Business Partner \[page 29\]](#) chapter.

Request

URI: `/ObjectGroups/TenantRoot[?tenant=<tenant ID>]`

HTTP Method: [GET](#)

Permissions: <auth>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
tenant	No	string	ID of the desired tenant. Can only be used for referring to T1 tenants when logged on to a T0 tenant. Defaults to the currently logged on tenant if omitted.	Query

Request Example

```
/ObjectGroups/TenantRoot?tenant=wdf-customer15
```

Response

Response Example

```
{
  "objectGroupID"      : "9764513e0fd540f09108e365d82f947c",
  "name"               : "car500wheel_fl",
  "etag"               : "3",
  "tenant"             : "wdf-customer15"
```

Note that in the above example, the `objectGroupParentID` field is omitted because it contains a Null value, according to the new onboarding strategy.

Response Status and Error Codes

Code	Reason
200	Root ObjectGroup retrieved successfully
403	Forbidden (user is not authorized to read the root object group)
404	Not found (wrong objectGroupID)

Related Information

[Root Object Group of a Tenant \[page 216\]](#)

4.1.3 CapabilityType

A `CapabilityType` serves as a template for a `Capability`.

`CapabilityType` objects provide the definition of a certain capability that can be granted to a user with respect to certain objects. The relation between a `CapabilityType` and a `Capability` is similar to the relation between a class and an object instance in object-oriented programming languages. That is, the essential properties of a given `Capability` are defined by the `CapabilityType` from which it is derived.

In SAP IoT, `CapabilityTypes` are treated as a very low-level kind of business content. That is, there are hard-coded, predefined `CapabilityTypes` available that are delivered by SAP and that can neither be changed nor extended by customers. However, the number of `CapabilityTypes` may grow in future releases. The following `CapabilityTypes` are currently available:

- Thing
- Organization
- Person

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/CapabilityTypes`
- Example for a base URI in a cloud foundry environment: `http://authorizations.cfapps.eu10.hana.ondemand.com/CapabilityTypes`

Permissions: `<auth>.r`

Methods

HTTP Method	Action	URI	Scopes
GET	Read a CapabilityType [page 222]	<code>/CapabilityTypes ('<ctID>')</code>	<code><auth>.r</code>
GET	Read all CapabilityTypes [page 223]	<code>/CapabilityTypes</code>	<code><auth>.r</code>

Structure

Unlike almost all of the other services in SAP IoT, `CapabilityTypes` do **not** appear in the persistence layer. This is due to their hardcoded nature, which leads to a mere transient usage with no representation in the database.

However, the hardcoded internal structure of the service can of course be described. It consists of the following parts:

Field Explanation

Name	Description
ID	Unique identifier for the capability type. It matches the following pattern: <code>FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF</code>. Here, the asterisks used as placeholder elements ("*") are to be replaced by a unique hexadecimal code, and they are reserved for capability types shipped by SAP. The values for these predefined capability types are as follows: • Person: <code>FFFFFFFFF0000000FFFFFFFFF0001</code> • Organization: <code>FFFFFFFFF0000000FFFFFFFFF0002</code> • Thing: <code>FFFFFFFFF0000000FFFFFFFFF0003</code>
Name	Semantic identifier for the capability type. These names are: • <code>thing:thing</code> • <code>bp:organization</code> • <code>bp:person</code>
Actions	A set of actions that are available for a particular type. Currently the following actions are supported: • Read • Write • Delete
Vocabulary	The set of available fields and their respective database entity. Only fields with a 1:1 relationship are allowed. The main source is the respective <code>Databasetable</code> or <code>View</code> underlying the "Get all" REST service. The <code>Vocabulary</code> has its own package where the respective classes with all needed methods are implemented.

With the field structure given above, the payload structure of `CapabilityType` service varies depending on the particular type in question. Here, not only the predefined field values for ID and Name are different. In addition, the structure of the `Vocabulary` field is type-specific and results in a very complex payload structure. Because of that, we have outsourced the payload into three separate topics. For more information, see the [Related Information](#) section at the bottom of this topic.

Related Information

[Capability](#) [page 224]

[Payload of CapabilityType "Person"](#) [page 77]

[Payload of CapabilityType "Organization"](#) [page 48]

[Payload of CapabilityType "Thing"](#) [page 813]

4.1.3.1 Read a CapabilityType

With this method, you can check the existence of a particular `CapabilityType`

You can use this method to find out whether a particular `CapabilityType` is available in the system landscape or not. This can be helpful when you experience technical problems and want to check whether the system is in a healthy state. Since the `CapabilityType` service has no persistence layer, there is no other use case for this method.

Request

URI: `/CapabilityTypes('<ID>')`

HTTP Method: `GET`

Permissions: `<auth>.r`

Query String Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique identifier of the <code>CapabilityType</code>	Path

Request Example

```
/CapabilityTypes('FFFFFFFFF00000000FFFFFFFFF0001')
```

Response

Response Status and Error Codes

Code	Description
200	<code>CapabilityType</code> retrieved successfully

Related Information

[CapabilityType](#) [page 220]

4.1.3.2 Read all CapabilityTypes

Retrieves a list of all `CapabilityType` objects from the database

You use this method to find out which `CapabilityTypes` are available in the system and can be used for deriving individual capabilities for certain objects.

Request

URI: `/CapabilityTypes`

HTTP Method: `GET`

Permissions: `<auth>.r`

Request Parameters

None.

i Note

Since the number of predefined `CapabilityType` objects is very small, there is no need for any kind of filtering or restricting parameters that are otherwise common for the "Get all" methods of most of the other services.

Request Example

```
/CapabilityTypes
```

Response

Response Status and Error Codes

Code	Description
200	CapabilityTypes retrieved successfully

Related Information

[CapabilityType \[page 220\]](#)

4.1.4 Capability

An object instance of a `CapabilityType` that can be associated with a role collection.

You use `Capability` objects to specify a set of objects in the database on which users can perform actions as defined by the `CapabilityType` from which the `Capability` has been derived. The multiple dimensions of authorization that are involved here can be grouped as follows:

Authorization Dimensions

Dimension	Explanation
Object set	Set of objects that a user can access defined by a complex filter expression given as <code>filterTerm</code> . The filter can be based on specific field values of a particular object such that granting the authorization is based on the presence (or absence) of a particular value.
Role collection	A set of roles of which at least one a user must be assigned to in order to be able to perform the actions controlled by the <code>Capability</code> .
Actions	The different actions (read, write, delete) that the user can perform on the objects defined by the object set.

The most powerful feature here is the definition of a set of objects for which access is granted. Here, a complex filter expression can be defined, which allows to restrict access not only to objects of a particular type, but to objects of a particular type with a particular value in one of its fields (or with different values in a list of its fields). This lets you define access rights on a very fine level of granularity, which in turn is a prerequisite for a clear segregation of duties needed to fulfill the data protection requirements for a multitenancy platform.

❖ Example

You want to define an authorization for a group of users who are in charge of monitoring a number of physical devices in a factory located in Munich (Germany). To accomplish this, you define a `Capability` object and assign a role collection for the user group in question where the set of accessible objects is restricted to those of the given type in question (for example, a welding robot) and that, at the same time, have the `cityName` field of the associated `Location` object set to 'Munich'.

Cross-Tenant Maintenance:

Regarding cross-tenant maintenance, the following applies:

- As opposed to older releases of SAP IoT, cross-tenant maintenance is possible only for cloud platform providers of SAP IoT.
- Users that are assigned to a tenant of a cloud platform consumer (T1) can only access `Capability` objects that belong to the tenant where they are logged on to.

Multiple Capabilities per User:

If a user has more than one `Capability` objects assigned that refer to the same set of objects, the access rights defined in the different `Capability` objects are combined via a logical OR, that is, the effective permission is a superset of all permissions granted by the `Capability` objects.

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/Capabilities`
- Example for a base URI in a cloud foundry environment: `https://authorizations.cfapps.eu10.hana.ondemand.com/Capabilities`

Methods

HTTP Method	Action	URI	Scopes
POST	Create a Capability [page 226]	/Capabilities	<auth>.c
GET	Read a Capability [page 230]	/Capabilities('ID')	<auth>.r
GET	Read all Capabilities [page 231]	/Capabilities	<auth>.r
PUT	Update a Capability [page 233]	/Capabilities('ID')	<auth>.u
DELETE	Delete a Capability [page 235]	/Capabilities('ID')	<auth>.d

Payload

Only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "ID" : { "type": "string", "maxLength": 32 },
  "capabilityTypeID" : { "type": "string", "maxLength": 32, "required":
"true" },
  "name" : { "type": "string", "maxLength": 255, "required":
"true" },
  "userGroupTenant" : { "type": "string", "maxLength": 36 },
  "filterTerm" : { "type": "json" },
  "etag" : { "type": "string" },
  "roleCollections" : { "value": {
    [ "roleCollection" : { "type" : "string",
      "maxLength": 255 } ]
  } },
  "actions" : { "value": {
    [ "actionName" : { "type" : "string", "maxLength":
      255 } ]
  } }
}
```

Note

- The name of a `Capability` object must be unique within a tenant.
- The `filterTerm` attribute declaration as `"type": "json"` in the payload listed above indicates that this field must be filled with a valid object selection criterion according to the JSON notation that is defined for filter terms. For more information and an example, see [Filter Terms \[page 236\]](#).

Related Information

[Filter Terms \[page 236\]](#)

[CapabilityType \[page 220\]](#)

[UserGroup \[page 314\]](#)

4.1.4.1 Create a Capability

With this method, you create a new capability. The system automatically assigns a unique ID to the new capability.

Creating a new capability requires that you provide values for the following mandatory fields:

- `capabilityTypeID`

i Note

You can retrieve the available values for this field with the [Read all CapabilityTypes \[page 223\]](#) method.

- `name`

If no value is given for the `userGroupTenant`, the system assigns the tenant of the currently logged on user to the new capability.

i Note

If no value is given for the `filterTerm` field, the system raises an error message to make you aware of this. In this case, a new capability cannot be created because the `filterTerm` defines the set of objects for which the capability shall grant access permission. Providing a value for this field is essential and cannot be omitted.

Request

URI: `/Capabilities`

HTTP Method: `POST`

Permissions: `<auth>.c`

Request Parameters

None.

Payload

Format: `JSON`

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "ID" : { "type": "string", "maxLength": 32 },
  "capabilityTypeID" : { "type": "string", "maxLength": 32, "required":
"true" },
  "name" : { "type": "string", "maxLength": 255, "required":
"true" },
  "userGroupTenant" : { "type": "string", "maxLength": 36 },
  "filterTerm" : { "type": "json" },
  "etag" : { "type": "string" },
  "roleCollections" : { "value": {
    [ "roleCollection" : { "type" : "string",
"maxLength": 255 } ]
  } },
}
```



```

    "actions"          : { "value": {
255 } ]                [ "actionName" : { "type" : "string", "maxLength":
                        } }
    }

```

Request Example

```
/Capabilities
```

Here is a pretty simple example of a payload for a request where a new capability is created that grants full access (read, write, and delete) to all objects of type thing without any restriction criteria. The trick to accomplish this is to make use of the special value assignment `"filterTerm": true` instead of a highly differentiated and complex `filterTerm` statement that follows in the second example further below. But let's start with the simple version:

```

{
  "capabilityTypeID": "FFFFFFFFF00000000FFFFFFFFF0003",
  "name"            : "<name of your capability type>",
  "filterTerm"      : true,
  "etag"            : "1",
  "roleCollections": {
    "value": [
      {
        "roleCollection": "<your role collection>"
      }
    ]
  },
  "actions": {
    "value": [
      {
        "action": "Write"
      },
      {
        "action": "Read"
      },
      {
        "action": "Delete"
      }
    ]
  }
}

```

Note

The simple `filterTerm` condition used in the example above corresponds to the [Unrestricted](#) checkbox that you can find in the [Create Capability](#) and [Edit Capability](#) dialog box of the Tenant Administration app.

Now, let's go for another example with a more sophisticated filter term expression. Here, a capability is created for granting access to an object of type person based on a specified object group collection:

```

{
  "capabilityTypeID": "FFFFFFFFF00000000FFFFFFFFF0001",
  "name"            : "{{temp}}",
  "filterTerm": {
    "type": "FilterTermHierarchyAssignment",
    "path": {
      "field": "objectGroup",
      "dimension": "root"
    },
    "objectGroupCollections": ["{{objectGroupCollectionID}}"]
  },
}

```

```

    "etag": "1",
    "roleCollections": {
      "value": [
        {
          "roleCollection": "{{<your role collection>}}"
        }
      ]
    },
    "actions": {
      "value": [
        {
          "action": "Write"
        },
        {
          "action": "Read"
        },
        {
          "action": "Delete"
        }
      ]
    }
  }
}

```

Finally, here's a more complex example of a payload for a request where a new capability is created that grants full access (read, write, and delete) to an object of type organization matching the following criteria:

- cityName = "Berlin" AND objectGroupCollection = "OGC_ID_1000" OR
- cityName = "Heidelberg" AND objectGroupCollection = "OGC_ID_2000"

The new capability shall be assigned to a role collection called "ThingEngineer_3000", so that all users assigned to a user group referencing that role collection can access to Organization objects matching the specified criteria:

```

{
  "capabilityTypeID": "FFFFFFFFF00000000FFFFFFFFF0002",
  "name": "{{CapaName}}",
  "filterTerm": {
    {
      "type": "FilterTermExpression",
      "booleanOperator": "OR",
      "filterTerms": [{
        "type": "FilterTermExpression",
        "booleanOperator": "AND",
        "filterTerms": [{
          "type": "FilterTermElement",
          "path": {
            "field": "cityName",
            "dimension": "root"
          },
          "operator": "EQUAL",
          "value": "Berlin"
        }
      ],
      "type": "FilterTermHierarchyAssignment",
      "path": {
        "field": "objectGroup",
        "dimension": "root"
      },
      "objectGroupCollections": ["{{OGC_ID_1000}}"]
    }
  ],
  {
    "type": "FilterTermExpression",
    "booleanOperator": "AND",
    "filterTerms": [{

```

```

        "type": "FilterTermElement",
        "path": {
            "field": "cityName",
            "dimension": "root"
        },
        "operator": "EQUAL",
        "value": "Heidelberg"
    },
    {
        "type": "FilterTermHierarchyAssignment",
        "path": {
            "field": "objectGroup",
            "dimension": "root"
        },
        "objectGroupCollections": ["{{OGC_ID_2000}}"]
    }
]
},
"roleCollections": {
    "value": [{
        "roleCollection": "{{ThingEngineer_3000}}"
    }]
},
"actions": {
    "value": [
        {
            "action": "Read"
        },
        {
            "action": "Write"
        },
        {
            "action": "Delete"
        }
    ]
}
}

```

Response

Response Status and Error Codes

Code	Description
201	Object created successfully

Related Information

[Capability \[page 224\]](#)

[Filter Terms \[page 236\]](#)

4.1.4.2 Read a Capability

Retrieves the specified `Capability` from the database

With this method, you send a request to the server to retrieve a particular `Capability` object specified by its ID.

Note

With a user assigned to a tenant on T1 level (Cloud Platform Consumer), you can only access `Capability` objects that belong to the currently logged on user.

Request

URI: `/Capabilities('<ID>')`

HTTP Method: `GET`

Permissions: `<auth>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique identifier of the Capability	Path

Request Example

```
/Capabilities('be531d4cfd524f06b8df7c999377fac8')
```

Response

Payload

```
{
  "ID" : { "type": "string", "maxLength": 32 },
  "capabilityTypeID" : { "type": "string", "maxLength": 32, "required":
"true" },
  "name" : { "type": "string", "maxLength": 255, "required":
"true" },
  "userGroupTenant" : { "type": "string", "maxLength": 36 },
  "filterTerm" : { "type": "json" },
  "etag" : { "type": "string" },
  "roleCollections" : { "value": {
    [ "roleCollection" : { "type" : "string",
      } },
    "actions" : { "value": {
      [ "actionName" : { "type" : "string", "maxLength":
255 } ]
    }
  }
}
```

```
}  
    }  
}
```

Response Status and Error Codes

Code	Description
200	Capability retrieved successfully

Related Information

[Capability \[page 224\]](#)

4.1.4.3 Read all Capabilities

Retrieves a list of `Capability` objects from the database

With this method, you send a request to the server to retrieve a subset of all `Capability` objects, according to the filter criteria provided. For a collective request for a set of `Capability` objects, you have these options:

- You can sort and restrict the set of `Capability` objects to be retrieved by filter criteria based on the following fields:
 - `ID`
 - `capabilityTypeID`
 - `name`
 - `userGroupTenant`
 - `crossTenantScope`
 - `actions/name`
 - `roleCollections/roleCollection`
- You can define that the set of matching `Capability` objects shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

i Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: /Capabilities

HTTP Method: *GET*

Permissions: <auth>.r

Query String Parameters

Name	Required	Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order
\$filter	No	string	Filter condition to be applied; for valid fields, see list given above.

Note

For the filter parameter, the following applies:

- Defining a filter is **not** mandatory for this service method.
- The filter behavior is different depending on the tenant level of the currently logged on user:
 - User is assigned to a T0 tenant (Cloud Platform Provider): Defining a filter definition can be used to restrict the result set to those capabilities belonging to the specified tenant. Otherwise, all `Capability` objects for all tenants are returned.
 - User is assigned to a T1 tenant (Cloud Platform Consumer): Only the `Capability` objects belonging to the user's tenant are returned. If a different tenant is specified in the filter, the system returns an empty result list.

Request Parameters

None.

Request Example

```
/Capabilities
```

Retrieves all `Capability` objects that are available for the currently logged on user, or all `Capability` objects in case the user is assigned to a T0 tenant **and** has been granted cross-tenant maintenance authorizations.

```
/Capabilities?$filter=roleCollections/roleCollection eq 'BP-FA-Group'
```

Retrieves all capabilities that are granted to users who are assigned to a user group with the specified role collection.

```
/Capabilities?$filter=actions/name eq 'Read' and roleCollections/roleCollection eq 'BP-FA-Group'
```

Retrieves all capabilities that grant read access to users who are assigned to a user group with the specified role collection. For specifying an action, you can use the string literals 'Read', 'Write', or 'Delete'.

```
/Capabilities?$top=25
```

Retrieves the first 25 `Capability` objects from the database.

```
/Capabilities?$filter=userGroupTenant eq 'customer-test001'
```

Retrieves all `Capability` objects that refer to the specified `userGroupTenant`.

```
/Capabilities?$skip=10&$top=20
```

Retrieves 20 `Capability` objects from the database where the first 10 objects are omitted. That is, the retrieved objects are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Description
200	Objects retrieved successfully

Related Information

[Capability](#) [page 224]

4.1.4.4 Update a Capability

With this method, you modify a `Capability` object with the specified ID.

In the payload of the request, you assign values to those fields that you want to modify. For example, assume you have a `Capability` defined that grants access rights to a group of users for a number of machines (modeled as `Thing` objects), where the machines are selected by the location data of their technical place. Now, a decision has been made to relocate the machines to a different assembly line in the same plant. You could then decide to update the respective `Capability` object by adjusting the selection criterion that is part of the `FilterTerm` field value rather than setting up completely new capabilities.

Request

URI: `/Capabilities('<ID>')`

HTTP Method: [PUT](#)

Permissions: <auth>.u

Request Header Fields

Header	Required	Description
If-Match	Yes	Check if cached version matches server version of the capability

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique identifier of the Capability object	Path

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "ID" : { "type": "string", "maxLength": 32 },
  "capabilityTypeID" : { "type": "string", "maxLength": 32, "required":
"true" },
  "name" : { "type": "string", "maxLength": 255, "required":
"true" },
  "userGroupTenant" : { "type": "string", "maxLength": 36 },
  "filterTerm" : { "type": "json" },
  "etag" : { "type": "string" },
  "roleCollections" : { "value": {
    [ "roleCollection" : { "type" : "string",
"maxLength": 255 } ]
  } },
  "actions" : { "value": {
    [ "actionName" : { "type" : "string", "maxLength":
255 } ]
  } }
}
```

Request Example

```
/Capabilities('be531d4cfd524f06b8df7c999377fac8')
```

Along with this PUT request, we pass the following payload to set the values for the respective fields of the specified capability:

```
{
  "capabilityTypeID": "FFFFFFFFF000000000FFFFFFFFF0003",
  "name" : "{{temp}}",
  "filterTerm": true,
  "etag": "1",
  "roleCollections": {
    "value": [
      {
        "roleCollection": "{{<your role collection>}}"
      }
    ]
  },
  "actions": {
    "value": [
      {

```



```

        "action": "Write"
      },
      {
        "action": "Read"
      },
      {
        "action": "Delete"
      }
    ]
  }
}

```

Response

Response Status and Error Codes

Code	Description
200	Capability updated successfully

Related Information

[Capability](#) [page 224]

4.1.4.5 Delete a Capability

With this method, you delete a `Capability` element with the specified ID.

This method deletes the `Capability` object physically. After the successful deletion, it is not possible to restore the deleted object. Also, along with the `Capability` itself, all actions that have been assigned to the object via the `actions` field are also deleted from the database. That is, they cannot be reused by other `Capability` objects.

If the element is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: `/Capabilities('<ID>')`

HTTP Method: `DELETE`

Permissions: `<auth>.d`

Request Header Fields

Header	Required	Values
If-Match	Yes	Check if cached version matches server version of the capability

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique identifier of the Capability object	Path

Request Example

```
/Capabilities('be531d4cfd524f06b8df7c999377fac8')
```

Response

Response Status and Error Codes

Code	Description
204	Capability deleted successfully

Related Information

[Capability \[page 224\]](#)

4.1.5 Filter Terms

A method to describe complex object selection criteria

Overview

A filter term is a formal expression used to describe a set of objects (typically modeled as a Thing) for which a user should have instance authorization. This set of objects can also consist of only one object. In other words, you use a filter term to restrict a user's access rights down to the finest possible granularity. You can go to the extreme of a single user being granted access to one single object, like a car, a coffee machine, or a wind turbine.

The general approach for using filter terms is to describe a group of objects (or an individual object) by the values of its fields. If the field values of an object match the criteria defined in the filter term, a user is granted access to that object to the extent that is defined in the `Capability` object containing the filter term.

❖ Example

You want to set up a capability for users in user group "Control Room Staff" to monitor the technical health of a group of forming presses in a car factory. To select only those instances of industrial machinery that fall into this category, you define a filter term condition for the `Capability` that limits the result set to objects that are located in the desired factory, and that have a matching press manufacturer and press type identifier in their property set.

The term is built using Boolean logic and a certain structure. It has to be provided in a structured, JSON-compatible form that can be processed by the filter term framework. Currently, the filter term concept explained in this section is used exclusively for evaluating the `FilterTerm` field in the payload of the `Capability` service.

i Note

Do not confuse the filter term concept described here with the filter that can be used as a query string parameter for almost all of the "Read all..." service methods offered by the SAP IoT platform. Although both concepts are similar in that they narrow down an otherwise vast number of objects to a number that can be handled, they are different in purpose as well as in their technical implementation. For more information on the filter query string parameter, see [Filter Conditions \(\\$filter\) \[page 1550\]](#).

Filter Term Constituents

Filter terms consist of a set of different parts, which constitute the selection criteria defined by the term. The following types of elements exist:

- Filter Term Element
- Filter Term Hierarchy Assignment
- Filter Term Expression
- Filter Term Negation

Filter Term Element

A filter term of type `FilterTermElement` has the following JSON format:

```
{
  "type" : "FilterTermElement",
  "path" : <Any Path>
  "operator" : <Operator>,
  "value" : <Value>
}
```

Here, `path` describes the data source to be queried in the filter term. It is a structured element that consists of two fields referring to the underlying database entities:

```
{
  "field" : <Field Name>,
  "dimension" : <Table Name>
}
```

```
}
```

To retrieve the possible values for these two fields, use the [Read all CapabilityTypes \[page 223\]](#) service method.

The following operators are supported:

- `EQUAL`, `NOT_EQUAL` (numeric and alphanumeric values; string comparisons are case-sensitive)
- `LOWER` (only numeric values)
- `LOWER_EQUAL` (only numeric values)
- `GREATER` (only numeric values)
- `GREATER_EQUAL` (only numeric values)
- `STARTS_WITH` (only string values)
- `ENDS_WITH` (only string values)
- `CONTAINS` (only string values)
- `MATCHES_PATTERN` (only string values)
- `REGEXP` (only string values)

Note

The `MATCHES_PATTERN` operator can be used to search for strings with a search criterion that is defined as a partial equivalent of the searched string, enriched with the following wildcards:

- `*` matches any number of characters
- `+` matches exactly one character

If you want to search for a string that contains one of the wildcard characters, you need to escape the wildcard characters by putting the escape character `#` in front of it, that is, `#*` and `#+`, respectively. The same applies for searched strings that contain the escape character itself (that is, enter `##` in the search string).

For more information on string comparison operations, see [Comparisons Between Character Strings and Byte Strings](#)

The `REGEXP` operator can be used to define a filter criterion via a regular expression. This operator is only supported for `Thing` objects, but **not** for entities referred to by other capability types, such as `Organization` or `Person`.

For more information on the `REGEXP` operator, see [LIKE_REGEXPR Function \(String\)](#). Note, however, that in the filter term implementation of the `REGEXP` operator, none of the HANA flag options is used during evaluation of the search expression.

Filter Term Hierarchy Assignment

A filter term of type `FilterTermHierarchyAssignment` has the following JSON format:

```
{
  "type" : "FilterTermHierarchyAssignment",
  "path" : <Hierarchy Assignment Path>
  "objectGroupCollections" : [ <ObjectGroupCollection ID>, ... ]
}
```

Here, the value placeholders have the following meaning:

- `<Hierarchy Assignment Path>`: Path object from the `Vocabulary` field of the capability type that points to `ValueTypeHierarchyAssignment`

- `<ObjectGroupCollection ID>`: ID of an `ObjectGroupCollection` header object. Here, you can specify an array of one or more object group collection IDs. If a particular object that a user wants to access is assigned to an object group of one or more of these object group collections, the filter term is evaluated to `TRUE`. That is, the user is granted the required permission and can access the object.

Filter Term Expression

A filter term of type `FilterTermExpression` has the following JSON format:

```
{
  "type" : "FilterTermExpression",
  "booleanOperator" : <Boolean Operator>,
  "filterTerms" : [ <Any JSON filter term>, ...]
}
```

Here, the `<Boolean Operator>` can have one of the following two values:

- `AND`
- `OR`

Note

When parsing a filter term, the system treats both the `AND` as well as the `OR` operator with equal priority. That is, there is no implicit logical precedence of `AND` over `OR` as you may know it from many programming languages. As a consequence, you do **not** need to provide extra brackets to influence the internal evaluation logic.

The placeholder `<Any JSON filter term>` refers to the JSON structure of any other filter term. Note that the `filterTerms` part is declared as an array of comma-separated filter term elements.

Filter Term Negation

A filter term of type `FilterTermNegation` has the following JSON format:

```
{
  "type" : "FilterTermNegation",
  "filterTerm" : <Any JSON filter term>
}
```

Since the `filterTerm` can be a filter term expression, you can logically invert any filter term with one filter term negation, regardless of size and complexity of the expression.

Example

The following filter term represents a certain Boolean expression given in a form you may be familiar with from the *Where* clause used in SQL database queries:

```
NOT[ ( table1.isDeleted EQ false AND table1.isDefault EQ TRUE ) OR
      ( table2.size EQ 3 AND table2.weight EQ 1 ) OR
      ( table2.size EQ 3 AND table2.status EQ OBSOLETE ) ]
```

For a filter term to be used with the Capability service, this SQL-like representation must be converted into the following JSON-compatible form:

```
{
  "type": "FilterTermNegation",
  "filterTerm": {
    "type": "FilterTermExpression",
    "booleanOperator": "OR",
    "filterTerms": [
      {
        "type": "FilterTermExpression",
        "booleanOperator": "AND",
        "filterTerms": [{
          "type": "FilterTermElement",
          "path": {
            "field": "isDeleted",
            "dimension": "table1"
          },
          "operator": "EQUAL",
          "value": "false"
        }],
        "operator": "EQUAL",
        "value": "true"
      },
      {
        "type": "FilterTermElement",
        "path": {
          "field": "isDefault",
          "dimension": "table1"
        },
        "operator": "EQUAL",
        "value": "true"
      }
    ]
  },
  {
    "type": "FilterTermExpression",
    "booleanOperator": "AND",
    "filterTerms": [{
      "type": "FilterTermElement",
      "path": {
        "field": "size",
        "dimension": "table2"
      },
      "operator": "EQUAL",
      "value": "3"
    }],
    {
      "type": "FilterTermElement",
      "path": {
        "field": "weight",
        "dimension": "table2"
      },
      "operator": "EQUAL",
      "value": "1"
    }
  ]
},
  {
    "type": "FilterTermExpression",
    "booleanOperator": "AND",
    "filterTerms": [{
      "type": "FilterTermElement",
      "path": {
        "field": "size",
        "dimension": "table2"
      },
      "operator": "EQUAL",
      "value": "3"
    }],
    {
      "type": "FilterTermElement",
```

```

        "path": {
            "field": "status",
            "dimension": "table2"
        },
        "operator": "EQUAL",
        "value": "Obsolete"
    }
}
}

```

For another example, see the *Request Example* section in [Create a Capability \[page 226\]](#).

Related Information

[Capability \[page 224\]](#)

[CapabilityType \[page 220\]](#)

[ObjectGroupCollection \[page 241\]](#)

4.1.6 ObjectGroupCollection

An `ObjectGroupCollection` represents a subset of object groups in the object group hierarchy

The `ObjectGroupCollection` represents the description of the object group hierarchy. It consists of a header and several item entries. This section is dealing with the header object. For more information on the items of an `ObjectGroupCollection`, see [ObjectGroupCollectionItem \[page 249\]](#).

→ Recommendation

For performance reasons, we recommend limiting the number of object groups that are assigned to an `ObjectGroupCollection` element to no more than 3000. Note that this limit refers to the assigned object groups and **not** to the assigned `ObjectGroupCollectionItem` elements.

Currently, we cannot offer any technical support to ensure that this limit is not exceeded. It is therefore in your own responsibility to keep track of the number of already assigned object groups.

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/ObjectGroupCollections`
- Example for a base URI in a cloud foundry environment: `http://authorizations.cfapps.eu10.hana.ondemand.com/ObjectGroupCollections`

Permissions:

`<auth>.c`

`<auth>.r`

`<auth>.d`

Methods

HTTP Method	Action	URI	Scopes
POST	Create an ObjectGroupCollection [page 243]	/ObjectGroupCollections	<auth>.c
GET	Read an ObjectGroupCollection [page 244]	/ObjectGroupCollections('ID')	<auth>.r
GET	Read all ObjectGroupCollections [page 246]	/ObjectGroupCollections	<auth>.r
DELETE	Delete an ObjectGroupCollection [page 248]	/ObjectGroupCollections('ID')	<auth>.d

i Note

Although a service method is available to explicitly create an `ObjectGroupCollection` header element, we do not recommend using this method. This is because a header element alone cannot carry any business logic or semantics. Instead, logic and semantics are defined by the items that are associated with the header element. Therefore, creating an `ObjectGroupCollection` header element can also be done implicitly by creating an `ObjectGroupCollectionItem` object with a reference to an `ObjectGroupCollection` header element that does not yet exist in the system.

Payload

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32},
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "tenant" : { "type": "string", "maxLength": 36 },
  "etag" : { "type": "string" }
}
```

Field Explanation

Name	Description
objectGroupCollectionID	Unique ID of the ObjectGroupCollection. i Note This field is not flagged as mandatory. However, the system ensures that the field always contains a proper value.
objectGroupCollectionName	Descriptive name of the ObjectGroupCollection (for example, "High Pressure Water Pump")

Name	Description
tenant	Name of the tenant to which an ObjectGroupCollection is assigned
etag	Entity tag used to identify a particular instance of an ObjectGroupCollection

Related Information

[ObjectGroupCollectionItem](#) [page 249]

4.1.6.1 Create an ObjectGroupCollection

With this method, you create a new `ObjectGroupCollection` header object

The most convenient way of creating an `ObjectGroupCollection` header object is to create an `ObjectGroupCollectionItem` object with a reference to a header object that does not yet exist. However, for certain use cases, this implicit object creation may not be the preferred approach. Therefore, a dedicated `Create` method is also available although a single header object (i.e., without assigned items) cannot carry any business logic or semantics.

Request

URI: `/ObjectGroupCollections`

HTTP Method: `POST`

Permissions: `<auth>.r`

Request Parameters

None.

Request Example

```
/ObjectGroupCollections
```

Payload

```
{
```

```

    "objectGroupCollectionID" : { "type": "string", "maxLength": 32},
    "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
    "required": "true" },
    "tenant" : { "type": "string", "maxLength": 36 },
    "etag" : { "type": "string" }
  }

```

Response

Response Headers

Header	Description
Location	Path to the newly created ObjectGroupCollection header object

Response Status and Error Codes

Code	Description
201	ObjectGroupCollection created successfully
403	Forbidden (user is not authorized to create an ObjectGroupCollection)

Related Information

[ObjectGroupCollection \[page 241\]](#)

4.1.6.2 Read an ObjectGroupCollection

Retrieves the ObjectGroupCollection header with the specified ID from the database

With this method, you send a request to the server to retrieve a particular ObjectGroupCollection header object specified by its ID.

i Note

With a user assigned to a tenant on T1 level (Cloud Platform Consumer), you can only access ObjectGroupCollection headers that belong to the tenant of the currently logged on user.

Request

URI: /ObjectGroupCollections ('ID')

HTTP Method: [GET](#)

Permissions: <auth>.r

Query String Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique identifier of the ObjectGroup-Collection header object	Path

Request Example

```
/ObjectGroupCollections('8c0b596b1bd340d3ac7b0072ffb5c8bd')
```

Response

Response Status and Error Codes

Code	Description
200	ObjectGroupCollection header retrieved successfully

Payload

Only media type JSON is supported.

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32},
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "tenant" : { "type": "string", "maxLength": 36 },
  "etag" : { "type": "string" }
}
```

Related Information

[ObjectGroupCollection \[page 241\]](#)

4.1.6.3 Read all ObjectGroupCollections

Retrieves a list of `ObjectGroupCollection` header objects from the database

With this method, you send a request to the server to retrieve a subset of all `ObjectGroupCollection` header objects, according to the filter criteria provided. For a collective request for a set of `ObjectGroupCollection` header objects, you have these options:

- You can sort and restrict the set of `ObjectGroupCollection` headers to be retrieved based on the following fields:
 - `tenant`
 - `objectGroupCollectionID`
 - `objectGroupCollectionName`
- You can define that the set of matching `ObjectGroupCollection` headers shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

If the list of `ObjectGroupCollection` headers is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

i Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: `/ObjectGroupCollections`

HTTP Method: `GET`

Permissions: `<auth>.r`

Query String Parameters

Name	Required	Type	Description
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set
<code>\$top</code>	No	integer	Number of records to include in the result set

Name	Required	Type	Description
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order
\$filter	No	string	Filter condition to be applied; valid fields are tenant, objectGroupCollectionID, and objectGroupCollectionName

Note

For the filter parameter, the following applies:

- Defining a filter is **not** mandatory for this service method.
- The filter behavior is different depending on the tenant level of the currently logged on user:
 - User is assigned to a T0 tenant (Cloud Platform Provider): Defining a filter definition can be used to restrict the result set to the ObjectGroupCollection headers belonging to the specified tenant. Otherwise, all ObjectGroupCollection headers are returned.
 - User is assigned to a T1 tenant (Cloud Platform Consumer): Only the ObjectGroupCollection headers belonging to the user's tenant are returned. If a different tenant is specified in the filter, the system returns an empty result list.

Request Example

```
/ObjectGroupCollections
```

Retrieves all ObjectGroupCollection headers that are available for the currently logged on user.

```
/ObjectGroupCollections?$top=25
```

Retrieves the first 25 ObjectGroupCollection headers. Data is retrieved in page mode to reduce network load and response times.

```
/ObjectGroupCollections?$skip=10&$top=20
```

Retrieves 20 ObjectGroupCollection header objects from the database where the first 10 ObjectGroupCollection header objects are omitted. That is, the retrieved headers are those with sequence numbers 11 through 30.

```
/ObjectGroupCollections?$filter=tenant eq 'Customer-test001'&
$orderby=objectGroupCollectionName
```

Retrieves all ObjectGroupCollection headers from the database that belong to the specified tenant. The list of headers is alphabetically sorted based on their names.

Response

Format: *JSON*

Payload

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32},
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "tenant" : { "type": "string", "maxLength": 36 },
  "etag" : { "type": "string" }
}
```

Response Status and Error Codes

Code	Reason
200	ObjectGroupCollection headers retrieved successfully

Related Information

[ObjectGroupCollection \[page 241\]](#)

4.1.6.4 Delete an ObjectGroupCollection

With this method, you delete an ObjectGroupCollection header with the specified ID.

This method deletes the ObjectGroupCollection header physically. After the successful deletion, it is not possible to restore the deleted object. All ObjectGroupCollectionItem elements that are referring to the deleted header are automatically deleted by the system to preserve data integrity (cascaded deletion).

If the ObjectGroupCollection header is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: /ObjectGroupCollections ('ID')

HTTP Method: [DELETE](#)

Permissions: <auth>.d

Request Header Fields

Header	Required	Values
If-match	Yes	Check if cached version matches server version of the ObjectGroupCollection header

Query String Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	unique identifier of the ObjectGroupCollection header	Path

Request Example

```
/ObjectGroupCollections('8c0b596b1bd340d3ac7b0072ffb5c8bd')
```

Deletes the ObjectGroupCollection header with the specified ID.

Response

Response Status and Error Codes

Code	Description
204	ObjectGroupCollection header deleted successfully

Related Information

[ObjectGroupCollection](#) [page 241]

[ObjectGroupCollectionItem](#) [page 249]

4.1.7 ObjectGroupCollectionItem

An `ObjectGroupCollectionItem` is a pointer to an object group in an `ObjectGroupCollection`.

The `ObjectGroupCollectionItem` serves as a connection between an `ObjectGroup` and an `ObjectGroupCollection` header element. One `ObjectGroupCollection` header element can have many `ObjectGroupCollectionItem` elements assigned, while each `ObjectGroupCollectionItem` element is assigned to exactly one `ObjectGroup`. For more information on the header element of an `ObjectGroupCollection`, see [ObjectGroupCollection](#) [page 241].

This architecture, at first glance, might bring up the question why the `ObjectGroupCollectionItem` is needed at all as an intermediate element between the `ObjectGroupCollection` header and the `ObjectGroup`. The answer is that the `ObjectGroupCollectionItem` is needed as an element that controls whether the sub-ordinate object groups that are descending from the referenced object group are also affected by the assigned capability or not. This is controlled with the help of the `isSubtreeSelected` flag, which can be either true or false.

Regarding cross-tenant maintenance, the following applies:

- Users that are assigned to a tenant of a cloud platform consumer (T1) can only access items that belong to the tenant where they are logged on to.

- Users that are assigned to a tenant of a cloud platform provider (T0) **and** who have been granted cross-tenant maintenance authorization can access items from all tenants, regardless of the tenant where they are logged on to.

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/ObjectGroupCollectionItems`
- Example for a base URI in a cloud foundry environment: `http://authorizations.cfapps.eu10.hana.ondemand.com/ObjectGroupCollectionItems`

Permissions:

<auth>.c

<auth>.r

<auth>.u

<auth>.d

Methods

HTTP Method	Action	URI	Scopes
POST	Create an ObjectGroupCollectionItem [page 251]	/ObjectGroupCollectionItems	<auth>.c
GET	Read an ObjectGroupCollectionItem [page 253]	/ObjectGroupCollectionItems (ogc='ogcID', og='ogID')	<auth>.r
GET	Read all ObjectGroupCollectionItems [page 254]	/ObjectGroupCollectionItems	<auth>.r
PUT	Update an ObjectGroupCollectionItem [page 256]	/ObjectGroupCollectionItems (ogc='ogcID', og='ogID')	<auth>.u
DELETE	Delete an ObjectGroupCollectionItem [page 258]	/ObjectGroupCollectionItems (ogc='ogcID', og='ogID')	<auth>.d

Payload

Only media type JSON is supported.

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32 },
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
    "required": "true" },
  "objectGroupID" : { "type": "string", "maxLength": 32,
    "required": "true" },
}
```



```

    "isSubtreeSelected" : { "type": "boolean" },
    "etag"              : { "type": "string" }
  }

```

Field Explanation

Name	Description
objectGroupCollectionID	ID of the ObjectGroupCollection header element to which the item is assigned
objectGroupID	ID of the ObjectGroup element to which the item refers
isSubtreeSelected	Indicates whether the referenced object group and its descendants in the object group hierarchy are affected by the assigned capability or not. If this flag is set to <code>false</code> this setting is propagated to all descendants as long as no lower level object group is found with deviating capability settings.
etag	Identifier of the ObjectGroupCollectionItem instance version

Related Information

[ObjectGroupCollection](#) [page 241]

[ObjectGroup](#) [page 205]

4.1.7.1 Create an ObjectGroupCollectionItem

With this method, you create a new item of an `ObjectGroupCollection`.

You use an `ObjectGroupCollectionItem` element to associate an `ObjectGroup` to the superordinate `ObjectGroupCollection` header element. In other words, the `ObjectGroupCollectionItem` serves as a link between the `ObjectGroupCollection` header and an `ObjectGroup` element that you want to refer to via the `ObjectGroupCollectionItem`.

The following mechanisms of this method are worth knowing:

- If the `ObjectGroupCollection` header element that is passed to the method already exists, the new `ObjectGroupCollectionItem` is added to the list of items associated with that header.
- If the `ObjectGroupCollection` header element that is passed to the method does **not** already exist, it is automatically created along with the new item, and the two new elements are associated with each other.
- During creation of an `ObjectGroupCollectionItem`, the `ObjectGroupCollection` header element is locked and cannot be changed by other processes.

Request

URI: `/ObjectGroupCollectionItems`

HTTP Method: *POST*

Permissions: <auth>.c

Request Parameters

None.

Request Example

```
/ObjectGroupCollectionItems
```

Payload

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32 },
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "objectGroupID" : { "type": "string", "maxLength": 32,
  "required": "true" },
  "isSubtreeSelected" : { "type": "boolean" },
  "etag" : { "type": "string" }
}
```

Response

Response Headers

Header	Description
Location	Path to the newly created ObjectGroupCollectionItem

Response Status and Error Codes

Code	Description
201	ObjectGroupCollectionItem created successfully
403	Forbidden (user is not authorized to create an ObjectGroupCollectionItem)

Related Information

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.7.2 Read an ObjectGroupCollectionItem

Retrieves an `ObjectGroupCollectionItem` with the specified ID from the database

An `ObjectGroupCollectionItem` is identified by the combination of its own ID and the ID of the `ObjectGroup` element to which it refers. Therefore, you need to specify both IDs as request parameters of this method.

Request

URI: /

```
ObjectGroupCollectionItems(objectGroupCollectionID='<ogcID>',objectGroupID='<ogID>')
```

HTTP Method: [GET](#)

Permissions: <auth>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
objectGroupCollectionID	Yes	string	ID of the ObjectGroupCollection header element to which the item is assigned	Path
objectGroupID	Yes	string	ID of the ObjectGroup element to which the item refers	Path

Request Example

```
/ObjectGroupCollectionItems(objectGroupCollectionID='8c0b596b1bd340d3ac7b0072ffb5c8bd',objectGroupID='be531d4cfd524f06b8df7c999377fac8')
```

Response

Response Status and Error Codes

Code	Description
200	Item retrieved successfully

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32 },
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "objectGroupID" : { "type": "string", "maxLength": 32,
  "required": "true" },
  "isSubtreeSelected" : { "type": "boolean" },
  "etag" : { "type": "string" }
}
```

Related Information

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.7.3 Read all ObjectGroupCollectionItems

Retrieves a list of `ObjectGroupCollectionItem` objects from the database

With this method, you send a request to the server to retrieve a subset of all `ObjectGroupCollectionItem` objects, according to the filter criteria provided. For a collective request for a set of `ObjectGroupCollectionItem` objects, you have these options:

- You can sort and restrict the set of `ObjectGroupCollectionItem` objects to be retrieved by filter criteria as shown in the table below.
- You can define that the set of matching `ObjectGroupCollectionItem` objects shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

i Note

Retrieving high numbers of objects from the database with only one collective GET request can lead to high system load and a significant increase of response times. Therefore, we highly recommend limiting the maximum number of returned objects to no more than 500 per method call. This can easily be accomplished with the help of the `$top` and `$skip` query parameters.

To avoid unwanted performance decline, collective GET requests are only supported up to a maximum of 500 objects that can be retrieved with one single call. Therefore, in use cases where it is crucial for you to ensure that all existing objects have been retrieved, you need to verify this by setting up a loop construct in your source code to repeat the request until the service method returns no further objects.

Request

URI: /ObjectGroupCollectionItems

HTTP Method: [GET](#)

Permissions: <auth>.r

Query String Parameters

Name	Required	Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order
\$filter	No	string	Filter condition to be applied; valid fields are objectGroupCollectionHeader/tenant, objectGroupCollectionHeader/name, objectGroupCollectionID, and objectGroupID

Note

For the filter parameter, the following applies:

- Defining a filter is mandatory for this service method.
- The filter behavior is different depending on the tenant level of the currently logged on user:
 - User is assigned to a T0 tenant (Cloud Platform Provider): Defining a filter definition can be used to restrict the result set to the ObjectGroupCollection headers belonging to the specified tenant. Otherwise, all ObjectGroupCollectionItem objects are returned.
 - User is assigned to a T1 tenant (Cloud Platform Consumer): Only the ObjectGroupCollectionItem objects belonging to the user's tenant are returned. If a different tenant is specified in the filter, the system returns an empty result list.

Request Parameters

None.

Request Example

```
/ObjectGroupCollectionItems
```

Retrieves all ObjectGroupCollectionItem objects that are available for the currently logged on user. Note that this unrestricted request is not recommended due to high system load.

```
/ObjectGroupCollectionItems?$top=25
```

Retrieves the first 25 ObjectGroupCollectionItem objects from the database.

```
/ObjectGroupCollectionItems?$filter=objectGroupID eq  
'8c0b596b1bd340d3ac7b0072ffb5c8bd'
```

Retrieves all `ObjectGroupCollectionItem` objects that refer to the specified `ObjectGroup`.

```
/ObjectGroupCollectionItems?$skip=10&$top=20
```

Retrieves 20 `ObjectGroupCollectionItem` objects from the database where the first 10 items are omitted. That is, the retrieved items are those with sequence numbers 11 through 30.

Response

Payload

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32 },
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
  "required": "true" },
  "objectGroupID" : { "type": "string", "maxLength": 32,
  "required": "true" },
  "isSubtreeSelected" : { "type": "boolean" },
  "etag" : { "type": "string" }
}
```

Response Status and Error Codes

Code	Description
200	Items retrieved successfully

Related Information

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.7.4 Update an ObjectGroupCollectionItem

With this method, you modify the specified `ObjectGroupCollectionItem`.

With this method, you modify the specified `ObjectGroupCollectionItem`. With `isSubtreeSelected` being the only field of an `ObjectGroupCollectionItem` that can be modified, calling this service method lets you either extend the scope of authorizations from one particular object group to all of its descendants or vice versa.

i Note

There is only one field in the service payload that you can modify with this method, namely the boolean value of `isSubtreeSelected`. Any attempt to change other field values will lead to an error.

Request

URI: /

```
ObjectGroupCollectionItems(objectGroupCollectionID='<ogcID>',objectGroupID='<ogID>'
)
```

HTTP Method: *PUT*

Permissions: <auth>.u

Request Header Fields

Header	Required	Description
If-Match	Yes	Check if cached version matches server version of the ObjectGroupCollectionItem

Query String Parameters

Parameter	Required	Data Type	Description	Parameter Type
ogc	Yes	string	ID of the ObjectGroupCollection header	Path
og	Yes	string	ID of the ObjectGroup to which the item refers	Path

Request Example

```
/
ObjectGroupCollectionItems(objectGroupCollectionID='8c0b596b1bd340d3ac7b0072ffb5c8bd',objectGroupID='c35cef3368cf439884823369479af8b1')
```

Payload

Only media type JSON is supported.

```
{
  "objectGroupCollectionID" : { "type": "string", "maxLength": 32 },
  "objectGroupCollectionName" : { "type": "string", "maxLength": 255,
"required": "true" },
  "objectGroupID" : { "type": "string", "maxLength": 32,
"required": "true" },
  "isSubtreeSelected" : { "type": "boolean" },
  "etag" : { "type": "string" }
}
```

i Note

As mentioned above, there is only one field in the service payload that you can modify with this method, namely the boolean value of `isSubtreeSelected`. Any attempt to change other field values will lead to an error.

Field Explanation

Name	Description
objectGroupCollectionID	ID of the ObjectGroupCollection header element to which the item is assigned
objectGroupID	ID of the ObjectGroup element to which the item refers
isSubtreeSelected	Indicates whether the referenced object group and its descendants in the object group hierarchy are affected by the assigned capability or not. If this flag is set to <code>false</code> this setting is propagated to all descendants as long as no lower level object group is found with deviating capability settings.
etag	Identifier of the ObjectGroupCollectionItem instance version

Response

Response Status and Error Codes

Code	Description
200	ObjectGroupCollectionItem updated successfully

Related Information

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.7.5 Delete an ObjectGroupCollectionItem

With this method, you delete an `ObjectGroupCollectionItem` element with the specified ID.

This method deletes the `ObjectGroupCollectionItem` object physically. After the successful deletion, it is not possible to restore the deleted object.

Note

In the [ObjectGroupCollection \[page 241\]](#) section, we have explained that a header is created implicitly by creating an `ObjectGroupCollectionItem` element with a reference to an `ObjectGroupCollection` header that doesn't yet exist. This might lead to the assumption that deleting the last `ObjectGroupCollectionItem` associated with a particular `ObjectGroupCollection` header would also implicitly delete that header object. However, triggering such an automated, cascaded deletion of the associated `ObjectGroupCollection` header is **not** implemented. Instead, after deleting the last item the `ObjectGroupCollection` header remains in the system as an empty collection. It can be reused by creating new `ObjectGroupCollectionItem` objects with a reference to that header.

If the element is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: /

ObjectGroupCollectionItems(objectGroupCollectionID='<ogcID>',objectGroupID='<ogID>')

HTTP Method: [DELETE](#)

Permissions: <auth>.d

Request Header Fields

Header	Required	Description
If-Match	Yes	Check if cached version matches server version of the ObjectGroupCollectionItem

Query String Parameters

Parameter	Required	Data Type	Description	Parameter Type
objectGroupCollectionID	Yes	string	ID of the ObjectGroupCollection header	Path
objectGroupID	Yes	string	ID of the ObjectGroup to which the item refers	Path

Request Example

```
/ObjectGroupCollectionItems(objectGroupCollectionID='8c0b596b1bd340d3ac7b0072ffb5c8bd',objectGroupID='c35cef3368cf439884823369479af8b1')
```

Response

Response Status and Error Codes

Code	Description
204	ObjectGroupCollectionItem successfully deleted

Related Information

[ObjectGroupCollectionItem \[page 249\]](#)

4.1.8 Capabilities

The following tables describe the capabilities required per HTTP method:

Capabilities for Accessing Thing, Event, and File Services

HTTP Methods (APIs) with Business Partner Dependency	Supported Capabilities		
	read	write	delete
POST /Things	n/a	X	n/a
GET /Things	X	n/a	n/a
POST /Things ('<Thing ID>')	n/a	X	n/a
DELETE /Things ('<Thing ID>')	n/a	n/a	X
GET /Things ('<Thing ID>')	X	n/a	n/a
GET /Things ('<Thing ID>')/Configuration	X	n/a	n/a
GET /Things/PropertySet/<propertySetType name>	X	n/a	n/a
PUT /Things ('<Thing ID>')/<thingType>/<propertySet ID>	n/a	X	n/a
GET /Things ('<Thing ID>')/<thingType>/<propertySet ID>	X	n/a	n/a
DELETE /Things ('<Thing ID>')/<thingType>/<propertySet ID>	n/a	n/a	X

HTTP Methods (APIs) with Business Partner Dependency	Supported Capabilities		
	read	write	delete
GET /Composite/Things	X	n/a	n/a
GET /Snapshot	X	n/a	n/a
GET M4 algorithm	X	n/a	n/a
POST /Events	n/a	X	n/a
GET /Events	X	n/a	n/a
POST /Events ('<Event ID>')	n/a	X	n/a
GET /Events ('<Event ID>')	X	n/a	n/a
DELETE /Events ('<Event ID>')	n/a	n/a	X
POST /Events.SetStatus(newStatus=<status>)	n/a	X	n/a
PUT /Files/Things/<Thing ID>/<path>/<filename>	n/a	X	n/a
GET /Files/Things/<Thing ID>/<path>/<filename>	X	n/a	n/a
DELETE /Files/Things/<Thing ID>/<path>/<filename>	n/a	n/a	X

Capabilities for Accessing Business Partner Services

Basic Services

For the basic services that belong to the business partner domain (that is, `Person` and `Organization`), the following simple rules apply:

- POST: Write capability
- GET (both single and collective request): Read capability
- PUT: Write capability
- DELETE: Delete capability

Services Used for Establishing Relationships Between Business Partners

A number of services in the SAP IoT platform are used for establishing a connection between different business partners (for example, a person is employee of an organization) or between a person and the user object that is used to authenticate that person against the system. These services are:

- [BPRelationship \[page 91\]](#)
- [BPUserRelationship \[page 120\]](#)

Surprisingly, write access to these services actually does **not** mean changing the respective relationship object. This is because the relationship services are **not** reflected by a corresponding entity in the database. Rather, the relationship between two objects is stored as mutual references of the two objects involved. Therefore, the necessary capabilities for relationship services are as follows:

HTTP Methods (APIs) for Relationships	Supported Capabilities		
	read	write	delete
POST /BPRelationships	n/a	n/a	n/a
PUT [/Persons('<ID1>') /Organizations('<ID1>')]		X	
PUT [/Persons('<ID2>') /Organizations('<ID2>')]		X	
GET /BPRelationships('relationshipID')	n/a	n/a	n/a
GET [/Persons('<ID1>') /Organizations('<ID1>')]	X		
GET [/Persons('<ID2>') /Organizations('<ID2>')]	X		
DELETE /BPRelationships('relationshipID')	n/a	n/a	n/a
PUT [/Persons('<ID1>') /Organizations('<ID1>')]		X	
PUT [/Persons('<ID2>') /Organizations('<ID2>')]		X	
POST /BPUserRelationships	n/a	n/a	n/a
PUT [/Persons('<ID>') /Organizations('<ID>')]		X	
GET /BPUserRelationships('relationshipID')	n/a	n/a	n/a
GET [/Persons('<ID>') /Organizations('<ID>')]	X		
DELETE /BPUserRelationships('relationshipID')	n/a	n/a	n/a
PUT [/Persons('<ID>') /Organizations('<ID>')]		X	

4.2 Functional Authorization

Authorization in the application router and container are handled by scopes. The functional authorizations are organized in scopes.

Scopes

- Scopes cover business users' authorizations in a specific Java application. They are deployed, for example, when you deploy an update of the application. The security descriptor file `xs-security.json` contains the application-specific "local" scopes (and, if applicable, also "foreign" scopes, which are valid for other defined applications).
- Scopes are assigned to users by means of security roles, which are mapped to the user group(s) to which the user belongs. Scopes are used for authorization checks by the application router.
- To assign scopes to an application, you need to perform the following steps
 - Create an instance of the User Account and Authentication (UAA) service. You can use the service broker to create an instance of the UAA service. This ensures the creation of a new OAuth 2.0 client in the UAA
 - Assign scopes for the application. Scopes are configured and assigned in the application descriptor file `xs-security.json`

Application Container

The container security API includes the `hasScope` method that allows you to programmatically check whether the OAuth 2.0 access token used for the current request has the appropriate scope. Among other things, the access token contains a list of scopes that the user is allowed to access in the current context. Each scope name must be unique in the context of the current UAA installation.

Scopes and Application Names

In this API reference documentation, the scopes that are required for executing a service are listed for each service method in the *Permissions* part of the method documentation. Since the scopes are defined by the various applications that make up the SAP IoT, each scope name consists of the application and the activity that is controlled by the scope. A formal description of a fully qualified scope looks as follows:

```
<xs_appname>[.<additional_resource>].<action>
```

Here is an explanation of the different parts of this formal description:

- `<xs_appname>`: This name is defined during deployment. Within a productive system landscape, this name does not change over time, but it may vary from landscape to landscape. For example, the name used in a development landscape may not be the same as in the test landscape, and both may differ from the name in the productive landscape.
- `<action>`: Self-explanatory. According to the CRUD pattern known from databases, the following actions are supported: Create, Read, Update, Delete.

i Note

The four supported activities are abbreviated to their initial letter in lowercase (that is, `c`, `r`, `u`, and `d`). Some complex operations in the SAP IoT platform require that a user performing the operation needs a

high number of permissions, which have to be passed to the system all at once. The short abbreviations make sure that this does not result in a field length overflow.

- `<additional_resource>`: Identifier of a particular resource within an application for which a scope is defined. For example, the `<thing>.event.r` scope is required for a user to read the events that have been logged for a thing, where `event` is a resource that belongs to the `thing` application.

i Note

In this API reference documentation, we present the application-specific part of the scopes in a simplified form that makes it easy to understand the application in question, but still needs to be adapted to the particular `<xs_appname>` that is in effect in your system landscape. The following symbolic names are used for this:

Symbolic Application Names for Scopes

Application	Symbolic Name
action-modeler	<code><action>.AM</code>
authorization	<code><auth></code>
business-partner	<code><bp></code>
location	<code><loc></code>
rule	<code><rule></code>
tenant-administration	<code><tenant></code>
thing	<code><thing></code>
vocabulary	<code><vocabulary></code>

Keep in mind that the angle brackets are used here to indicate the symbolic character of the name of the application defining the scope. In a real usage scenario, the entire symbolic name (including the angle brackets) must be replaced by the technical application name that has been chosen for your system landscape.

Application Names and Service URIs

In the previous section, we have explained the relation between application names and scope qualifiers. A similar mechanism is in place (although not relevant for authorization) with respect to the service endpoints that are given in the *Base URI* part of each service overview chapter. Here, the formal description of a fully qualified URI looks like this:

```
http://<application name>.<application domain>[:<port number>][/<path>]
```

Like in the *Scopes and Application Names* section above, the `<application name>` as well as the `<application domain>` part are subject to arbitrary decisions of system administrators and cannot be considered a stable and uniform URI part across all installations around the globe. The reliable part, however, is the fact that by default, the `<application name>` part is identical with the application names listed above.

i Note

In certain scenarios, the service URIs become longer as there could be too many request parameters in the URL to fetch the desired result set in the response payload. The long service URI results in large header size and the execution of the service fails with an error status code 400. Header size is limited to 16k. To overcome the long service URI, you can break the request into multiple requests.

For example, to [Read Reference Properties Data for a List of Property Sets \[page 933\]](#), you use the request URL `https://appiot-mds.cfapps.eu10.hana.ondemand.com/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:car/ReferenceProperties/'wheel_rr,Pressure&wheel_rr,RotationSpeed&wheel_fl,Pressure&wheel_fl,RotationSpeed'?timerange2015-03-10T08:00:00.000Z-2018-08-09T12:00:00.000Z`. The request might fail when there are huge number of reference properties in the request URL. To avoid larger header size, you can split a single request and hence, reduce the number of properties per request.

Here are some examples of service URIs to access the services:

Service URIs

Application	Service URI
Actions [page 753]	<code>https://action-modeler.cfapps.eu10.hana.ondemand.com/Actions</code>
Actions [page 753]	<code>https://sap-iot-noah-live-action-modeler.cfapps.eu10.hana.ondemand.com/envPing</code>
Advanced Thing List [page 1400]: OData	<code>https://advancedlist-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings</code>
Assignment [page 853]	<code>https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/assignments</code>
Authorization: ObjectGroup [page 205]	<code>https://authorization.cfapps.eu10.hana.ondemand.com/ObjectGroups</code>
Business Partner: Organization [page 32]	<code>https://business-partner.cfapps.eu10.hana.ondemand.com/Organizations</code>
Business Partner: Person [page 59]	<code>https://business-partner.cfapps.eu10.hana.ondemand.com/Persons</code>
Composite Events: OData Service [page 1326]: OData	<code>https://composite-events-odata.cfapps.eu10.hana.ondemand.com/CompositeEvents</code>
Composite Things: REST Service [page 1307]: REST	<code>https://appiot-composite-things.cfapps.eu10.hana.ondemand.com/Composite/Things/PropertySet</code>
Composite Things: OData Service [page 1312]: OData	<code>https://composite-things-odata.cfapps.eu10.hana.ondemand.com/CompositeThings</code>

Application	Service URI
Composite Thing Configuration for a Specific Thing Hierarchy: OData Service [page 1357] : OData	<code>https://cs-hierarchy-meta-sap.cfapps.eu10.hana.ondemand.com/CompositesThingHierarchy</code>
Content Manager [page 1471]	<code>https://sap-iot-noah-live-cm-metadata-management.cfapps.eu10.hana.ondemand.com/metadata/v1/model.svc</code>
Content Manager Runtime [page 1471]	<code>https://sap-iot-noah-live-cm-runtime.cfapps.eu10.hana.ondemand.com/data/v1/odata.svc</code>
Credentials [page 821]	<code>https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/credentials</code>
Custom Master Data [page 658]	<code>https://config-customdata-sap.cfapps.eu10.hana.ondemand.com/CustomDataConfiguration</code> <code>https://customdata.cfapps.eu10.hana.ondemand.com/ObjectType</code> <code>https://customdata-associations.cfapps.eu10.hana.ondemand.com/CustomDataAssociation</code>
Custom Master Data Composite Services [page 730]	<code>https://composite-custom-master-data-sap.cfapps.eu10.hana.ondemand.com/CompositeMasterData/v1/Things</code> <code>https://composite-custom-master-data-sap.cfapps.eu10.hana.ondemand.com/CompositeMasterData/Details/v1/Things</code>
Device Connectivity: gateway configuration	<code>https://iot-device-management.cfapps.eu10.hana.ondemand.com/api/v1/gateways/<gatewayId>/configuration</code>
Event Configuration [page 522] : OData	<code>https://events-sap.cfapps.eu10.hana.ondemand.com/ES</code>
Event List: OData Service [page 1455]	<code>https://bpanalytics-event-sap.cfapps.eu10.hana.ondemand.com/BFAnalytics/EventType/v1/<event type name></code>

Application	Service URI
Events Aggregate: OData Service [page 1464]	https://events-aggregate-sap.cfapps.eu10.hana.ondemand.com/EventsAggregate/v1/Events?timeRange=<from time>-<to time>&divisions=<divisions>
Export Time Series Data [page 987]	https://coldstore-export-sap.cfapps.eu10.hana.ondemand.com/ https://coldstore-downloader-sap.cfapps.eu10.hana.ondemand.com/
File [page 1297]: REST	https://apiot-fs.cfapps.eu10.hana.ondemand.com/Files
Geolocation [page 137]	https://sap-iot-noah-live-geolocation-runtime.cfapps.eu10.hana.ondemand.com
Geolocation: Thing Clustering [page 191]	https://sap-iot-noah-live-geo-runtime.cfapps.eu10.hana.ondemand.com
Mapping [page 829]	https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/mappings
Monitoring and Logging [page 1541]	https://service-metrics-sap.cfapps.eu10.hana.ondemand.com/ServiceMonitoring
Onboarding Things [page 780]: REST	https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things
Package Configuration [page 343]: OData	https://config-package-sap.cfapps.eu10.hana.ondemand.com/Package
Read Thing Configuration Details for a Thing [page 801]	https://apiot-mds.cfapps.eu10.hana.ondemand.com/Configuration
Smart Sensing [page 751]	https://sap-iot-noah-live-sis-subscriptions.cfapps.eu10.hana.ondemand.com
Standard or Predefined Events (Deprecated) [page 1195]: REST	https://apiot-mds.cfapps.eu10.hana.ondemand.com/Events
Thing Detail [page 1385]: OData	https://details-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings/v1/<thing type name>
Thing Hierarchy [page 1156]: OData	https://apiot-thing-hierarchy.cfapps.eu10.hana.ondemand.com/ThingHierarchy

Application	Service URI
Thing Configuration [page 358] : OData	https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration
Thing Time Series Data: OData Service [page 996]	https://analytics-thing-sap.cfapps.eu10.hana.ondemand.com/<property set type name>
Time Series Aggregate Store [page 960] : REST	https://appiot-mds.cfapps.eu10.hana.ondemand.com/Things
Time Series Cold Store [page 981] : REST	https://appiot-coldstore.cfapps.eu10.hana.ondemand.com/Things
Time Series Store [page 941] : REST	https://appiot-mds.cfapps.eu10.hana.ondemand.com/Things
Value Helps [page 1576]	https://business-partner.cfapps.eu10.hana.ondemand.com/<Value Help>

Attributes

You can define attributes to perform checks based on a source that is not yet defined. For example, in xs-security.json file, the check is based on a cost center, whose name is not known because it differs according to context.

Role Templates

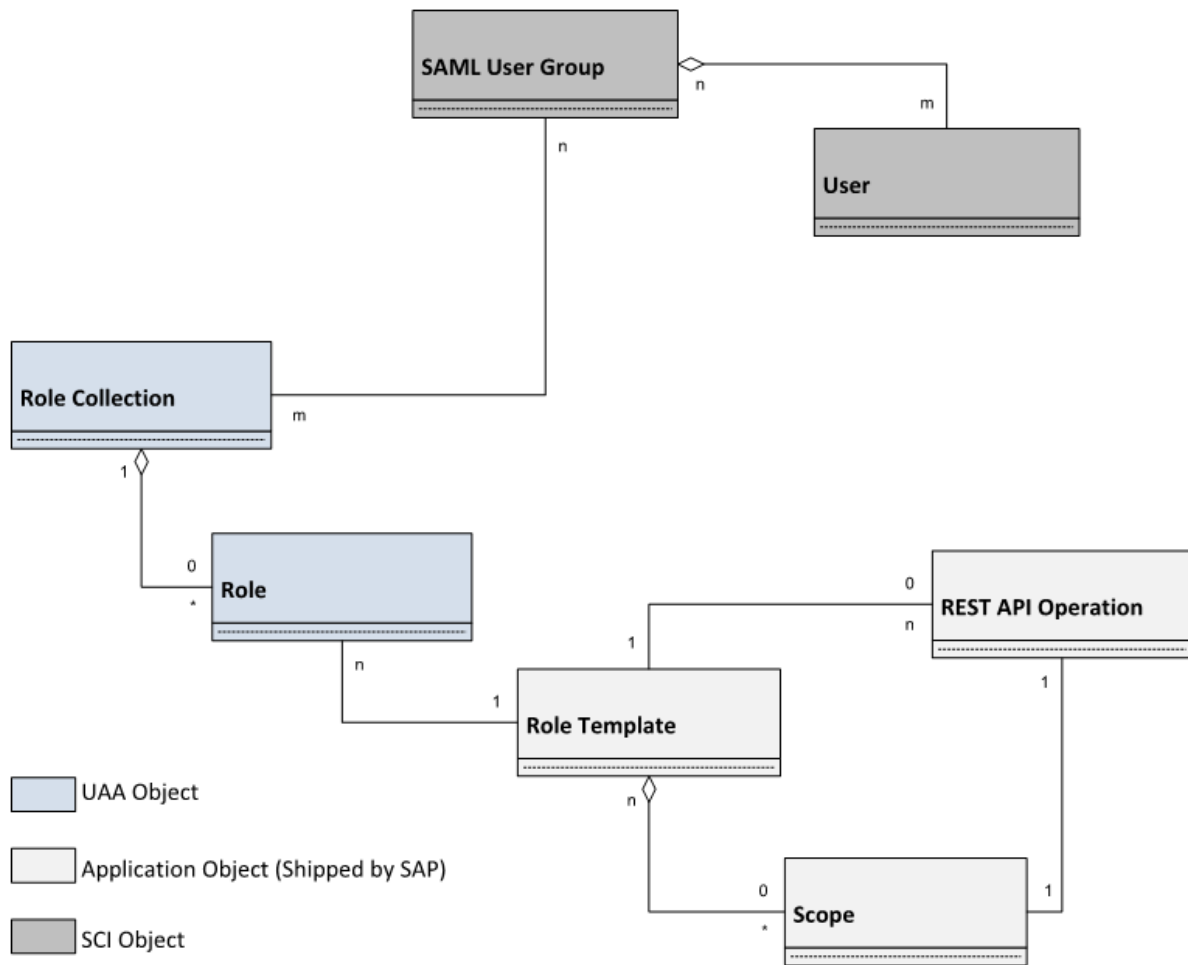
A role template describes a role and any attributes that apply to the role.

Scopes provide a set of role templates for a named application. The role templates contain authorizations for business users' activities such as viewing, editing, or deleting data. Information retrieved from the user's identity (such as department or cost center) is stored in attributes. After you have created the role templates and deployed them to the relevant application, it is an administrator's task to do the following:

- Use the role templates to build roles.
- Aggregate roles into role collections.
- Assign the role collections to business users in the application.

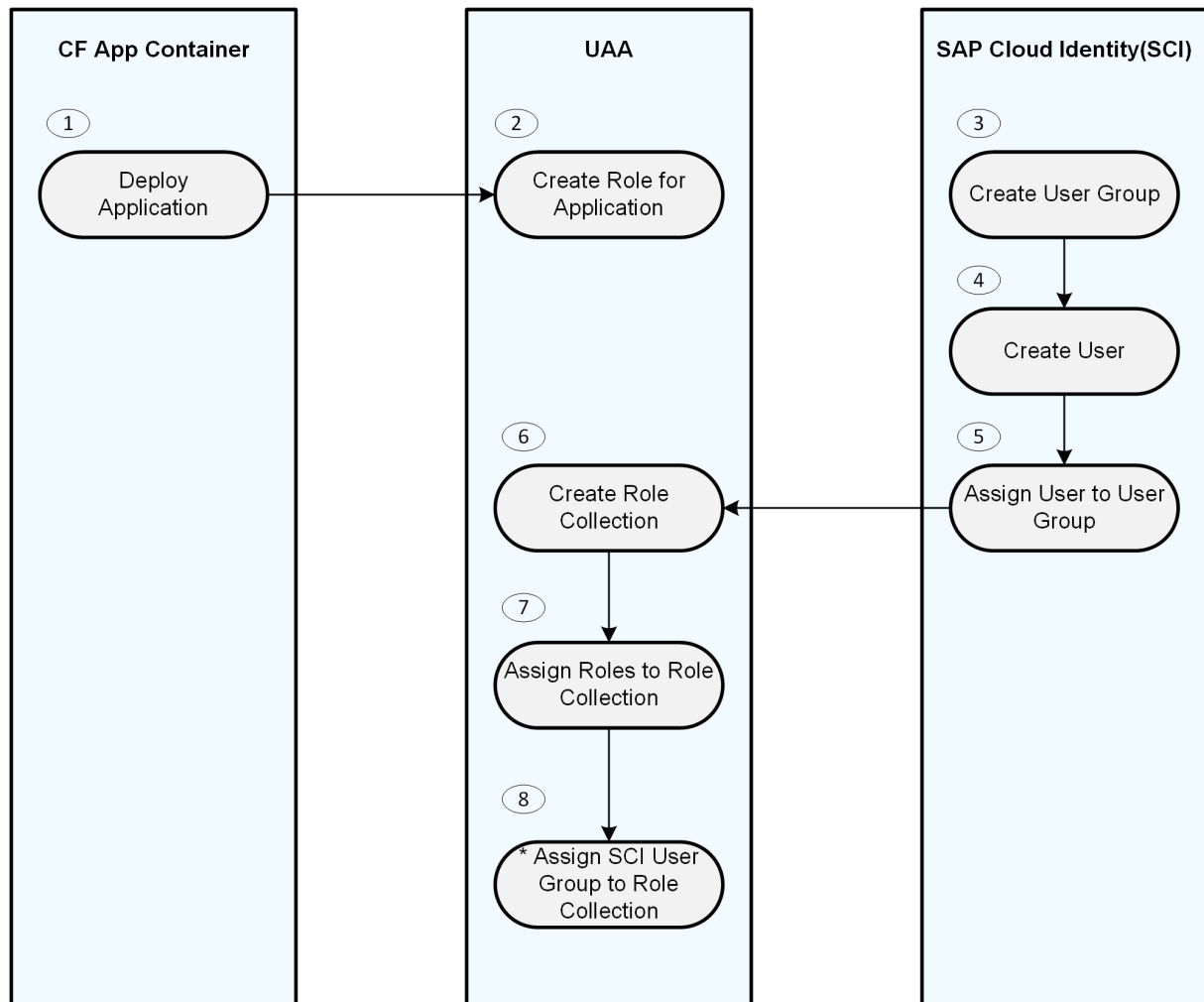
Entities and Relationships

The following diagram represents the different entities and the relationships between each one.



Setting Up Security Artifacts

Developers create authorization information for business users in their environment; the information is deployed in an application and made available to administrators who complete the authorization setup and assign the authorizations to business users. Developers store authorization information as design-time role templates in the security descriptor file `xs-security.json`. Using the UAA service broker, they deploy the security information. The administrators view the authorization information in role templates, which they use as part of the run-time configuration. The administrators use the role templates to build roles, which are aggregated in role collections. The role collections are assigned, in turn, to business users. After the deployment of the authorization artifacts as role templates, the administrator uses the role templates provided by the developers for building role collections and assigning them to business users. The following diagram represents the different process steps for setting up the security artifacts.



4.2.1 Accessing SAP IoT APIs Using OAuth Token

Overview

After you subscribe your subaccount to SAP IoT, you can retrieve the client secret from the service keys you created for your subaccount. For more information on retrieving the client secret, see [Retrieving ClientID and Client Secret](#). You can use the client secret to retrieve the OAuth token. The client secret is unique for a tenant and you can access all APIs and data within the tenant. This kind of authentication is used when you build backend applications, where you don't have a user context. You can automate configuring things, ingesting data, and retrieving data using the OAuth token.

Retrieving OAuth Token using Postman

Postman is a popular and easy to use REST client using which you can access the SAP IoT APIs. You can use the following API endpoint to retrieve the OAuth token specific for your tenant.

`https://<your tenant>.authentication.eu10.hana.ondemand.com/oauth/token`

Perform the following steps to retrieve the token:

1. Turn off the interceptor in Postman.
2. Send a POST request to the endpoint `https://<your tenant>.authentication.eu10.hana.ondemand.com/oauth/token`.
3. Enter the following in the [Headers](#) tab:

Key	Value
Content-Type	<code>application/x-www-form-urlencoded</code>

4. In the [Body](#) tab, choose **x-www-form-urlencoded**. Choose the keys and enter the values as explained in the following table:

Key	Value
grant_type	<code>client_credentials</code>
response_type	<code>token</code>
client_id	The unique client ID of your tenant. For example, <code>sb-49fa22b5-4e44-46da-83eb-b5445c6c57e7!b15621</code> is the client ID of a tenant.
client_secret	The unique client secret value of your tenant. For example, <code>iotae_service!b5</code> is the client secret of a tenant.
scope	Specify only those scopes necessary for accessing a service

i Note

All available scopes are listed in the response payload.

The response contains the following values:

- **token:** Bearer token used to authenticate the requests
- **expiresIn:** Duration (in seconds) for which the token you received is valid
- **scope:** List of all available scopes

The following is an example response payload:

```
{
  "access_token": "<<bearer token string>>",
  "token_type": "bearer",
  "expires_in": 899,
  "scope": "<<list of scopes>>",
  "jti": "1387092968724edfbafe04f772466536"
}
```

You can use this Bearer token with an API endpoint to retrieve data. To know more about the API endpoints to access the services offered by SAP IoT, see [Application Names in Service URIs \[page 21\]](#). The table in the section **Application Names and Service URIs**, lists the service URIs with and without application router.

Retrieving Data using Postman

The API endpoint to retrieve the package configuration data defined in your tenant using the **Service2Service** communication is `https://config-package-sap.cfapps.eu10.hana.ondemand.com/Package/v1/Packages`. The request is pointing directly to the microservice for thing configuration.

1. Send a POST request for the API endpoint to retrieve the package configuration.
2. Enter the following in the *Headers* tab:

Key	Value
Authorization	Bearer <<your token>>

The response contains the package configuration data.

Note

You must be aware of the following when you call an API endpoint using the OAuth token:

- Only the most commonly used functional scopes for executing the services are hardcoded in the Bearer token. You must know that not the complete set of functional scopes is included in the token.
- The object instance-based authorization is not active. This means that the access rights to specific objects are not restricted. For example, the things created in a tenant are visible to all users who have access to the tenant. Hence, the application calling the APIs using OAuth token must ensure to define their own filtering capabilities to restrict access to all available objects.

Tutorial

[Call SAP IoT APIs with Postman](#) 

4.3 Role Templates and Scopes

Standard role templates provided by SAP for typical user profiles

Overview

The large number of different scopes that are needed to grant (or to revoke) functional authorizations in SAP IoT can turn into a challenge for administrators who are in charge of assigning proper user profiles for the users of the system. To make this task easier, SAP provides a number of predefined role templates that an administrator may use as a blueprint for setting up individual roles as they are needed for a concrete organization. The basic procedure for this is as follows:

1. Derive a role from a role template.
2. Assign role (one or many) to a role collection.
3. Assign role collection (one or many) to a user group.

Role templates and scopes have a n:m relationship. That is, one template may contain many scopes, and one scope may be contained in many templates. The following sections show listings of the available role templates

and the scopes that are contained in each template. The listings are broken down by the main areas of the SAP IoT platform.

i Note

The technical names of the role templates are given with their significant part in this chapter. In a real-world installation, they are all prefixed with the application identifier that was chosen during the onboarding process. For example, the Thing Viewer scope given as `_Thing_Viewer` in the table below would have to be translated to `iotas_Thing_Viewer` for the `iotas` application.

Disclaimer

This section presents all the role templates and scopes supported to grant (or revoke) functional authorizations in SAP IoT. When exploring the role templates, you may discover additional functional scopes that are not explained in this reference. These undocumented scopes are mostly providing authorizations that are needed by the configuration services that are shipped by SAP as a part of the SAP IoT platform.

i Note

To see the detailed scope lists, click the following headings.

Business Partner

Role Templates for Business Partner

Role Template	Description	Scopes
<code>_Tenant_Administrator</code>	Perform all activities that are necessary for managing tenants as well as the data that is stored in a tenant.	<code><tenant>.pers.c</code> <code><tenant>.pers.r</code> <code><tenant>.pers.u</code> <code><tenant>.pers.d</code> <code><tenant>.org.c</code> <code><tenant>.org.r</code> <code><tenant>.org.u</code> <code><tenant>.org.d</code> <code><bp>.tenant.r</code> <code><bp>.tenant.u</code> <code><bp>.c</code> <code><bp>.r</code> <code><bp>.u</code> <code><bp>.d</code> <code><auth>.c</code> <code><auth>.r</code> <code><auth>.u</code> <code><auth>.d</code> <code>xs_authorization.read</code> <code>xs_authorization.write</code> <code><thing>.TenantTSS.c</code> <code><thing>.TenantTSS.d</code>
<code>_Person_Viewer</code>	View person data	<code><tenant>.pers.r</code> <code><bp>.r</code>

Role Template	Description	Scopes
<code>_Person_Editor</code>	Edit person data	<code><tenant>.pers.c</code> <code><tenant>.pers.r</code> <code><tenant>.pers.u</code> <code><tenant>.pers.d</code> <code><bp>.c</code> <code><bp>.r</code> <code><bp>.u</code> <code><bp>.d</code>
<code>_Organization_Viewer</code>	View organization data	<code><tenant>.org.r</code> <code><bp>.r</code>
<code>_Organization_Editor</code>	Edit organization data	<code><tenant>.org.c</code> <code><tenant>.org.r</code> <code><tenant>.org.u</code> <code><tenant>.org.d</code> <code><bp>.c</code> <code><bp>.r</code> <code><bp>.u</code> <code><bp>.d</code>
<code>_BusinessPartner_Viewer</code>	View person and organization data on elementary service level	<code><bp>.r</code>
<code>_BusinessPartner_Editor</code>	Edit person and organization data on elementary service level	<code><bp>.c</code> <code><bp>.r</code> <code><bp>.u</code> <code><bp>.d</code>
<code>_BusinessPartner_OnboardTenant</code>	Perform all activities that are necessary for onboarding a new tenant	<code><bp>.OnboardTenant</code>

Authorization and Location

Role Templates for Authorization and Location

Role Template	Description	Scopes
<code>_Authorization_Viewer</code>	View authorization	<code><auth>.r</code>
<code>_Authorization_Editor</code>	Edit authorization	<code><auth>.c</code> <code><auth>.r</code> <code><auth>.u</code> <code><auth>.d</code>
<code>_Location_Viewer</code>	View locations	<code><loc>.r</code>
<code>_Location_Editor</code>	Edit locations	<code><loc>.c</code> <code><loc>.r</code> <code><loc>.u</code> <code><loc>.d</code>

Thing

Role Templates for Thing

Role Template	Description	Scope
<code>_Configuration_Viewer</code>	View configuration	<code><pkg>.r</code> <code><thingconf>.r</code>
<code>_Configuration_Editor</code>	Create/Edit configuration	<code><pkg>.c</code> <code><pkg>.r</code> <code><pkg>.u</code> <code><pkg>.d</code> <code><thingconf>.c</code> <code><thingconf>.r</code> <code><thingconf>.u</code> <code><thingconf>.d</code>

Role Template	Description	Scope
_Thing_Viewer	View thing	<thing>.r <thing>.Event.r <auth>.r <coldstore>.r <ohs>.r <ths>.r <advlist>.r <tg>.r <thngdtl>.r <loc>.r <geolocation>.r

Role Template	Description	Scope
_Thing_Editor	Create/Edit thing	<thing>.c <thing>.r <thing>.d <thing>.Event.c <thing>.Event.r <thing>.Event.u <thing>.Event.d <auth>.c <auth>.r <auth>.u <auth>.d <coldstore>.c <coldstore>.r <coldstore>.d <ohs>.c <ohs>.r <ohs>.u <ohs>.d <ths>.c <ths>.r <ths>.u <ths>.d <tg>.c <tg>.r <tg>.u <tg>.d <bp>.tenant.r <bp>.vh.r <advlist>.r <thngdtl>.r <loc>.c

Role Template	Description	Scope
		<loc>.r
		<loc>.u
		<loc>.d
		<geolocation>.r
		<geolocation>.c
		<geolocation>.u

Role Template	Description	Scope
_Thing_Engineer_Odata	Comprises all authorizations needed by the Thing Modeler app	<thing>.c <thing>.r <thing>.d <thing>.Event.c <thing>.Event.r <thing>.Event.u <thing>.Event.d <auth>.r <conf>.c <conf>.r <conf>.d <tde>.c <tde>.r <tde>.d <bp>.conf.c <bp>.conf.r <bp>.conf.d <auth>.conf.c <auth>.conf.r <auth>.conf.d <ohs>.r <ohs>.c <ohs>.u <ohs>.d <ths>.r <ths>.c <ths>.d <ths>.u <tg>.c <tg>.r <tg>.u

Role Template	Description	Scope
		<tg>.d <tenant>.pers.r <advlist>.r <thngdtl>.r <bpanlyt>.r <pkg>.c <pkg>.r <pkg>.u <pkg>.d <thingconf>.c <thingconf>.r <thingconf>.u <thingconf>.d <loc>.c <loc>.r <loc>.u <loc>.d <file>.c <file>.r <file>.d <geolocation>.r <geolocation>.c <geolocation>.u <geolocation>.d <rule>.c <rule>.r <rule>.u <rule>.d <rule>.a (activate, deactivate) <vocabulary>.c

Role Template	Description	Scope
		<vocabulary>.r (includes getting data objects for a rule context) <vocabulary>.u <vocabulary>.d <action>.AM.c <action>.AM.r <action>.AM.u <action>.AM.d <seg>.c <seg>.r <seg>.u <seg>.d

Rules

Role Templates for Rule Processing (SAP IoT)

Role Template	Description	Scope
Rule_Project_Admin	Allows all activities related to rule modeling, including the definition of data objects (sometimes referred to as "rule contexts" or "vocabularies").	<rule>.c <rule>.r <rule>.u <rule>.d <rule>.a <vocabulary>.c <vocabulary>.r <vocabulary>.u <vocabulary>.d

Role Template	Description	Scope
Rule_Editor	Allows a user to configure rules.	<rule>.c <rule>.r <rule>.u <rule>.d <vocabulary>.r
Rule_Viewer	Allows a user to view rule configurations.	<rule>.r <vocabulary>.r
Rule_Activator	Allows a user to activate rules.	<rule>.a <rule>.r <vocabulary>.r

Note

The following role templates related to rule definition and rule execution are only listed for the purpose of completeness. They are **not** part of SAP IoT itself. Instead, they belong to SAP Business Rules, which is used as the underlying rule processing engine of the rule solutions for IoT data offered by SAP IoT. The scopes that are in effect for the latter solution are part of the `_Thing_Engineer_Odata` role template listed in the *Thing* section above (`<rule>.*` and `<vocabulary>.*`).

Role Templates for Rule Processing (SAP Business Rules)

Role Template	Description	Scope
_RuleRepositorySuperUser	Allows all activities related to rule modeling, including the definition of data objects (sometimes referred to as "rule contexts" or "vocabularies").	n/a
_RuleRuntimeSuperUser	Allows a user to execute rules.	n/a

As a consequence of the two-layer architecture for rules, working with rules at design time always requires a combination of roles based on the role templates provided by both layers. The following table lists those required combinations:

Role Template Combinations for Rule Modeling

SAP IoT	SAP Business Rules
Thing_Engineer	_RuleRepositorySuperUser _RuleRuntimeSuperUser
Rule_Project_Admin	_RuleRepositorySuperUser _RuleRuntimeSuperUser

SAP IoT	SAP Business Rules
Rule_Editor	_RuleRepositorySuperUser
Rule_Viewer	_RuleRepositorySuperUser
Rule_Activator	_RuleRepositorySuperUser _RuleRuntimeSuperUser

Actions

Role Templates for Action Modeling

Role Template	Description	Scope
_Action_Viewer	View actions.	<action>.AM.r
_Action_Editor	Edit actions.	<action>.AM.c <action>.AM.r <action>.AM.u <action>.AM.d

Miscellaneous

Role Templates for Miscellaneous Tasks

Role Template	Description	Scope
_Monitoring	Check whether a service is running	<auth>.Uptime
_PhysicalDelete	Allows a user to see and physically delete logically deleted business partners as well as locations.	<bp>.pd <loc>.pd

Role Template	Description	Scope
<code>_System_Admin</code>	Perform system administration tasks like changing the log level	<code><auth>.SysAdmin</code> <code><bp>.SysAdmin</code> <code><tenant>.SysAdmin</code> <code><loc>.SysAdmin</code> <code><conf>.SysAdmin</code> <code><thing>.SysAdmin</code> <code><coldstore>.SysAdmin</code> <code><ohs>.SysAdmin</code> <code><ths>.SysAdmin</code>
<code>_ReuseUI_Viewer</code>	Grants read access to a part of your data in SAP IoT. This role provides all the authorizations required to test apps created with the SAP IoT feature in SAP Web IDE and the available UI reuse controls.	<code><thing>.r</code> <code><ct>.r</code> <code><ctodata>.r</code> <code><ct>.SysAdmin</code> <code><ctodata>.SysAdmin</code> <code><file>.r</code> <code><ctodata>.SysAdmin</code> <code><ctodata>.r</code> <code><advlist>.r</code> <code><thngdtl>.r</code> <code><pkg>.r</code> <code><thingconf>.r</code> <code><ths>.r</code> <code><tg>.r</code>
<code>BusinessLogging_Viewer</code>	Grants the permission to read the application logs written for any SAP IoT component.	<code><businesslogging>.r</code>

Related Information

[Functional Authorization \[page 263\]](#)

[UserGroup \[page 314\]](#)

5 Onboarding Services

Service mashups for complex operations during platform onboarding

Prerequisites

To avoid confusion about the different aspects of the term "onboarding", we would like to start this section with the following clarification: Before you can start using the onboarding services described in the following chapters, you must have been onboarded as an SAP customer to SAP BTP. For more information, see the [Getting Started](#) guide for SAP IoT.

Introduction

In this section, you find services that consist of a combination of individual services used for managing the basic business partner or authorization entities of which the SAP IoT platform consists. In addition, these compound services make it easier to map the functions and features of the identity provider to those of Cloud Foundry User Account and Authentication (UAA). The purpose of these compound services is to make it easier for a system administrator to set up all the necessary data for onboarding new persons, organizations, or tenants on to the platform. The most complex use case that is addressed by the compound services is tenant onboarding, where five different entities are involved plus some technical services.

i Note

While this section is concentrating on onboarding organizations and persons, there is also another aspect of onboarding, namely onboarding of things. For this aspect, see the respective topic referred to in the *Related Information* section below.

The compound services that are listed here differ in the following respects from the services for the basic entities of the SAP IoT platform:

- In almost all cases, the payload of the compound services is much bigger and more complex than the payload of the basic entities. This is because the compound services enable you to define the most relevant settings of several basic entities involved with one single call.
- Compared to the basic entities, the compound services come with a reduced set of methods on offer (for example, only a Create and a Delete method, but no method for updating). If you need to carry out an operation on an entity that was created with a compound service, you may use the complete set of methods that is available for the respective basic entity.

Related Information

[Onboarding Organizations \[page 292\]](#)

[Onboarding Persons \[page 300\]](#)

[UserGroup \[page 314\]](#)

[IdentityZone \[page 323\]](#)

[Onboarding Things \[page 780\]](#)

5.1 Tenant

An entity used to separate the data of different customers of the platform owner from each other

A tenant is the top-level container object in the SAP IoT architecture. It serves as a self-contained area where an administrator working for a Cloud Platform Provider sets up all the objects needed for a particular IoT scenario. As the business model of a cloud platform provider is aiming at onboarding a significant number of customers who want to use the services offered by the platform, it is very important to make sure that the data belonging to a particular customer is strictly separated from the data of all other customers using the same platform.

This separation of data is accomplished by the construct of the Tenant object. During the onboarding procedure, each customer is assigned to an individual tenant in the form of a 1:1 relationship. That is, there is no chance for a customer to access data that is not in the realm of its own tenant.

i Note

The tenant service described here is the elementary service dedicated to tenant-related operations. It is mainly used internally by other services that belong to SAP IoT. Due to the high degree of interrelationships with other services, we highly recommend using the mashup services instead rather than the elementary service. These mashups are all documented in the *Onboarding Services* section of this API reference documentation. Using this elementary Tenant service should be limited to read accesses.

i Note

A tenant in SAP IoT corresponds with a subaccount as implemented in the unified SAP BTP domain model.

Tenant role and authorization

Depending on the role of a tenant to which a user is assigned, users are authorized to perform certain actions on the objects managed by the SAP IoT platform:

- A user who is assigned to a tenant for a cloud platform provider (T0) can access objects that are assigned to a tenant assigned to a cloud platform user (T1). This is necessary because otherwise the platform provider would not be able to keep the platform services up and running. Also, it is a privilege of a T0 user to perform any kind of cross-tenant accesses. In other words, to perform cross-tenant activities, the object type in question must be prepared for allowing cross-tenant access **and** the user must be assigned to a tenant for a cloud platform provider (T0).
- A user who is assigned to a tenant for a cloud platform consumer (T1) can only access objects that are assigned to this particular tenant. There is no way for such a user to access objects that belong to other tenants. This is necessary for reasons of data protection.

Naming Conventions for Packages

The `package` field is required and prefilled upon creation of a tenant. It is used for defining a namespace for the packages that will later be created within the scope of the tenant. The naming conventions for package namespaces are very similar (but **not** identical) to those in effect for the tenant itself:

- Allowed characters: [a..z, 0..9, .]
- Maximum length: 36 characters
- The first character must be a letter, that is, numbers are **not** allowed here.
- The namespace must consist of two segments, separated by a dot ("."). The first segment must have at least two characters, and the second segment must have at least three characters.
- Package namespaces have to be unique within one tenant. In addition, it is **not** allowed to define a namespace that is a substring of an already existing namespace.
- The namespace "com.sap" is reserved for SAP and cannot be used for customer-defined packages.

Base URI:

- Formal description:
- Example for a base URI in a cloud foundry environment: `http://business-partner.cfapps.eu10.hana.ondemand.com/Tenants`

Permissions: The following permissions are needed for using the tenant services:`http://<server address>[:<port number>][</path>]/Tenants`

`<bp>.tenant.r`

Note

The read permission for tenants is not only used in the context of the [Tenant](#)`http://` service itself. Rather, the `<bp>.tenant.r` permission is needed for successful execution of almost all the methods of the other services dealing with business partners and instance-based authorizations in the SAP IoT platform. This is because the vast majority of the operations that can be performed in the platform are limited to the scope of the tenant where a user is logged on to. It is therefore crucial from a data protection perspective to ensure that each activity in the platform is performed within the boundaries of the proper tenant. As a consequence, the `<bp>.tenant.r` permission is needed for almost all service methods in addition to the service-specific permissions.

Methods

HTTP Method	Action	URI	Scopes
GET	Read a Tenant [page 289]	<code>/Tenants ('<tenantName>')</code>	<code><bp>.tenant.r</code>
GET	Read All Tenants [page 290]	<code>/Tenants</code>	<code><bp>.tenant.r</code>

Payload

For PUT and GET, only the media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "tenant"      : { "type": "string", "maxLength": 36, "required": true },
  "etag"        : { "type": "string" },
  "organization": { "type": "string", "maxLength": 32},
  "package"     : { "type": "string", "maxLength": 40, "readOnly" : true,
"required": true }
}
```

Related Information

[Package Configuration \[page 343\]](#)

5.1.1 Read a Tenant

Retrieves a specified tenant from the database

With this method, you send a request to the server to retrieve a particular Tenant object specified by its name.

If the tenant is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error.

Request

URI:

HTTP Method: [GET](#)

Permissions: `Tenants('<tenant>')<bp>.tenant.r`

Request Header Fields

None.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Tenant	Yes	string	Name of the tenant	Path

Request Example

```
/Tenants('customer-test001')
```

Response

Response Status and Error Codes

Code	Reason
200	Tenant retrieved successfully

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "tenant"      : { "type": "string", "maxLength": 36, "required": true },
  "etag"        : { "type": "string" },
  "organization": { "type": "string", "maxLength": 32},
  "package"     : { "type": "string", "maxLength": 40, "readOnly" : true,
"required": true }
}
```

Related Information

[Tenant \[page 287\]](#)

5.1.2 Read All Tenants

Retrieves a list of tenants from the database

With this method, you send a request to the server to retrieve a subset of tenants for which you are authorized.

i Note

Due to a conceptual change in the architecture and authorization concept, this collective GET request always returns only the current tenant you are logged on to. Accessing objects outside of the scope of the current tenant is **not** supported. The service method has only been preserved for compatibility reasons. We recommend always using the single GET request as described in [Read a Tenant \[page 289\]](#).

Request

URI: `/Tenants`

HTTP Method: [GET](#)

Permissions: <bp>.tenant.r

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set

Note

Although from a technical perspective all the query parameters listed above are not mandatory, the requirement of restricting the result set of elements still remains in effect. It is only up to you to define a proper combination of parameters to fulfill this requirement.

Request Example

```
/Tenants
```

Retrieves all tenants that are available in the database. Note that this unrestricted request is not supported due to unacceptable system load.

```
/Tenants?$top=25
```

Retrieves the first 25 tenants. Data is retrieved in page mode to reduce network load and response times.

```
/Tenants?$skip=10&$top=20
```

Retrieves 20 tenants from the database where the first 10 tenants are omitted. That is, the retrieved tenants are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Reason
200	Tenants retrieved successfully

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "tenant"      : { "type": "string", "maxLength": 36, "required": true },
  "etag"       : { "type": "string" },
  "organization": { "type": "string", "maxLength": 32},
}
```

```
"package"      : { "type": "string", "maxLength": 40, "readOnly" : true,
"required": true }
}
```

Related Information

[Tenant \[page 287\]](#)

5.2 Onboarding Organizations

Describes services used for onboarding and offboarding an organization into a SAP IoT landscape

In the context of a SAP IoT landscape, the terms "onboarding" and "offboarding" are used in the following sense:

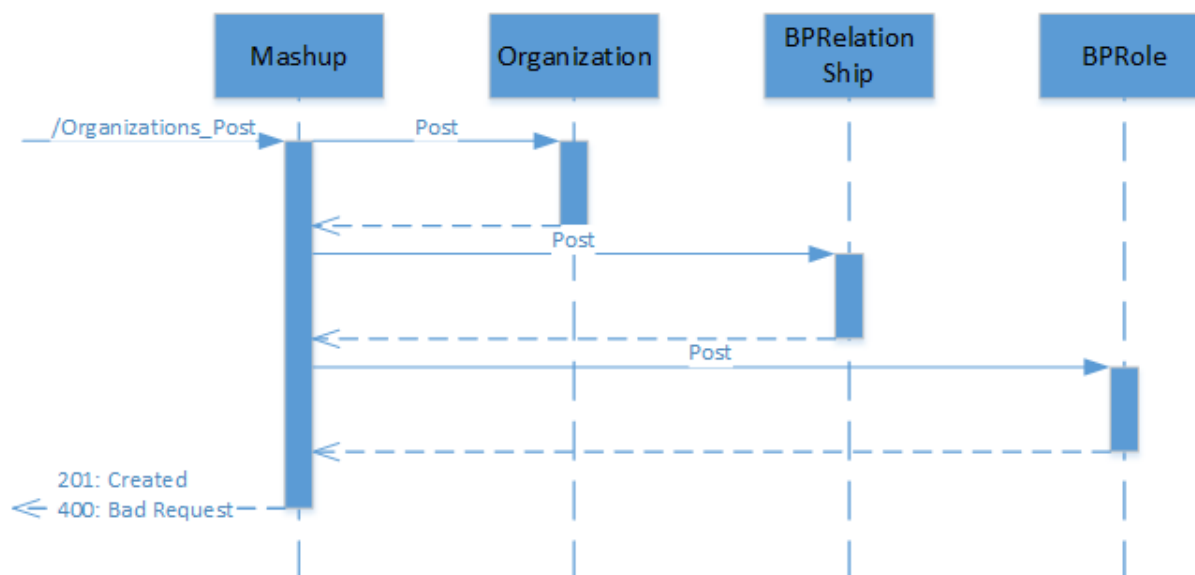
- **Onboarding:** The Cloud Platform Host that is responsible for operating the platform makes sure that an organization or a person is made known to the platform, maintains a set of master data for them, assigns them to an ObjectGroup defining their access rights within the platform. In case there is a business relationship between the newly created organization and an organization that already exists in the system, that relationship is also modeled in the data model of the platform.
- **Offboarding:** Whenever an organization does no longer require access to the services offered via the platform, it is up to the Cloud Platform Host to make sure that all relationships between this organization and other organizations are deleted, all access rights are revoked, and finally the organization is deleted from the system.

With these services, a business partner acting in the role of a Cloud Platform Provider can grant an organization access to the SAP IoT landscape as a Cloud Platform Consumer or as a Cloud Platform Consumer (2nd level). Likewise, the cloud platform provider can decide to revoke an access right already granted to an organization.

The structure of this service is very similar to the one described as [Organization \[page 32\]](#). The main differences are the following:

- The payload of the Onboarding services is a superset of the Organization payload. In addition, it comprises data sections used to indicate the assigned object group and the onboarding organization.
- An organization is either on board or not. Consequently, there is no need for the full CRUD method set that is offered for most of the other services. Creating and deleting the assignment of an organization to the platform is therefore sufficient.

The following interaction diagram illustrates the various steps that are processed during onboarding of an organization:



Base URI:

- Formal description: `http://<server address>[:<port number>]/[<path>]/Organizations`
- Example for a base URI in a cloud foundry environment: `http://tenant-administration.cfapps.eu10.hana.ondemand.com/Organizations`

Permissions: The following permissions are needed for using the organization onboarding services:

`<tenant>.org.c`

`<tenant>.org.r`

`<tenant>.org.d`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create Organization Assignment [page 295]	<code>/Organizations('<businessPartnerID>')</code>	<code><tenant>.org.c</code> <code><bp>.r</code> <code><bp>.c</code> <code><bp>.tenant.r</code>
<i>GET</i>	Read Organization Assignment [page 297]	<code>/Organizations('<businessPartnerID>')</code>	<code><tenant>.org.r</code> <code><bp>.r</code> <code><bp>.tenant.r</code>

HTTP Method	Action	URI	Scopes
DELETE	Delete Organization Assignment [page 298]	/ Organizations('<businessPartnerID>')	<tenant>.org.d <bp>.r <bp>.d <bp>.tenant.r

Payload

Only the media/type JSON is supported. The JSON for this method has the following structure:

```
{
  "organization": {
    "basicData": {
      "businessPartnerID": { "type": "string", "maxLength": 32 },
      "tenant": { "type": "string", "maxLength": 36 },
      "etag": { "type": "string" }
    },
    "organizationName": {
      "organizationName1": { "type": "string", "maxLength": 255, "required": true },
      "organizationName2": { "type": "string", "maxLength": 255 }
    },
    "communicationData": {
      "emailAddress": { "type": "string", "maxLength": 255, "required": true },
      "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
      "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
      "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
      "streetName": { "type": "string", "maxLength": 255 },
      "houseNumber": { "type": "string", "maxLength": 10 },
      "cityName": { "type": "string", "maxLength": 255 },
      "postalCode": { "type": "string", "maxLength": 10 },
      "country": { "type": "string", "maxLength": 2 },
      "countryDescription": { "type": "string", "maxLength": 60, "readOnly": true },
      "region": { "type": "string", "maxLength": 3 },
      "regionDescription": { "type": "string", "maxLength": 60, "readOnly": true }
    },
    "objectGroup": { "type": "string" }
  },
  "onboardingOrganization": {
    "businessPartnerID": { "type": "string", "maxLength": 32 }
  }
}
```

Note

A special mechanism has been implemented for the fields dealing with phone numbers in the communication data block of the payload with respect to the preceding numeric country code. Unlike manual dialing with a phone, the country code is **not** given as the standardized number for a country (for example, 1 for USA, 49 for Germany). Instead, the system expects the alphabetical ISO country code as a prefix (for example, "US" for USA, "DE" for Germany). The following fields are affected:

- mobileDestinationLocation

- `landlineDestinationLocation`

This mechanism is in effect for the service request types POST, GET, and PUT. You may look up the required ISO country codes in the [Country Codes \[page 1583\]](#) section of this documentation.

Related Information

[Business Partner \[page 29\]](#)

[Organization \[page 32\]](#)

[ObjectGroup \[page 205\]](#)

[BPRole \[page 106\]](#)

5.2.1 Create Organization Assignment

With this method, you create a new business partner of type organization and relate it to other entities in one step

Onboarding an organization consists of the following steps:

1. Creating a new ObjectGroup instance underneath the tenant root object group (only if no object group Id is provided).
2. Creating a new organization.
3. Creating a relationship between the onboarding organization and the newly created organization.
4. Creating a new BPRole instance of type `ROLE_CUSTOMER_OF_CUSTOMER`

Although assigning the new organization to an object group is an essential step during the onboarding process, it is still possible to create the new organization without providing an object group. In that case, the system creates a new object group with the tenant root object group as its parent object group. The new organization is then assigned to this object group.

Request

URI: `/Organizations`

HTTP Method: `POST`

Permissions:

`<tenant>.org.c`

`<bp>.r`

`<bp>.c`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token

Request Parameters

Name	Required	Type	Description	Send As
organizationName1	Yes	string	Semantic name of the organization	JSON
emailAddress	Yes	string	An email address used to get in contact with the organization.	JSON
tenant	No	string	If omitted, tenant of currently logged on user is used.	JSON

Request Example

```
/Organizations
```

Payload

Only the media/type JSON is supported. The JSON for this method has the following structure:

```
{
  "organization": {
    "basicData": {
      "businessPartnerID": { "type": "string", "maxLength": 32 },
      "tenant": { "type": "string", "maxLength": 36 },
      "etag": { "type": "string" }
    },
    "organizationName": {
      "organizationName1": { "type": "string", "maxLength": 255, "required": true },
      "organizationName2": { "type": "string", "maxLength": 255 }
    },
    "communicationData": {
      "emailAddress": { "type": "string", "maxLength": 255, "required": true },
      "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
      "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
      "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
      "streetName": { "type": "string", "maxLength": 255 },
      "houseNumber": { "type": "string", "maxLength": 10 },
      "cityName": { "type": "string", "maxLength": 255 },
      "postalCode": { "type": "string", "maxLength": 10 },
      "country": { "type": "string", "maxLength": 2 },
      "countryDescription": { "type": "string", "maxLength": 60, "readOnly": true },
      "region": { "type": "string", "maxLength": 3 },
      "regionDescription": { "type": "string", "maxLength": 60, "readOnly": true }
    },
    "objectGroup": { "type": "string" }
  },
  "onboardingOrganization": {
    "businessPartnerID": { "type": "string", "maxLength": 32 }
  }
}
```

```
}
```

Response

Format: *JSON*

Response Header Fields

Name	Type	Description
Location	string	Path to the newly created Organization
Etag	string	entity tag of the newly created Organization instance

Response Status and Error Codes

Code	Reason
201	Organization created successfully
400	Bad request (for example, required field value missing)

Related Information

[Onboarding Organizations \[page 292\]](#)

[ObjectGroup \[page 205\]](#)

[BPRole \[page 106\]](#)

5.2.2 Read Organization Assignment

Describes how to retrieve an onboarded organization and its related entities

With this method, you send a request to the server to retrieve a particular Organization object specified by its ID. Based on the retrieved organization instance, you can also access and modify its attributes as well as the attributes of the related entities, such as the onboarding organization, that is, the organization by which the current organization has been entered into the system.

Request

URI: `/Organizations('<businessPartnerID>')`

HTTP Method: *GET*

Permissions:

<tenant>.org.r

<bp>.r

<bp>.tenant.r

Request Header Fields

Name	Required	Values
If-Match	No	Check if cached version matches server version of the organization

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	Technical ID of the Organization object	Path

Request Example

```
/Organizations('d5fa4d8cf1c94c7b8b72c97b185d3711')
```

Response

Response Status and Error Codes

Code	Reason
200	Organization retrieved successfully
404	Not found

Related Information

[Onboarding Organizations \[page 292\]](#)

5.2.3 Delete Organization Assignment

With this method, you delete an Organization with the specified ID

With this method, you delete the organization with the specified ID from the system. If an organization is deleted, all assigned relationships to other business partners are deleted as well. The deletion includes also relations that have not been created using this service, for example, relations to other organizations. All other entities remain unchanged.

i Note

Deleting an organization is done in the form of a logical deletion only. That is, from a user's perspective, the deleted organization is no longer visible and cannot be accessed by the user. However, the physical organization object in the database remains untouched and can be retrieved by administrators, if necessary. This can be important, for example, for auditing purposes.

If the organization is successfully deleted, the server sends HTTP response code 204. Any other code indicates an error.

Request

URI: /Organizations ('<businessPartnerID>')

HTTP Method: *DELETE*

Permissions:

<tenant>.org.d

<bp>.r

<bp>.d

<bp>.tenant.r

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross-site request forgery token
If-Match	Yes	Check if cached version matches server version of the organization

Request Parameters

Name	Required	Type	Description	Send As
businessPartnerID	Yes	string	technical ID of the Organization	Path parameter

Request Example

```
/Organizations ('4459cb0648ec4c83a01b1fffd7bae205')
```

Response

Format: JSON

Response Status and Error Codes

Code	Reason
204	Organization deleted successfully
404	Not found (for example, due to a misspelled organization ID)

Related Information

[Onboarding Organizations \[page 292\]](#)

5.3 Onboarding Persons

Describes Services used for onboarding and offboarding a person into a SAP IoT landscape.

With these services, a business partner acting in the role of a Cloud Platform Provider can grant a person access to the SAP IoT landscape and establish the person's relationships to other entities in the database. Likewise, the cloud platform provider can decide to revoke an access right already granted to a person. With that, this service aims at providing a single point of entry for maintaining person-related data and to keep them synchronized with the user data for that person.

A person can only be onboarded if there is an organization for which the person works as an employee. Onboarding a single person without a relationship to an organization is **not** possible. The employing organization also serves as a provider of access rights for the person, as the object group assigned to an organization is inherited by the organization's employees.

Prerequisites

The following prerequisites must be fulfilled:

- The organization to which the person shall be assigned already exists.
- The tenant to which the onboarding organization belongs has access to the relevant SAP Cloud Identity data (SCI), for example the SCI endpoint. This is needed for the mapping between a person and the corresponding user as well as for accessing user groups.
- The following fields must be provided during creation of a person:
 - Person: Family name
 - Person: Given name
 - Person: Email address
 - Person: userActive
 - employingOrganization: ID

Base URI:

- Formal description: `http://<server address>[:<port number>]/[<path>]/Persons`
- Example for a base URI in a cloud foundry environment: `http://tenant-administration.cfapps.eu10.hana.ondemand.com/Persons`

Permissions: The following permissions are needed for using the person onboarding services:

<tenant>.pers.c

<tenant>.pers.r

<tenant>.pers.u

<tenant>.pers.d

Methods

In contrast to the onboarding services for organizations, onboarding for persons comes with the complete set of CRUD methods. This is because for a person, the service allows for additional features with respect to modifying an already established person assignment. For example, you can use this service to assign an already onboarded person to a different organization, or you can modify the complete set of data fields stored for a person.

HTTP Method	Action	URI	Scopes
POST	Create Person Assignment [page 303]	/Persons	<tenant>.pers.c <bp>.c <bp>.tenant.r <bp>.r
GET	Read Person Assignment [page 307]	/Persons ('<businessPartnerID>')	<tenant>.pers.r <bp>.r <bp>.tenant.r
PUT	Update Person Assignment [page 309]	/Persons ('<businessPartnerID>')	<tenant>.pers.u <bp>.c <bp>.r <bp>.u <bp>.d <bp>.tenant.r
DELETE	Delete Person Assignment [page 312]	/Persons ('<businessPartnerID>')	<tenant>.pers.d <bp>.r <bp>.tenant.r <bp>.d

Payload

Only the media/type JSON is supported. The JSON for these methods has the following structure:

```
{
  "person" : {
    "basicData" : {
      "businessPartnerID": { "type": "string", "maxLength": 32 },
      "tenant": { "type": "string", "maxLength": 36 },
      "etag": { "type": "string" }
    },
    "personName": {
      "formOfAddress": { "type": "string", "maxLength": 10 },
      "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" : true },
      "familyName": { "type": "string", "maxLength": 255, "required": true },
      "additionalFamilyName": { "type": "string", "maxLength": 255 },
      "familyNamePrefix": { "type": "string", "maxLength": 10 },
      "middleName": { "type": "string", "maxLength": 255 },
      "givenName": { "type": "string", "maxLength": 255, "required": true },
      "initials": { "type": "string", "maxLength": 10 },
      "academicTitle": { "type": "string", "maxLength": 4 },
      "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
      "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
      "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60, "readOnly" : true }
    },
    "communicationData" : {
      "emailAddress": { "type": "string", "maxLength": 255, "required": true },
      "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
      "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
      "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
      "streetName": { "type": "string", "maxLength": 255 },
      "houseNumber": { "type": "string", "maxLength": 10 },
      "cityName": { "type": "string", "maxLength": 255 },
      "postalCode": { "type": "string", "maxLength": 10 },
      "country": { "type": "string", "maxLength": 2 },
      "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
      "region": { "type": "string", "maxLength": 3 },
      "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
    },
    "objectGroup" : { "type": "string" }
  },
  "userActive": { "type": "boolean" },
  "userGroups": {
    "value" : [
      {
        "name": { "type": "string", "maxLength": 30 }
      }
    ]
  },
  "employingOrganization" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 }
  }
}
```

Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which

applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

i Note

A special mechanism has been implemented for the fields dealing with phone numbers in the communication data block of the payload with respect to the preceding numeric country code. Unlike manual dialing with a phone, the country code is **not** given as the standardized number for a country (for example, 1 for USA, 49 for Germany). Instead, the system expects the alphabetical ISO country code as a prefix (for example, "US" for USA, "DE" for Germany). The following fields are affected:

- `mobileDestinationLocation`
- `landlineDestinationLocation`

This mechanism is in effect for the service request types POST, GET, and PUT. You may look up the required ISO country codes in the [Country Codes \[page 1583\]](#) section of this documentation.

Related Information

[Business Partner \[page 29\]](#)

[Person \[page 59\]](#)

[ObjectGroup \[page 205\]](#)

5.3.1 Create Person Assignment

With this method, you create a new business partner of type person and relate it to other entities in one step

You use this method to create a person and to assign it to several other entities in the system. This method takes care of the following actions:

- Create a business partner object of type person.
- Assign the new person to an organization that acts as the person's employer (required).
- Relate the person to an object group describing the access rights for the person.
- Create a new user or map the person to an existing matching user for system access.
- Assign the person via its associated user to one or more usergroups (optional).

Required Fields

The following fields must be provided during creation of a person:

- Person: Family name
- Person: Given name
- Person: Email address

- Person: `userActive`
- `employingOrganization`: ID

Employing Organization

The employing organization is required and must exist in the system prior to onboarding a person. Its tenant determines the tenant to which the person is assigned. If no object group is provided, the system assigns the newly created person to the object group of the employing organization.

Relation between Person and User

A person can have either one user for accessing the system or none. The relation between person and user is controlled via the `<activeUser>` field in the payload of this service. Here, the following scenarios can occur during creation:

- User with matching name and email address already exists: The system associates the newly created person with the already existing user.
- User with matching name and email address does **not** exist: The system creates a new user with a subset of the person's data and associates person and user.
- User with either matching name or matching email address exists, but not both: The system returns an error, and the intended relation between person and user is **not** established.

When the system creates a new user for a person, the following field values are automatically transferred to the user object:

- Family name
- Email address

Currently, the following limitations apply with respect to the person onboarding service:

- If the last name of a person changes, it is currently **not** possible to reflect that change in the corresponding user data automatically.
- Data synchronization between person and user is possible only from person to user, but not vice versa. That is, if user data is changed directly by calling the respective SAP Cloud Identity (SCI) services or via the SCI administration console, these changes are **not** reflected in the corresponding person data.
- The email address of a business partner (person or organization) must be unique. Creating a business partner with an already existing email address is not supported. The same applies for changing the email address to a value already used in another business partner.

i Note

There is one exception to this rule: It is possible to use the same email address for one person **and** one organization within a tenant. This allows for defining a generic, non-individual email address like `support@company.com` and assigning it to both a person and to the organization the person belongs to.

- Also, the email address of a user must be unique.

Request

URI: `/Persons`

HTTP Method: `POST`

Permissions:

<tenant>.pers.c

<bp>.c

<bp>.tenant.r

<bp>.r

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token

Request Fields

Parameter	Required	Data Type	Description	Parameter Type
tenant	Yes	string	If omitted, tenant of currently logged on user is used.	JSON
familyName	Yes	string	Last name of the person to be created.	JSON
givenName	Yes	string	First name of the person to be created.	JSON
emailAddress	Yes	string	An email address used to get in contact with the person.	JSON

Request Example

```
/Persons
```

Payload

Only the media/type JSON is supported. The JSON for this method has the following structure:

```
{ "person" :
  { "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
    "tenant": { "type": "string", "maxLength": 36 },
    "etag": { "type": "string" }
  },
  "personName": {
    "formOfAddress": { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" :
true },
    "familyName": { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
  }
}
```

```

    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
},
"communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
},
"objectGroup" : { "type": "string"
},
"userActive": { "type": "boolean" },
"userGroups":{
    "value" : [
        {
            "name": { "type": "string", "maxLength": 30 }
        }
    ],
"employingOrganization" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 }
}
}
}

```

i Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

Response

Response Header Fields

Name	Description
Location	Path to the newly created Person assignment
ETag	Entity tag of the newly created Person assignment

Response Status and Error Codes

Code	Reason
201	Person assignment created successfully
400	Bad request

Related Information

[Onboarding Persons \[page 300\]](#)

[Person \[page 59\]](#)

5.3.2 Read Person Assignment

Describes how to retrieve an onboarded person and its related entities

With this method, you send a request to the server to retrieve a particular Person object specified by its ID. Based on the retrieved person instance, you can also access and modify its attributes as well as the attributes of the related entities, such as the employing organization.

If the person is successfully retrieved, the server sends HTTP response code 200. Any other code indicates an error

Request

URI: `/Persons('<businessPartnerID>')`

HTTP Method: `GET`

Permissions:

`<tenant>.pers.r`

`<bp>.r`

`<bp>.tenant.r`

Request Header Fields

Header	Required	Description
If-Match	Yes	Check if cached version matches server version of the person

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	Technical ID of the Person object	Path

Request Example

```
/Persons('5d9616a522a64ed6974b01e4468cf8b1')
```

Response

Response Status and Error Codes

Code	Reason
200	Person retrieved successfully
404	Not found

Payload

Only the media/type JSON is supported. The JSON for this method has the following structure:

```
{
  "person" : {
    "basicData" : {
      "businessPartnerID": { "type": "string", "maxLength": 32 },
      "tenant": { "type": "string", "maxLength": 36 },
      "etag": { "type": "string" }
    },
    "personName": {
      "formOfAddress": { "type": "string", "maxLength": 10 },
      "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" : true },
      "familyName": { "type": "string", "maxLength": 255, "required": true },
      "additionalFamilyName": { "type": "string", "maxLength": 255 },
      "familyNamePrefix": { "type": "string", "maxLength": 10 },
      "middleName": { "type": "string", "maxLength": 255 },
      "givenName": { "type": "string", "maxLength": 255, "required": true },
      "initials": { "type": "string", "maxLength": 10 },
      "academicTitle": { "type": "string", "maxLength": 4 },
      "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
      "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
      "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60, "readOnly" : true }
    },
    "communicationData" : {
      "emailAddress": { "type": "string", "maxLength": 255, "required": true },
      "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
      "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
      "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
      "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
      "streetName": { "type": "string", "maxLength": 255 },
    }
  }
}
```

```

"houseNumber": { "type": "string", "maxLength": 10 },
"cityName": { "type": "string", "maxLength": 255 },
"postalCode": { "type": "string", "maxLength": 10 },
"country": { "type": "string", "maxLength": 2 },
"countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
"region": { "type": "string", "maxLength": 3 },
"regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
},
"objectGroup" : { "type": "string"
},
"userActive": { "type": "boolean" },
"userGroups":{
  "value" : [
    {
      "name": { "type": "string", "maxLength": 30 }
    }
  ],
},
"employingOrganization" : {
  "businessPartnerID": { "type": "string", "maxLength": 32 }
}
}

```

Related Information

[Onboarding Persons \[page 300\]](#)

[Create a Person \[page 63\]](#)

5.3.3 Update Person Assignment

With this method, you modify the person assignment of the person with the specified ID

In the payload of the request, you assign values to those fields that you want to modify. For example, to add the birth name of a female person in addition to the mandatory `<familyName>`, you may pass a value for `<additionalFamilyName>` in the payload of the service request. With that, you could differentiate between different persons who, at first sight, have the same name. The only limitation here is that you cannot change those attributes that are needed for technically identifying the person (that is, `<tenant>`, `<businessPartnerID>`, and `<etag>`)

With this onboarding service method, you cannot only modify the fields that directly belong to the onboarded person but also those fields belonging to the related entities that are currently associated with that person. This includes changing the references to associated entities. In other words, you can, for example, reassign a person to a different organization or object group.

Relation between Person and User

The relation between an onboarded person and the user assigned to that person is controlled via the `<userActive>` flag. Toggling this flag during the Update service has the following effects:

- Set `<userActive>` to `true`
 Either a new user object is created, or an existing but currently unassigned user with matching data is detected by the system. In both cases, the system automatically associates the person with the user. If the system creates a new user, the user fields are populated with the corresponding data of the person. For more information, see [Create Person Assignment \[page 303\]](#).

- Set `<userActive>` to `false`

The user that was previously associated with the person is set to inactive and can no longer be used for logging on to the system unless it is reassigned to a person at a later point in time. All other user data remains unchanged. As a result, the person in question is still known in the system, but cannot access the system any longer.

Request

URI: `/Persons(<businessPartnerID>)`

HTTP Method: `PUT`

Permissions:

`<tenant>.pers.u`

`<bp>.c`

`<bp>.r`

`<bp>.u`

`<bp>.d`

`<bp>.tenant.r`

Request Header Fields

Name	Required	Values
If-Match	Yes	Check if cached version matches server version of the person
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	ID of the person	Path parameter

Request Example

```
/Persons('5d9616a522a64ed6974b01e4468cf8b1')
```

Payload

Only the media type JSON is supported. The JSON for this method has the following structure:

```
{ "person" :
  { "basicData" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 },
```

```

    "tenant": { "type": "string", "maxLength": 36 },
    "etag": { "type": "string" }
  },
  "personName": {
    "formOfAddress": { "type": "string", "maxLength": 10 },
    "formOfAddressDescription": { "type": "string", "maxLength": 30, "readOnly" :
true },
    "familyName": { "type": "string", "maxLength": 255, "required": true },
    "additionalFamilyName": { "type": "string", "maxLength": 255 },
    "familyNamePrefix": { "type": "string", "maxLength": 10 },
    "middleName": { "type": "string", "maxLength": 255 },
    "givenName": { "type": "string", "maxLength": 255, "required": true },
    "initials": { "type": "string", "maxLength": 10 },
    "academicTitle": { "type": "string", "maxLength": 4 },
    "academicTitleDescription": { "type": "string", "maxLength": 60, "readOnly" :
true },
    "additionalAcademicTitle": { "type": "string", "maxLength": 4 },
    "additionalAcademicTitleDescription" : { "type": "string", "maxLength": 60,
"readOnly" : true }
  },
  "communicationData" : {
    "emailAddress": { "type": "string", "maxLength": 255, "required": true },
    "mobileDestinationLocation": { "type": "string", "maxLength": 2 },
    "mobilePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlineDestinationLocation": { "type": "string", "maxLength": 2 },
    "landlinePhoneNumber": { "type": "string", "maxLength": 127 },
    "landlinePhoneNumberExtension": { "type": "string", "maxLength": 127 },
    "streetName": { "type": "string", "maxLength": 255 },
    "houseNumber": { "type": "string", "maxLength": 10 },
    "cityName": { "type": "string", "maxLength": 255 },
    "postalCode": { "type": "string", "maxLength": 10 },
    "country": { "type": "string", "maxLength": 2 },
    "countryDescription": { "type": "string", "maxLength": 60, "readOnly" : true },
    "region": { "type": "string", "maxLength": 3 },
    "regionDescription": { "type": "string", "maxLength": 60, "readOnly" : true }
  },
  "objectGroup" : { "type": "string"
},
  "userActive": { "type": "boolean" },
  "userGroups":{
    "value" : [
      {
        "name": { "type": "string", "maxLength": 30 }
      }
    ],
  },
  "employingOrganization" : {
    "businessPartnerID": { "type": "string", "maxLength": 32 }
  }
}

```

i Note

Although the `givenName` as well as the `familyName` fields are defined with a field length of 255 characters, this length can only be used partially if the Person shall be associated with a User object (which applies in most cases). Due to limitations of the underlying user administration layer, the following restrictions apply:

- `givenName`: 31 characters
- `familyName`: 63 characters

Response

Response Header Fields

Name	Description
Etag	Identifies the updated Person instance

Response Status and Error Codes

Code	Reason
200	Person updated successfully
400	Bad request
404	Not found

Related Information

[Onboarding Persons \[page 300\]](#)

[Create Person Assignment \[page 303\]](#)

5.3.4 Delete Person Assignment

With this method, you delete a Person assignment with the specified ID

With this method, you delete the person with the specified ID from the system. If a person is deleted, all assigned relationships to other entities (for example, business partners or object groups) are deleted as well. If the person is associated with a user, that user is automatically deactivated.

i Note

Deleting a person is done in the form of a logical deletion only. That is, from a user's perspective, the deleted person is no longer visible and cannot be accessed by the user. However, the physical Person object in the database remains untouched and can be retrieved by administrators, if necessary. This can be important, for example, for auditing purposes.

As opposed to the Person object, all the relationships of the person to other entities are deleted physically. This is true for all relationships where the person in question is involved, regardless of whether these relations have been established with the help of the onboarding service or not.

While the person's relationships to other entities are deleted, the objects that were related to the person remain untouched by this service. They can therefore still be used for other purposes (for example, attaching them to other persons).

Request

URI: /Persons ('<businessPartnerID>')

HTTP Method: *DELETE*

Permissions:

<tenant>.pers.d

<bp>.r

<bp>.tenant.r

<bp>.d

Request Header Fields

Name	Required	Description
X-CSRF-Token	Yes	Cross site request forgery token
If-Match	Yes	Check if cached version matches server version of the person.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
businessPartnerID	Yes	string	technical ID of the Person object	Path

Request Example

```
/Persons ('5d9616a522a64ed6974b01e4468cf8b1')
```

Response

Response Status and Error Codes

Code	Reason
204	Person deleted successfully
404	Not found

Related Information

[Onboarding Persons \[page 300\]](#)

5.4 UserGroup

A UserGroup serves as a connector between a user account and access rights.

Note

Due to a change in the tenant administration concept, the User Groups app is no longer needed for newly created tenants. Use this service only if you have to access legacy tenants that have been set up with an older release of SAP IoT.

A UserGroup object contains references to a list of ObjectGroupCapabilities as well as to a list of ObjectGroupRoleCollections defined for a specified tenant. In a later step, the UserGroup can be assigned to a user in the SAP IoT landscape. As a consequence, the user receives all the access rights and authorizations defined by the list objects contained in the UserGroup. The ID of a UserGroup must be unique within the scope of the tenant to which it belongs.

Base URI:

- Formal description: `http://<server address>[:<port number>][/path]/UserGroups?$filter=<filter condition>`
- Example for a base URI in a cloud foundry environment: `http://tenant-administration.cfapps.eu10.hana.ondemand.com/UserGroups?$filter=tenant eq {{TenantT1_migrated}}&skipCapabilities=true`

Methods

HTTP Method	Action	URI	Scopes
POST	Create a UserGroup [page 316]	/UserGroups	<tenant>.pers.c <auth>.r <auth>.c <bp>.tenant.r xs_authorization.read xs_authorization.write
GET	Read a UserGroup [page 318]	/UserGroups (<ID>)	<tenant>.pers.r <auth>.r <bp>.tenant.r xs-authorization.read

HTTP Method	Action	URI	Scopes
GET	Read all UserGroups [page 319]	/UserGroups	<tenant>.pers.r <auth>.r <bp>.tenant.r xs-authorization.read
PUT	Update a UserGroup [page 320]	/UserGroups (<ID>)	<tenant>.pers.u <auth>.r <auth>.c <auth>.u <auth>.d <bp>.tenant.r xs-authorization.read xs- authorization.write
DELETE	Delete a UserGroup [page 322]	/UserGroups (<ID>)	<tenant>.pers.d <auth>.r <auth>.d <bp>.tenant.r xs-authorization.read xs- authorization.write

Note

When you are calling the methods of the UserGroup service, you do not only need the permissions provided by the SAP IoT framework. In addition, the respective permissions of the Cloud Foundry User Account and Authentication (UAA) system are required. These permissions can be recognized by their naming convention `xs-authorization.<access type>`.

Payload

Only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "id"          : { "type": "string", "maxLength": 32 },
  "tenant"      : { "type": "string", "maxLength": 36 },
  "name"        : { "type": "string", "maxLength": 30 },
```

```

"display_name" : { "type": "string", "maxLength": 30 },
"description"  : { "type": "string", "maxLength": 30 },
"objectGroupRoleCollections" : {
  "value": {
    [
      "name"      : { "type": "string", "maxLength": 32 }
    ]
  }
}
}

```

Related Information

[Business Partner \[page 29\]](#)

5.4.1 Create a UserGroup

With this method, you create a new UserGroup object and relate it to other entities in one step

Setting up a user group consists of the following steps, which are performed automatically during execution of this method:

1. Creating a new UserGroup object.
2. Creating and assigning ObjectGroupCapabilities for the UserGroup.
3. Assigning role collections to the UserGroup.

Request

URI: /UserGroups

HTTP Method: *POST*

Permissions:

<tenant>.pers.c

<auth>.r

<auth>.c

<bp>.tenant.r

xs_authorization.read

xs_authorization.write

Request Header Fields

None.

Request Parameters

None.

Request Example

```
/UserGroups
```

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "id"          : { "type": "string", "maxLength": 32 },
  "tenant"      : { "type": "string", "maxLength": 36 },
  "name"        : { "type": "string", "maxLength": 30 },
  "display_name": { "type": "string", "maxLength": 30 },
  "description" : { "type": "string", "maxLength": 30 },
  "objectGroupRoleCollections" : {
    "value": {
      [
        "name" : { "type": "string", "maxLength": 32 }
      ]
    }
  }
}
```

Response

Response Headers

Name	Description
Location	Path to the newly created UserGroup

Response Status and Error Codes

Code	Reason
201	UserGroup created successfully

Related Information

[UserGroup \[page 314\]](#)

5.4.2 Read a UserGroup

Retrieves a specified UserGroup from the database

With this method, you send a request to the server to retrieve a particular UserGroup object specified by its name and the tenant name. In addition to the UserGroup object, the system also returns the role collections as well as the object group capabilities that are assigned to the user group.

Request

URI: /UserGroups (name=<name>, tenant=<tenant>)

HTTP Method: [GET](#)

Permissions:

<tenant>.pers.r

<auth>.r

<bp>.tenant.r

xs-authorization.read

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
name	Yes	string	Name of the UserGroup	Path
tenant	Yes	string	Name of the tenant	Path

Request Example

```
/UserGroups (name=UG1, tenant=ab-customer001)
```

Response

Response Status and Error Codes

Code	Reason
200	UserGroup retrieved successfully

Related Information

[UserGroup \[page 314\]](#)

5.4.3 Read all UserGroups

Retrieves a list of UserGroups from the database

With this method, you send a request to the server to retrieve a subset of all UserGroups, according to the filter criteria provided. For a collective request for a set of UserGroups, you have these options:

- You can restrict the set of user groups to be retrieved by filter criteria based on the tenant. In fact, defining filter criteria is mandatory. The system does not accept an unrestricted request for a list of all user groups in the database.
- You can define that the set of matching user groups shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

Request

URI: /UserGroups

HTTP Method: *GET*

Permissions:

<tenant>.pers.r

<auth>.r

<bp>.tenant.r

xs-authorization.read

Query String Parameters

Parameter	Required	Data Type	Description
\$filter	Yes	string	Filter condition to be applied; valid field is tenant

Request Example

```
/UserGroups?$filter=tenant eq 'customer-test001'
```

Retrieves all user groups that have been defined for the specified tenant.

Response

Response Status and Error Codes

Code	Reason
200	UserGroups retrieved successfully

Related Information

[UserGroup](#) [page 314]

5.4.4 Update a UserGroup

With this method, you modify a user group with the specified name

In the payload of the request, you assign values to those fields that you want to modify. Note that you cannot change the elementary fields of the UserGroup (like `<display_name>` or `<description>`). If you need to change these fields, you can accomplish this via the SAP Cloud Identity console. However, you can replace the assigned ObjectGroupCapabilities and ObjectGroupRoleCollections.

i Note

During execution of this method, the system **always** deletes the existing assignments of both ObjectGroupCapabilities as well as ObjectGroupRoleCollections. It is therefore important to take extra care of providing the required assignments every time you call this method, even if you want to keep all existing assignments unchanged.

Request

URI: /UserGroups (name=<name>, tenant=<tenant>)

HTTP Method: *PUT*

Permissions:

<tenant>.pers.u

<auth>.r

<auth>.c

<auth>.u

<auth>.d

<bp>.tenant.r

xs-authorization.read

xs-authorization.write

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

Name	Required	Data Type	Description	Parameter Type
name	Yes	string	Name of the UserGroup	Path

Request Example

```
/UserGroups(name=UG01, tenant=ab-customer001)
```

Payload

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "id"          : { "type": "string", "maxLength": 32 },
  "tenant"      : { "type": "string", "maxLength": 36 },
  "name"        : { "type": "string", "maxLength": 30 },
  "display_name": { "type": "string", "maxLength": 30 },
  "description" : { "type": "string", "maxLength": 30 },
  "objectGroupRoleCollections" : {
    "value": {
      [
        "name" : { "type": "string", "maxLength": 32 }
      ]
    }
  }
}
```

Response

Response Status and Error Codes

Code	Reason
200	UserGroup updated successfully
400	Bad request (for example, if you try to update one of the elementary fields)

Related Information

[UserGroup \[page 314\]](#)

5.4.5 Delete a UserGroup

With this method, you delete a UserGroup with the specified name.

Calling the Delete method deletes the UserGroup instance, and it also erases the existing references to ObjectGroupCapabilities as well as to ObjectGroupRoleCollections of the UserGroup.

Request

URI: /UserGroups (name=<name>, tenant=<tenant>)

HTTP Method: *DELETE*

Permissions:

<tenant>.pers.d

<auth>.r

<auth>.d

<bp>.tenant.r

xs-authorization.read

xs-authorization.write

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross site request forgery token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
name	Yes	string	Name of the UserGroup	Path

Request Example

```
/UserGroups (name=UG01, tenant=ab-customer001)
```

Response

Response Status and Error Codes

Code	Reason
204	UserGroup deleted successfully

Related Information

[UserGroup \[page 314\]](#)

5.5 IdentityZone

A logical structure used to manage the connection between Cloud Foundry User Account and Authentication (UAA) and an identity provider service like SAP Cloud Identity (SCI).

i Note

This service is no longer supported. However, it is possible for SAP to reactivate the service upon individual request. If still you need to access the service, please create a support ticket (component `IOT-BSV-BP`).

You use this service to set up a user group with administrator authorizations for the SAP IoT landscape. For this, during execution of the POST method, you pass the credentials of one administrative user account each belonging to the two platforms involved:

- Cloud Foundry User Account and Authentication (UAA)
- An identity provider service like SAP Cloud Identity (SCI)

Once logged on to the two platforms, a trusted relationship is established between the two platforms, which is required by the tenant onboarding service for setting up a new tenant.

Base URI:

- Formal description: `http://<server address>[:<port number>]/[<path>]/IdentityZone`
- Example for a base URI in a cloud foundry environment: `http://tenant-administration.cfapps.neo.ondemand.com/IdentityZone`

Permissions: `<tenant>.tenant.c`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create an IdentityZone [page 324]	<code>/IdentityZone</code>	<code><tenant>.tenant.c</code>

Payload

Only the media type `application/json` is supported. The JSON for this method has the following structure:

```
{
  "Name" : { "type": "string", "maxLength": 32, "required": true},
```

```

    "Description"      : { "type": "string", "maxLength": 255},
    "uaaURI"           : { "type": "string", "maxLength": 255, "required": true},
    "uaaUser"          : { "type": "string", "maxLength": 50, "required": true},
    "uaaPassword"      : { "type": "string", "maxLength": 50, "required": true},
    "idpURI"           : { "type": "string", "maxLength": 255, "required": true},
    "idpUser"          : { "type": "string", "maxLength": 50, "required": true},
    "idpPassword"      : { "type": "string", "maxLength": 50, "required": true},
    "idpCert"          : { "type": "string" },
    "UserGroup"        : { "type": "string", "required": true}
  }

```

Field Explanation

Name	Description
Name	Name of the IdentityZone
Description	Explanation of the purpose or specific boundary conditions of the IdentityZone
uaaURI, uaaUser, uaaPassword	Credentials of an administrator user defined for the Cloud Foundry User Account and Authentication (UAA) environment
idpURI, idpUser, idpPassword	Credentials of an administrator user defined for an identity provider service like SAP Cloud Identity (SCI)
idpCert	Certificate string for certificate-based logon to the identity provider service
UserGroup	Name of the new user group to be created

Related Information

[UserGroup \[page 314\]](#)

5.5.1 Create an IdentityZone

Describes how to set up a new identity zone.

With this method, you set up a new identity zone that serves as a trusted environment for both the SAP IoT landscape and an external identity provider service. After the trusted relationship has been established, the service creates a new user group. Users assigned to that user group are authorized to manage objects stored in the SAP IoT platform with administrator rights.

Prerequisites

Prior to creating a new identity zone, the following requirements must be fulfilled:

- An OAuth2 Cloud Foundry (CF) User Account and Authentication (UAA) administrator client and password must be provided in the service payload.

- A user with administrator authorization has been defined via the corresponding identity provider (IDP; for example, SAP Cloud Identity).
- The following fields must be provided during creation of a tenant:
 - A short Name of the new identity zone.
 - uaaURI
 - uaaUser
 - uaaPassword
 - idpURI
 - idpUser
 - idpPassword
 - UserGroup

With this method, the following services are created:

- UAA IdentityZone
- UAA Role Collection
- IDP Service Provider

During execution, metadata are exchanged between UAA and IDP. This results in a trusted relationship. The created UAA role collection is linked to the provided UserGroup and to the BOOTSTRAP RoleTemplate of this application. This will enable all users within this UserGroup to use the Onboarding Services as an administrator.

Request

URI: /IdentityZone

HTTP Method: *POST*

Permissions: <tenant>.tenant.c

Request Header Fields

Name	Required	Values
X-CSRF-Token	Yes	Cross-site request forgery token

Request Example

```
/IdentityZone
```

Payload

Only the media type `application/json` is supported. The JSON for this method has the following structure:

```
{
  "Name"           : { "type": "string", "maxLength": 32, "required": true},
  "Description"    : { "type": "string", "maxLength": 255},
  "uaaURI"         : { "type": "string", "maxLength": 255, "required": true},
```

```

    "uaaUser"      : { "type": "string", "maxLength": 50, "required": true},
    "uaaPassword"  : { "type": "string", "maxLength": 50, "required": true},
    "idpURI"       : { "type": "string", "maxLength": 255, "required": true},
    "idpUser"      : { "type": "string", "maxLength": 50, "required": true},
    "idpPassword"  : { "type": "string", "maxLength": 50, "required": true},
    "idpCert"      : { "type": "string" },
    "UserGroup"    : { "type": "string", "required": true}
  }

```

Field Explanation

Name	Description
Name	Name of the IdentityZone
Description	Explanation of the purpose or specific boundary conditions of the IdentityZone
uaaURI, uaaUser, uaaPassword	Credentials of an administrator user defined for the Cloud Foundry User Account and Authentication (UAA) environment
idpURI, idpUser, idpPassword	Credentials of an administrator user defined for an identity provider service like SAP Cloud Identity (SCI)
idpCert	Certificate string for certificate-based logon to the identity provider service
UserGroup	Name of the new user group to be created

Response

Response Status and Error Codes

Code	Reason
201	IdentityZone created successfully
400	Bad request

Related Information

[IdentityZone \[page 323\]](#)

6 Data Protection and Privacy

General Data Protection Regulation Manager (GDPR) is an information framework that deals with Privacy of Personal Data. This service can be used by Data subject to identify and handle the privacy of personal data in the system. SAP provides specific features and functions to support compliance with regards to relevant legal requirements, including data protection. SAP IoT delivers predefined annotations

`com.sap.appiot.security:pii` and `com.sap.appiot.security:spi` to support compliance with regard to relevant legal requirements, including data protection.

You can assign the predefined annotations for property set types when you create a property set type or update a property set type.

After you define the annotations, all properties of the property set type are considered as personal data or sensitive data based on the annotation defined. You can add annotation for a property set type if nothing is already assigned and even though the data exists for the properties. You cannot delete or change the already assigned annotation, if data exists for the properties of the property set type. Whenever you create or modify data for properties that are identified as personal data or sensitive data, the system must generate audit logs.

Note

You cannot assign the predefined annotations for property set types of data category **ReferencePropertyData**. If the referred property set type is considered as personal information or sensitive personal information by assigning the predefined annotations (`com.sap.appiot.security:pii` and `com.sap.appiot.security:spi`), the reference property data such as threshold values, unit of measure, and target values are also treated as personal information or sensitive personal information.

Assigning the `com.sap.appiot.security:pii` (personal information) annotation to a property set type can lead to decreased performance for data ingestion and writing data for property sets derived from that property set type.

Assigning the `com.sap.appiot.security:spi` (sensitive personal information) annotation to a property set type can lead to decreased read performance for property sets derived from that property set type.

The following are examples of various configuration payloads illustrating how predefined annotations are assigned for a property set type.

Property Set Type Configuration (OData Service)

In the following example payload for creating a property set type, the predefined annotation `com.sap.appiot.security:spi` is assigned to the property set type `core.automobiles:CarInfo` to indicate that all properties of the property set type are considered as sensitive data:

```
{
  "Name": "core.automobiles:CarInfo",
  "DataCategory": "MasterData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Master data for car information"
  }],
  "Annotations": [{
```

```

        "Name": "com.sap.apptot.security:spi",
        "PackageName": "com.sap.apptot.security"
    }},
    "Properties": [{
        "Name": "RegNum",
        "Descriptions": [{
            "LanguageCode": "en",
            "Description": "registration number"
        }],
        "Type": "String",
        "PropertyLength": "225"
        "UnitOfMeasure": "F"
    }]
}

```

Event Property Set Type Configuration (OData Service)

In the following example payload for creating an event property set type, the predefined annotation `com.sap.apptot.security:spi` is assigned to the property set type `core.automobiles:TemperatureEventPST` to indicate that all properties of the property set type are considered as sensitive data:

```

{
  "Name": "core.automobiles:TemperatureEventPST",
  "DataCategory": "EventData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Properties in core.automobiles:TemperatureEventPST"
  }],
  "Annotations": [{
    "Name": "com.sap.apptot.security:spi"
  }],
  "Properties": [{
    "Name": "Temperature",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Temperature of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "1",
    "UnitOfMeasure": "AA"
  },
  {
    "Name": "Pressure",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Pressure of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "0",
    "UnitOfMeasure": "BA"
  }
]
}

```

Related Information

[SAP IoT Security Guide](#)

6.1 Delete User Data

With the various micro services provided by SAP IoT, you can configure metadata objects such as package or thing type and create data for the metadata objects. These services when called persists the user data field `username`. If the user's consent to persist personal or private data is withdrawn, you must delete such data. You can use the service described in this topic to delete the user data `username`.

Deletion of user data is not a one-time activity. Though the user data is deleted, it is persisted again whenever the metadata objects created by the user is processed (created, modified, or deleted) by the API services. Hence, you must always ensure to delete the user data based on the user's consent.

Request

URI: `http://<server address>[:<port number>][<path>]/UserInfo`

Example for a base URI in a cloud foundry environment: `https://sap-iotaexplore.iot-sap.cfapps.eu10.hana.ondemand.com/appiot-mds/UserInfo`

HTTP Method: *DELETE*

Permissions: `<thing>.d`

Request Parameters

None

Request Example

```
/UserInfo
```

Response

Response Status and Error Codes

Code	Description
200	User data deleted successfully
403	Forbidden

6.2 Export Rule Data

Lets you export all the data related to rules and rule contexts.

As a preparatory step for customer offboarding, SAP offers this service method that can be used to export all the data related to rules and rule contexts. With that, you have the opportunity to move to a platform other than SAP IoT without losing rule-related data. The method collects all rule-related data available in the tenant and exports it into a data stream that can be stored as a ZIP file.

SAP IoT makes use of SAP Business Rules as an underlying rule engine. This means that while you are creating and maintaining objects with the rule modeling tools of SAP IoT, the system automatically reflects that in corresponding secondary objects handled by SAP Business Rules. This is true, e.g., for rule conditions and event names. When using the rule export service, you can decide whether the system shall export these corresponding objects as well, depending on a parameter setting provided for that purpose.

i Note

When using this service, keep the following in mind:

- Exporting the corresponding rule objects along with the primary rule objects maintained in SAP IoT is a time-consuming feature, which results in a response time slowdown of approximately 0.5 seconds per rule context. Therefore, if you want to export a high number of rule contexts, you should pay extra attention to the processing time.
- There is currently no import tool available that you could use to bring exported data back into the system.
- The internal format of the data files contained inside the ZIP file is subject to change. It is therefore **not** advisable to invest any efforts in developing any kind of tools that you might want to use for accessing the data.

Request

URI: `v1/data-management/tenant`

HTTP Method: `GET`

Permissions:

`rules.r`

`voc.r`

Request Header Fields

Name	Required	Description
<code>content-type</code>	Yes	<code>application/zip</code>

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
addRuleCondition	No	Boolean	Indicates whether secondary rule objects shall be exported along with the primary rule objects. Default value: <code>False</code>	Query string

Request Example

```
v1/data-management/tenant?addRuleCondition=false
```

With this request, the system collects all the primary rule data that is present in the current tenant and returns a byte stream in its payload that represents the content of a ZIP file. The optional `addRuleCondition` parameter could as well have been omitted, because it defaults to `False` anyway.

Response

After successful operation, the service returns a byte array that can be stored as a ZIP file in the file system for backup purposes. The internal structure of the resulting ZIP file is as follows: The ZIP file contains a flat list of data files. There is one data file for each rule as well as one for each rule context. If the method has been invoked with the `addRuleCondition` parameter set to `True`, a third set of data files is added to the ZIP file which contain the associations of rules with a rule context. The data files are named according to the following naming convention:

- `Rule_<Rule_ID>`
- `Vocabulary_<Rule_Context_ID>`
- `RuleDataForVocabulary_<Rule_Context_ID>`

In the files that belong to the third type, the following entries are logged for each rule:

- `<Rule_Name>_<Creation_Time>_draft`: Contains the rule data of the (inactive) draft version of the rule
- `<Rule_Name>_<Creation_Time>`: Contains the rule data of the active version of the rule

Response Status and Error Codes

Code	Reason
200	Rule data exported successfully.

Response Example

Here is an example of a data file representing a rule:

```
{ "createdOn": "2019-05-14T07:22:56.663Z", "lastChangedOn": "2019-05-15T06:21:41.868Z",
  "id": "db7f2b98-dcb9-4c2e-baa4-ae6351721c90", "name": "VocabularyName_1557818569402",
  "eTag": "0f51bef3c244df0a483c91058c854958", "ermProjectId": "65f832f22d1c4e77870eab352506aa79",
  "texts": [ { "language": "en", "shortText": null, "description": "" } ],
  "thingModels": [ { "vocabularyId": "db7f2b98-dcb9-4c2e-baa4-ae6351721c90", "propertySet": "timeSeriesData",
```

```
"thingType":"noah.sbrules02.rules:MultiVocThingType","propertySetType":"noah.sbrules02.rules:MultiVocTimeSeries",  
"referencePropertySetType":"noah.sbrules02.rules:MultiVocReferencePst","useThreshold":true,"modelType":"TimeSeriesData",  
"dataObjectName":"timeSeriesDOName"}}}
```

Related Information

[Offboarding](#)

7 Configuration: Metadata Objects

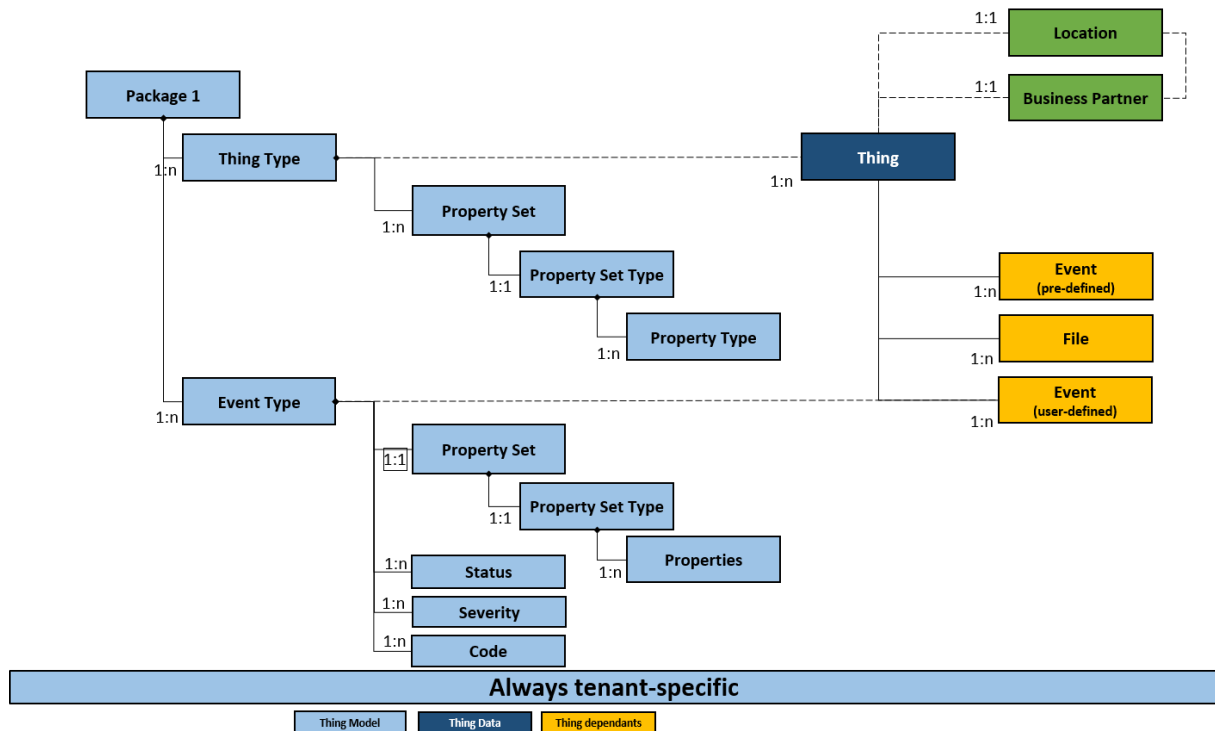
Package

A package is a container that contains metadata objects such as *ThingTypes*, *EventTypes*, *PropertySetTypes*, and *Property Types*. The Configuration service orchestrates the calls to other services such as thing metadata services and business partner metadata services to ensure a consistent system configuration.

For example, if the tenant namespace is `com-abc`, then the package name is `com.abc.core.automobiles`. For ease of reference, the rest of the document contains example payloads with the package name as `core.automobiles`.

For more information about configuring a package, see [Package Configuration \[page 343\]](#).

The following diagram illustrates the various metadata objects:



Property

The properties of a thing have a specific data type assigned. You can group the properties under a property set type. For example, the colour and body style of the car, pressure and rotation speed of the wheel, or capacity and transmission of an engine are some of the properties.

Annotation is an array of attributes used to qualify properties of a property set type. You can define annotations in a package and assign it only to property set types that belong to the same package. In addition to the annotations you define, you can also assign the predefined annotations offered by SAP.

The properties of the event property set type holds the measurement values based on which the events are triggered. The properties have a specific data type assigned. You can group the properties under a property set

type. For example, the temperature of the engine and the message displayed when the temperature of engine exceeds the threshold value are some of the properties.

Property Set Type

Property set type is a group of attributes that are used to describe things. Property set types enable groups of properties to be assigned to a thing. Property set types are assigned to thing types to describe a thing. Property set type can be assigned to one of the available data categories such as [MasterData](#), [TimeSeriesData](#), [DerivedData](#), and [Parameters](#). For example, `core.automobiles:Car`, `core.automobiles:Wheel`, and `core.automobiles:Engine` are valid property set types. The colour and body style of the car, pressure and rotation speed of the wheel, and capacity and transmission of an engine are some of the properties that you can define for the corresponding property set type.

Similarly, you can define property set types to be assigned to an event. These property set types belong to the data category [EventData](#) and are assigned to event types to describe an event. For example, **Exceeded Temperature** is a valid property set type defined for an event type. Temperature of the engine and the message displayed when the temperature exceeds are some of the properties that you can define for the corresponding property set type.

For more information about configuring the property set type, see [Property Set Type \[page 442\]](#).

Thing Type

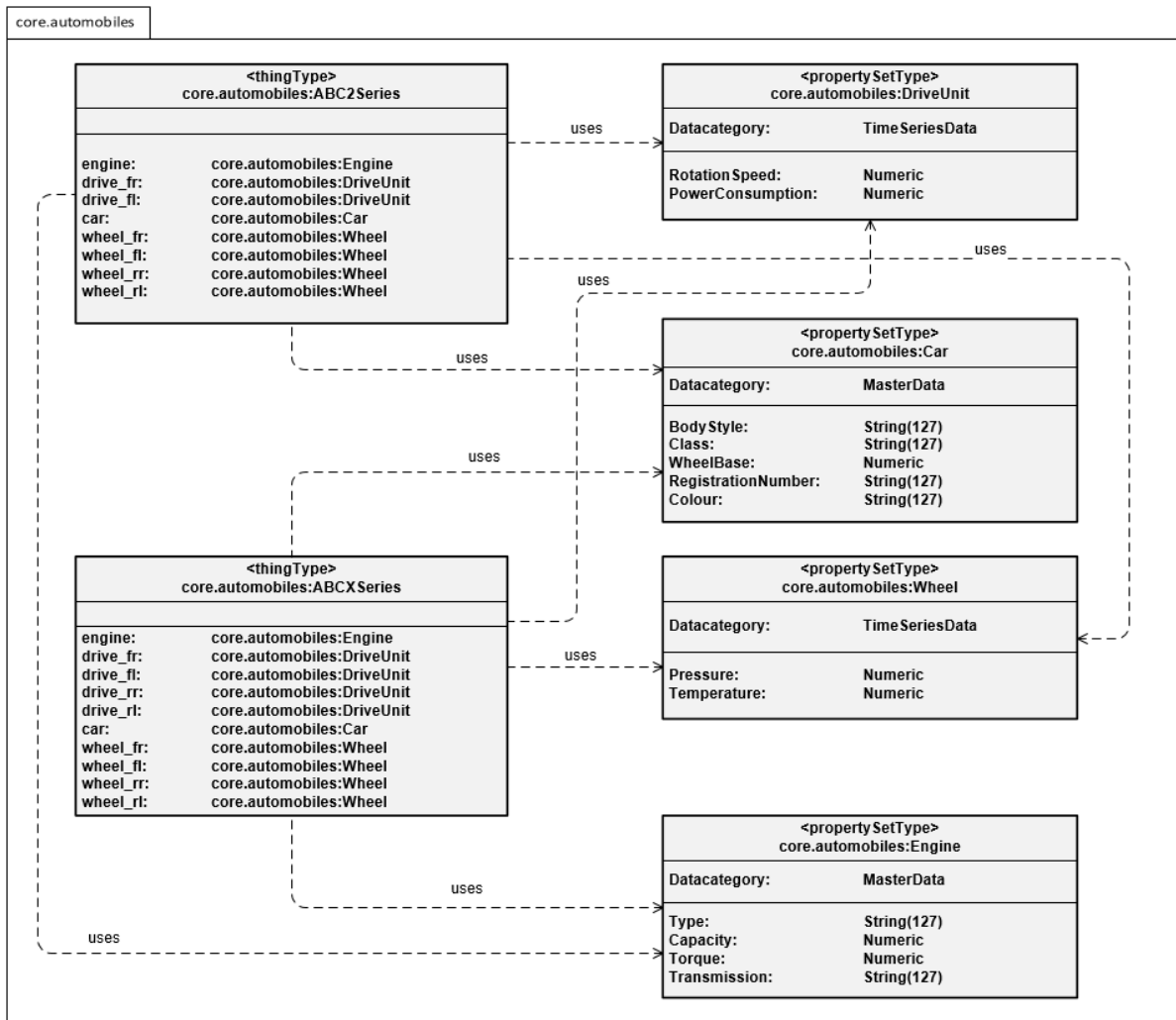
Thing type is used to group the property sets that describes a thing. For example, you can define a thing type `core.automobiles:ABCXSeries`. You can create different things, for example, different automobiles identified by their license plates or vehicle identification numbers.

For more information about configuring a thing type, see [Thing Type \[page 374\]](#).

Property Set

The assigned property set type for a thing type or an event type is called a property set. For example, property set type `core.automobiles:Wheel` is assigned as property sets **wheelfr** and **wheelfl** for a thing type.

The following diagram illustrates a package as an example. This package contains two thing types - `core.automobiles:ABC2Series` and `core.automobiles:ABCXSeries`; one for each car model. The property set types `core.automobiles:Car` and `core.automobiles:Engine` that contain master data properties such as registration number and torque are assigned to both the car models as property sets `car` and `engine`, respectively. In addition, the property set types `core.automobiles:Wheel` and `core.automobiles:DriveUnit` that contain time series properties such as rotation speed, power consumption, pressure, and temperature are also assigned to both the car models as property sets `wheel_fr` and `drive_fr`, respectively. An instance of a thing type in the example can be a car with a registration number RA KL 8136 and colour as black.



Thing

A thing is an instance of a thing type. Thing type and thing have a one-to-many relationship, that is, one thing type may be referenced by many things, while each thing is defined by exactly one thing type. For example, you can create a thing of a specific car model ABCXSeries of thing type `core.automobiles:ABCXSeries` and specify values for the attributes defined in the `core.automobiles:ABCXSeries` thing type.

For information about creating a thing, see [Onboarding Things \[page 780\]](#).

Event Type

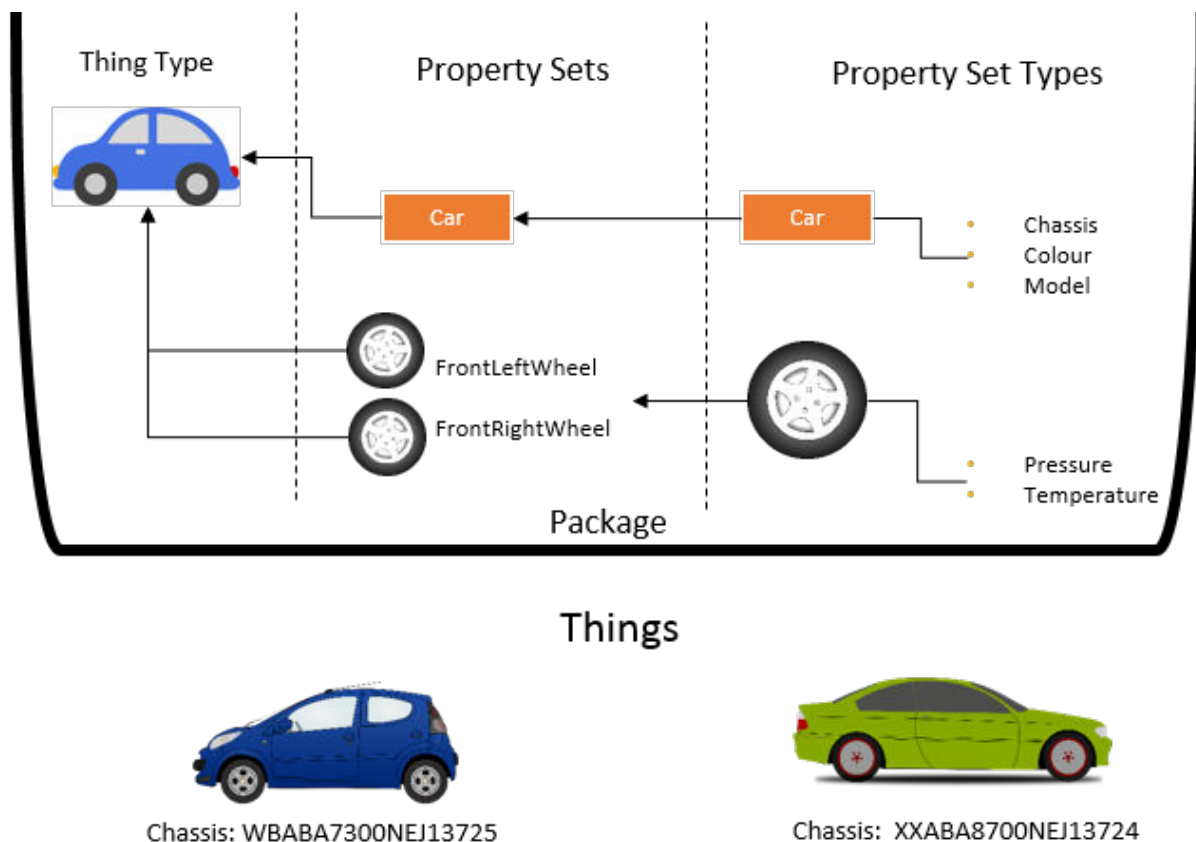
An event type is used to group the property sets that describe an event along with the different statuses and severities. You can define event types as part of the package configuration. You can create events of different event types to associate the change in data for a thing.

Event

An event instance of an event type.

Thing Model

The following diagram is an example thing model:



Example

Industrial Robot

Consider an industrial robot as a **Thing**. Industrial robots can be used in a production line of a car manufacturing plant. It can have different components such as a motor drive, hydraulic piston, and so on. These components carry sensors that provide relevant data about the robot at specific time intervals.

The Configuration service is used to model **Things**. These are the types of data that can be stored and read using the Thing service. Consider the motor drive component of the robot. The motor drive can have different signals from the sensors such as temperature, power consumption, motor status, and rotations per minute. The data that comes from these sensors can have different properties (such as temperature, power consumption) and units of measure (K, KWHr). This forms the basic atom of a **Thing** known as **PropertySetType**.

There can be many types of such industrial robots. A thing type contains an array of property set types. A robot of Type A can contain both property set types (for example, motor drive and piston) while another robot of Type B may contain only one of the property set types (for example, motor drive).

Car Manufacturer

Consider a car manufacturer whose task is to monitor the performance of all manufactured cars out of the assigned production line. Cars of different models (for example, ABC2Series and ABCXSeries) produced by this manufacturer can have some attributes that are similar. In such case, each car model can be modeled as a thing type containing many property set types that in turn contain properties.

A few of the properties such as body style, class, wheel base can be master data that corresponds to non-time series data. Few of the properties such as pressure and temperature of a wheel can correspond to time series data (data that changes with time very frequently while the car is in operation).

Related Information

[Reference Property Set Type \[page 337\]](#)

[Configuration: OData Service \[page 340\]](#)

7.1 Reference Property Set Type

Defining attributes such as unit of measure and threshold for a property using the configuration service.

You can define attributes such as unit of measure and threshold for a property using the configuration service.

In this way, all things and all data records of the property have the same unit of measure and threshold value. In addition, SAP IoT allows you to use the data category [ReferencePropertyData](#) to define reference properties with different predefined attribute types. In this way, all data records of a property for a thing instance can have different unit of measure and threshold values at different points in time, as defined.

The following are the supported predefined attribute types:

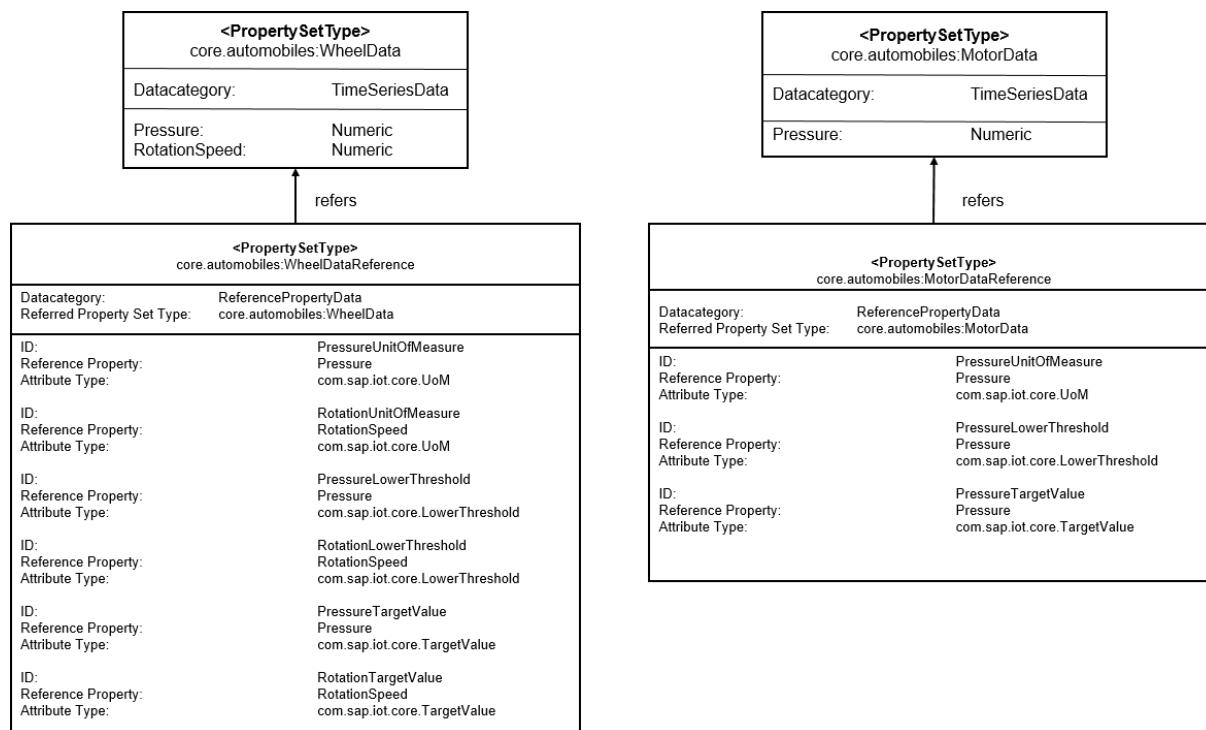
- `com.sap.iot.core.LowLowerThreshold`
- `com.sap.iot.core.LowerThreshold`
- `com.sap.iot.core.UpperThreshold`
- `com.sap.iot.core.UpperUpperThreshold`
- `com.sap.iot.core.UoM`
- `com.sap.iot.core.TargetValue`

Note

- For a property type of attribute type `com.sap.iot.core.UoM` and `com.sap.iot.core.TargetValue`, the data must be of one of the valid predefined value data types.
- For a property type of other attribute types, `com.sap.iot.core.LowLowerThreshold`, `com.sap.iot.core.LowerThreshold`, `com.sap.iot.core.UpperThreshold`, and `com.sap.iot.core.UpperUpperThreshold`, the data must match data type [Numeric](#) or [NumericFlexible](#).
- You can define a property type of attribute type `com.sap.iot.core.TargetValue` to send a desired value to a device modeled using SAP IoT services for SAP BTP for the Cloud Foundry Environment. When you update or change the value of the property type, the device is updated with the new value once it is connected. To define this attribute, you must have already created [Credentials \[page 821\]](#).

For more information about sending data to a device, see [Send Data to Sensor](#).

The following diagram illustrates the reference property type:



- You can define a reference property set type for a property set type that is part of the current package, a dependent package, or a package to which you have access. In the above example, property set type **WheelData** and reference property set type **WheelDataReference** can be part of the same package, dependent packages, or a package to which you have access.
- You can refer to a specific property set type only once. In the above example, you cannot create another reference property set type using the property set type **WheelData**.
- You can only refer to a property set type of data category *TimeSeriesData* or *DerivedData*. If the referred property set type is considered as personal information or sensitive personal information by assigning the predefined annotations (`com.sap.apptot.security:pii` and `com.sap.apptot.security:spi`), the reference property data such as threshold values, unit of measure, and target values are also treated as personal information or sensitive personal information. Hence, if data is created or modified for such reference properties, the system generates audit logs. However, you cannot directly assign these predefined annotations for the property set type of data category *ReferencePropertyData*.
- You cannot reuse the reference property set type for another reference. In the above example, you cannot use the reference property set type **WheelDataReference** to create another reference property.
- You can define the property type as reference property in the reference property set type only if it belongs to the referred property set type. In the above example, reference property **Pressure** must belong to the referred property set type **WheelData**.
- You can refer to a specific attribute type for a reference property type only once. In the above example, you cannot define another instance of **Pressure** with the same attribute type `com.sap.iot.core.UoM`.
- You can only define the fields *id*, *referenceProperty*, and *attributeType* for a property type in the reference property set type.
- You cannot define a property type in the reference property set type without the fields *id*, *referenceProperty*, and *attributeType*.

- You cannot delete or update the reference property type if time series data exists for that property type.

Related Information

[Thing: Reference Property Data \[page 927\]](#)

8 Configuration: OData Service

Configuration-related services

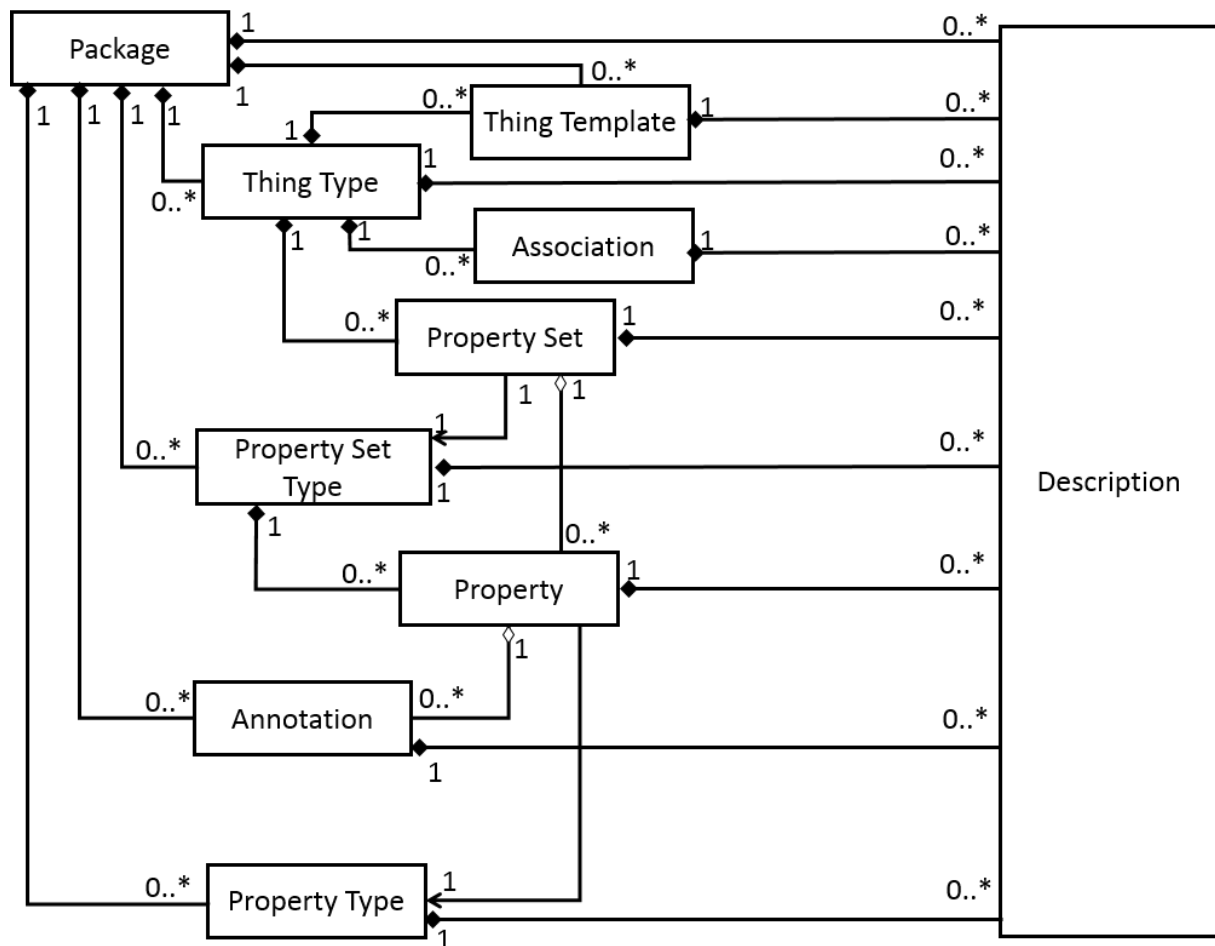
Overview

You can use this service to configure individual objects such as package, thing type, property set type, and annotation in SAP IoT platform. Hence, the service allows you to update the individual objects simultaneously within the same package. You need not maintain the version of all individual objects, instead the system generates and maintains version of the objects. Only the latest version of the objects is active for updates.

OData Version: 2.0

Entity Data Model

The following diagram shows the EDM of the configuration package:



Here is a short overview of what the objects shown in the diagram represent and how they are related:

- All objects which, in their entirety, make up the thing model of SAP IoT, are assigned to a **Package**. The package serves as a container for all objects that are set up to serve a particular business purpose, for example, all kinds of objects that you need to model the digital twin of a car or a coffee machine. The package also serves as a virtual data space where all objects defined in the package are visible and can be accessed by each other.
- During thing modeling, you typically start by identifying the general aspects of a particular group of mostly identical things in the real world (coffee machine type "CM 3000", car type "Volkswagen Beetle"). These common aspects are reflected by a **Thing Type**.
- A thing type alone is not much more than an empty bucket with a small set of attributes, such as a name and ID. To actually describe what is specific of a particular thing type, you set up so-called **Property Set Types** from which you then derive a **Property Set** that you can assign to one or many thing types. As the name suggests, a property set type is an object used for bundling a set of individual properties that belong together (for example, the fill level and the temperature of a milk tank found in a coffee machine or rotation speed of a car wheel).

- Typically, each **Property** that is part of a property set type corresponds to a measured value that is recorded by a sensor mounted to a physical device. However, properties can also represent basic data of a thing that is stable over time (for example, name, color, serial number) or derived data that is calculated on the basis of measured data (for example, average temperature within a given time frame).
- The technical details of each property (such as maximum string length or number of decimals) are stored in an object called **Property Type**. Each property refers to exactly one property type, while a package can contain any number of property types.
- Under real-world conditions, you will often feel the need to instantiate numerous variants of things that have most of their properties in common but vary in certain aspects. For example, as a producer of coffee machines, you may have different product lines with the same customer-facing features, but different tank volumes or compression unit pressure limits. For the purpose of reflecting such similar, but not identical products, you may take advantage of using **Thing Templates**. The thing template is derived from a thing type just like any other thing. However, you then define the common parts of things to be created in the thing template. Once done, you use the template for creating copies of the template as things. Each thing based on the template automatically inherits all settings that are present in the template, while the varying parts can be defined individually per thing.
- Sometimes, you may want to qualify certain properties found in a property set. You can accomplish this by associating a property with an **Annotation**. The most common use case for that may be to highlight certain properties as sensitive data or private data. Such qualification may be legally required by applicable law like the General Data Protection Regulation (GDPR), which is in effect in the European Union.
- Collecting sensor data for things is not a purpose in itself. Rather, you may feel the need to relate thing data with business-specific entities that you maintain in your ERP system, such as customer, supplier, sales order, storage location, and so on. To accomplish this, you can establish an **Association** between a thing type and a business object to which it is related.
- Each single real-world instance of the things mirrored by a thing type has its virtual equivalent in an object called **Thing** (for example, the particular coffee machine of type CM 3000 with the unique serial number 987987945 that is installed in the coffee corner in the second floor of your company's main building).
- Each type of object can be semantically specified with a **Description** in natural language. Although it is good practice to provide such descriptions, it is technically not required and can therefore be omitted.

Service Metadata URI for package: `http://<server address>[:<port number>]/Package/v1/$metadata`

Service Metadata URI for thing configuration: `http://<server address>[:<port number>]/ThingConfiguration/v1/$metadata`

Resources

Resource	Description	Path
Package Configuration [page 343]	Package	<code>/v1/Packages</code>
Thing Type [page 374]	Thing Type	<code>/v1/ThingTypes</code>
Thing Template [page 413]	Thing Template	<code>/v1/ThingTemplates</code>
Property Set Type [page 442]	Property Set Type	<code>/v1/PropertySetTypes</code>

Resource	Description	Path
Property Type [page 484]	Property Type	/v1/PropertyTypes
Annotation [page 510]	Annotation	/v1/Annotations
Event Configuration [page 522]	Event	/v1/EventTypes

Related Information

[Configuration: Metadata Objects \[page 333\]](#)

8.1 Package Configuration

Service to create, retrieve, and update the package objects

The configuration service allows you to create, retrieve, and update package objects. A package is a container that contains metadata objects such as *ThingTypes*, *PropertySetTypes*, and *Annotations*. As the objects are managed individually, you can update the objects belonging to the same package simultaneously without locking the package. You can change the status of the package as *Freeze* and the service does not allow you to create new objects for a frozen package.

Resource Path: `http://<server address>[:<port number>][<path>]/Package`

Example for a base URI in a cloud foundry environment: `https://config-package-sap.cfapps.eu10.hana.ondemand.com/Package`

Operations

CRUD Operations

HTTP Method	Operation	URI	
GET	Read Metadata of Package [page 345]	/v1/\$metadata	<pkg>.r
POST	Create a Package [page 347]	/v1/Packages	<pkg>.c
GET	Read a Package [page 350]	/v1/Packages ('<package name>')	<pkg>.r
GET	Read all Packages [page 352]	/Package/v1/Packages	<pkg>.r
PATCH	Update a Package [page 355]	/v1/Packages ('<package name>')	<pkg>.u
DELETE	Delete a Package [page 357]	/v1/Packages ('<package name>')	<pkg>.d

i Note

<pkg> refers to the package configuration application name.

Package Object Properties

Property	Data Type	Mandatory	Maximum Length	Description
Name	string	Yes	50	Unique name of the configuration package
Descriptions	Array of description objects	No	-	Description of the package for each language with the corresponding ISO language code
Scope	string	No	10	Indicates the scope of the configuration package. Permissible values are <i>tenant</i> or <i>private</i> . i Note Default value is <i>private</i>
Status	string	No	10	Indicates the status of the configuration package. Permissible values are <i>Active</i> or <i>Freeze</i> . i Note The value provided for this field in the request payload is ignored and the package is always created with the status <i>Active</i> .

Description Object Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

i Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

8.1.1 Read Metadata of Package

With this method, you can retrieve the metadata of the *Package* entity.

Request

URI: `/Package/v1/$metadata`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<pkg>.r`

Request Headers

None

Request Parameters

None

Request Example

```
/Package/v1/$metadata
```

Response

Response Status and Error Codes

Code	Description
200	Package metadata retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<EntityType Name="Package">
  <Documentation>
    <Summary>Details of package type entity</Summary>
  </Documentation>
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="true" sap:updatable="false">
    <Documentation>
      <Summary>Name of package</Summary>
    </Documentation>
  </Property>
  <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="true" sap:updatable="true">
    <Documentation>
      <Summary>Description of package entity</Summary>
    </Documentation>
  </Property>
  <Property Name="Scope" Type="Edm.String" Nullable="true"
MaxLength="10" sap:creatable="true" sap:updatable="true">
    <Documentation>
      <Summary>Scope of package entity</Summary>
    </Documentation>
  </Property>
  <Property Name="Status" Type="Edm.String" Nullable="true"
MaxLength="10" sap:creatable="false" sap:updatable="true">
    <Documentation>
      <Summary>Status of the package</Summary>
    </Documentation>
  </Property>
  <NavigationProperty Name="Descriptions"
Relationship="com.sap.appcore.PackageToDescriptionAssociation"
FromRole="Package" ToRole="Description"></NavigationProperty>
</EntityType>
<EntityType Name="Description">
  <Documentation>
    <Summary>Details of description type entity</Summary>
  </Documentation>
  <Key>
    <PropertyRef Name="LanguageCode"></PropertyRef>
  </Key>
  <Property Name="LanguageCode" Type="Edm.String" Nullable="false"
MaxLength="2" sap:creatable="true" sap:updatable="false">
    <Documentation>
      <Summary>Language code of description</Summary>
    </Documentation>
  </Property>
</EntityType>
```



```

        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Description of package entity</Summary>
            <LongDescription>Long description of description entity</
LongDescription>
          </Documentation>
        </Property>
      </EntityType>
      <Association Name="PackageToDescriptionAssociation">
        <End Type="com.sap.appcore.Package" Multiplicity="1"
Role="Package"></End>
        <End Type="com.sap.appcore.Description" Multiplicity="*"
Role="Description"></End>
      </Association>
      <EntityContainer Name="PackageContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Packages" EntityType="com.sap.appcore.Package">
          <Documentation>
            <Summary>Details of package set type entity</Summary>
          </Documentation>
        </EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appcore.Description">
          <Documentation>
            <Summary>Details of description set type</Summary>
          </Documentation>
        </EntitySet>
        <AssociationSet Name="PackageToDescriptionAssociation"
Association="com.sap.appcore.PackageToDescriptionAssociation">
          <End EntitySet="Packages" Role="Package"></End>
          <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
      </EntityContainer>

```

Related Information

[Package Configuration \[page 343\]](#)

8.1.2 Create a Package

With this method, you can create a package.

By default, the status of the package is set to *Active*. The service ignores the status value specified in the request payload of the `POST` method. You can change the status of the package to *Freeze* while updating a package using the `PATCH` service. After update, the system saves the status of the package as *Frozen* in the database. You cannot edit a package with status *Frozen*. The response header parameter `ETag` represents the entity value of the newly created package instance. This `ETag` value is a mandatory request header parameter used to update the latest version of a specific package using the `PATCH` service.

Naming convention for package

- Must be a combination of alphanumeric characters and dots (dots to be used only to separate segments).

- Dots have to be followed by an alphanumeric character.
- Prefix the package name with the namespace of the tenant. For more information, see [Tenant \[page 287\]](#).
- Must be a unique name within the tenant.
- Do not start the name with a dot or digit.
- Any segment length has to be at least 2 characters.
- Second segment length has to be at least 3 characters.
- Maximum length is 50 characters.
- The name must contain a minimum of two segments.
- The name should be in lowercase.

Note

You can only create a package for a tenant, if a namespace is assigned for the tenant and the namespace is not null or empty.

For example, if the tenant namespace is `com-abc`, then the package name is `com.abc.core.automobiles`. For ease of reference, the rest of the document contains example payloads with the package name as `core.automobiles`.

Scopes

Scope defined for a package determines whether the package and the metadata objects contained in the package are available for public access or not. The default scope for a package is always set to private. You can define the following scopes for a package:

- **private:** Metadata objects in such a package are visible only within the package. Hence, you cannot use the metadata objects of such a package in any other package.
- **tenant:** Metadata objects in such a package are visible only within a tenant where the package is created. Hence, you can use the metadata objects in such a package only in other packages belonging to the same tenant.

Request

URI: `/Package/v1/Packages`

Operation Type: CRUD

HTTP Method: `POST`

Permissions: `<pkg>.c`

Request Parameters

None

Request Example

`/Package/v1/Packages`

Payload

Format: *JSON*

```
{
  "Name": "core.automobiles",
  "Scope": "tenant",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Automobiles Package"
  }]
}
```

Response

Response Status and Error Codes

Code	Description
201	Package created successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://config-package-sap.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "uri": "https://config-package-sap.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "type": "com.sap.appcore.Package"
    },
    "Name": "core.automobiles",
    "Description": null,
    "Scope": "tenant",
    "Status": Active,
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-package-sap.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')/Descriptions"
      }
    }
  }
}
```

8.1.3 Read a Package

With this method, you can retrieve the details contained within a package with specific ID. The response returns the latest version of the package.

Request

URI: `/Package/v1/Packages ('<Name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<pkg>.r`

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Unique name of the package

Query String Parameters

Parameter	Required	Data Type	Description
\$expand	No	String	Includes the related resources inline while retrieving the requested resources. The only association of a package that can be retrieved using \$expand is Description .

Request Example

```
/Package/v1/Packages ('core.automobiles')
```

Retrieves details of the package with the ID `core.automobiles`

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created package instance. The system generates a new value and replaces the old value every time a package is updated.

Response Status and Error Codes

Code	Description
200	Package retrieved successfully
404	Specific package is not found

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

```
/Package/v1/Packages('core.automobiles')
```

Retrieves details of the package `core.automobiles`

```
{
  "d": {
    "__metadata": {
      "id": "https://config-package-sap-ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "uri": "https://config-package-sap-ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "type": "com.sap.appcore.Package"
    },
    "Name": "core.automobiles",
    "Description": "Automobiles Package",
    "Scope": "tenant",
    "Status": "Active",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-package-sap-ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')/Descriptions"
      }
    }
  }
}
```

Example 2

```
/Package/v1/Packages('core.automobiles')?$expand=Descriptions
```

Retrieves details of the package `core.automobiles` with the list of descriptions in multiple languages, if provided.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-package-sap-ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "uri": "https://config-package-sap-ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
      "type": "com.sap.appcore.Package"
    }
  }
}
```

```

    },
    "Name": "core.automobiles",
    "Description": "Automobiles Package",
    "Scope": "tenant",
    "Status": "Active",
    "Descriptions": {
      "results": [
        {
          "__metadata": {
            "id": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Descriptions('en')",
            "uri": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Descriptions('en')",
            "type": "com.sap.appcore.Description"
          },
          "LanguageCode": "en",
          "Description": "Automobiles Package"
        }
      ]
    }
  }
}

```

8.1.4 Read all Packages

With this method, you can retrieve all packages present in the database. The result set contains the latest version of all packages.

This method retrieves all packages to which the user has access authorization. It includes all packages with scope `tenant` and `private` from the same tenant to which the user has access.

In addition, you can retrieve a subset of all packages, according to the filter criteria provided. For a collective request for a set of packages, you have these options:

- You can restrict the set of packages to be retrieved by filter criteria based on the package name, description, scope, and status.
- You can define that the set of matching packages shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/Package/v1/Packages`

Operation Type: [CRUD](#)

HTTP Method: [GET](#)

Permissions: `<pkg>.r`

Request Parameters

None

Query String Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set
\$orderby	No	Boolean	Field name to be used for sorting the result set in ascending order; valid fields are package name, description, scope, and status. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are package name, description, scope, and status.
\$inlinecount	No	String	Total number of packages available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of packages available. • If you use this with \$filter parameter, the result contains the total count of packages based on the defined filter condition.

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; the valid fields are package name, scope, status, and description. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using \$filter. Valid fields are package name and description. For more information, see Filter Conditions (\$filter) [page 1550].

Request Example

```
/Package/v1/Packages
```

Retrieves all packages in the database

```
/Package/v1/Packages?$orderby=Name asc
```

Retrieves all packages and the retrieved packages are sorted by their name in ascending order.

```
/Package/v1/Packages?$select=Name, Scope
```

Retrieves all packages and retrieved result only contains the name and scope of the package

```
/Package/v1/Packages?$skip=10&$top=20
```

Retrieves 20 packages from the database where the first 10 packages are omitted. That is, the retrieved packages are those with sequence numbers 11 through 30.

Response

Response Status and Error Codes

Code	Description
200	Package retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
        "uri": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')",
        "type": "com.sap.appcore.Package"
      },
      "Name": "core.automobiles",
      "Description": "Automobiles Package",
      "Scope": "tenant",
      "Status": "Active",
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.automobiles')/
Descriptions"
        }
      }
    }],
    {
      "__metadata": {
        "id": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.computers')",
        "uri": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.computers')",
        "type": "com.sap.appcore.Package"
      },
      "Name": "core.computers",
      "Description": "Computers Package",
      "Scope": "tenant",
      "Status": "Active",
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-package-sap-
ci.cfapps.sap.hana.ondemand.com:443/Package/v1/Packages('core.computers')/
Descriptions"
        }
      }
    }
  ]
}
```

8.1.5 Update a Package

With this service, you can update an existing package.

The `ETag` value is mandatory to update a package. You must retrieve the `ETag` value of the package using the [GET \(/Package/v1/Packages\('<package name>'\)\)](#) service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `ETag` value in the request header or if the `ETag` value is not correct, the server displays an error message.

Only the following actions are supported using this service:

- You can change the scope of the package from *private* to *tenant*.
- You can change the status of the package from *Active* to *Freeze*. After update, the system saves the status of the package as *Frozen*.
- You can change the description of the package.

After updating a package, the system generates a new ETag value for the package and replaces the old value with the new value.

Note

You cannot update a package with status *Frozen* using the PATCH service.

You cannot change the package name using PATCH request.

Request

URI: /Package/v1/Packages ('<package name>')

Operation Type: CRUD

HTTP Method: PATCH

Permissions: <pkg>.u

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific package that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Unique name of the package

Request Example

/Package/v1/Packages ('core.automobiles')

```
{
  "Name": "core.automobiles",
  "Scope": "tenant",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Automobiles Package"
  }]
}
```

i Note

You cannot update the package name using the `PATCH` request. The package name specified in the request payload is ignored for update.

Response

Response Headers

Name	Description
Etag	Identifies the updated package

Response Status and Error Codes

Code	Description
204	Package updated successfully.
400	Bad request.

8.1.6 Delete a Package

With this method, you can delete a package with a specific name.

The `Etag` value is mandatory to delete a package. You must retrieve the `Etag` value of the package using the `GET (/Package/v1/Packages ('<package name>'))` service. The `Etag` value is assigned to the request header parameter `If-Match` in the `DELETE` request. If you do not include the `Etag` value in the request header or if the `Etag` value is not correct, the server displays an error message.

i Note

You cannot delete a package under the following conditions:

- Metadata objects such as thing type, property set type, property type, annotation, event type, and event property set type are already created in the package being deleted.
- The package belongs to a different tenant.

Request

URI: `/Package/v1/Packages ('<package name>')`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<pkg>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific package

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Request Example

```
/Package/v1/Packages('core.automobiles')
```

Response

Response Status and Error Codes

Code	Description
204	Package deleted successfully

8.2 Thing Configuration

The thing configuration service uses the package to define the following metadata objects:

[Thing Type \[page 374\]](#)

[Thing Template \[page 413\]](#)

[Property Set Type \[page 442\]](#)

[Property Type \[page 484\]](#)

[Annotation \[page 510\]](#)

[Thing \[page 770\]](#)

8.2.1 Read Metadata of Thing Configuration

With this method, you can retrieve the metadata of thing configuration.

Request

URI: `/ThingConfiguration/v1/$metadata`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

None

Request Parameters

None

Request Example

`/ThingConfiguration/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Thing configuration metadata retrieved successfully.

Payload

```
<EntityType Name="PropertySet">
  <Documentation>
    <Summary>Details of property set entity type</Summary>
  </Documentation>
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="30" sap:creatable="true" sap:updatable="false">
    <Documentation>
      <Summary>Name of entity</Summary>
    </Documentation>
  </Property>
```

```

        <Property Name="ThingType" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Thing type of entity</Summary>
        </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Description of entity</Summary>
        </Documentation>
        </Property>
        <Property Name="PropertySetType" Type="Edm.String"
Nullable="false" MaxLength="81" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Details of property set type</Summary>
        </Documentation>
        </Property>
        <Property Name="DataCategory" Type="Edm.String" Nullable="false"
MaxLength="30" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Data category of entity</Summary>
        </Documentation>
        </Property>
        <Property Name="Operation" Type="Edm.String" Nullable="false"
MaxLength="10" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Operation to be performed for the object</
Summary>
        </Documentation>
        </Property>
        <NavigationProperty Name="ThingTypes"
Relationship="com.sap.apptot.PropertySetToThingTypeAssociation"
FromRole="PropertySet" ToRole="ThingType"></NavigationProperty>
        <NavigationProperty Name="PropertySetTypes"
Relationship="com.sap.apptot.PropertySetToPropertySetTypeAssociation"
FromRole="PropertySet" ToRole="PropertySetType"></NavigationProperty>
        <NavigationProperty Name="Properties"
Relationship="com.sap.apptot.PropertySetToPropertyAssociation"
FromRole="PropertySet" ToRole="Property"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.PropertySetToDescriptionAssociation"
FromRole="PropertySet" ToRole="Description"></NavigationProperty>
    </EntityType>
    <EntityType Name="PropertySetType">
        <Documentation>
        <Summary>Details of property set type entity type</Summary>
        </Documentation>
        <Key>
        <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="true"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
        <Summary>Name of entity</Summary>
        </Documentation>
        </Property>
        <Property Name="PackageName" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="false" sap:updatable="false">
        <Documentation>
        <Summary>Package name of entity</Summary>
        </Documentation>
        </Property>
        <Property Name="DataCategory" Type="Edm.String" Nullable="false"
MaxLength="30" sap:creatable="true" sap:updatable="false">
        <Documentation>
        <Summary>Data category of entity</Summary>
        </Documentation>

```

```

        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Description of entity</Summary>
          </Documentation>
        </Property>
        <Property Name="ReferredPropertySetType" Type="Edm.String"
Nullable="true" MaxLength="81" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Details of referred property set type entity
type</Summary>
          </Documentation>
        </Property>
        <Property Name="CopySource" Type="Edm.String" Nullable="true"
MaxLength="81" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Copy Source of Entity</Summary>
          </Documentation>
        </Property>
        <Property Name="NumberOfProperties" Type="Edm.Int16"
Nullable="true" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Property Type Count in a given Property Set
Type</Summary>
          </Documentation>
        </Property>
        <Property Name="IsMultiLingual" Type="Edm.Boolean"
Nullable="true" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Support for multiple language</Summary>
          </Documentation>
        </Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.apptot.PropertySetTypeToPropertyAssociation"
FromRole="PropertySetType" ToRole="Property"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.PropertySetTypeToDescriptionAssociation"
FromRole="PropertySetType" ToRole="Description"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.PropertySetTypeToAnnotationAssociation"
FromRole="PropertySetType" ToRole="Annotation"></NavigationProperty>
      </EntityType>
      <EntityType Name="Description">
        <Documentation>
          <Summary>Details of description type entity</Summary>
        </Documentation>
        <Key>
          <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String" Nullable="false"
MaxLength="2" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Language code of entity</Summary>
          </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Description of entity</Summary>
            <LongDescription>Long description of description entity</
LongDescription>
          </Documentation>
        </Property>
      </EntityType>
      <EntityType Name="Property">
        <Documentation>
          <Summary>Details of property entity type</Summary>

```

```

        </Documentation>
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
            <PropertyRef Name="PropertySetType"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="30" sap:creatable="true" sap:updatable="false">
            <Documentation>
                <Summary>Name of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="PropertySetType" Type="Edm.String"
Nullable="true" MaxLength="81" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Details of property set type</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="Type" Type="Edm.String" Nullable="true"
MaxLength="30" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Type of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="PropertyLength" Type="Edm.String"
Nullable="true" MaxLength="30" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Length of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="QualityCode" Type="Edm.String" Nullable="true"
MaxLength="1" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Quality code of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="UnitOfMeasure" Type="Edm.String" Nullable="true"
MaxLength="5" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Unit of measure of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="ReferenceProperty" Type="Edm.String"
Nullable="true" MaxLength="115" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Reference property of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="AttributeType" Type="Edm.String" Nullable="true"
MaxLength="81" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Attribute of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="Operation" Type="Edm.String" Nullable="true"
MaxLength="10" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Operation to be performed for the object</
Summary>
            </Documentation>
        </Property>
        <Property Name="PropertyType" Type="Edm.String" Nullable="true"
MaxLength="81" sap:creatable="true" sap:updatable="true">

```



```

        <Documentation>
            <Summary>Details of Property Type Entity</Summary>
        </Documentation>
    </Property>
    <Property Name="IsMultiLingual" Type="Edm.Boolean"
Nullable="true" sap:creatable="true" sap:updatable="true">
        <Documentation>
            <Summary>Support for multiple language</Summary>
        </Documentation>
    </Property>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.PropertyToDescriptionAssociation"
FromRole="Property" ToRole="Description"></NavigationProperty>
    <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.PropertyToAnnotationAssociation"
FromRole="Property" ToRole="Annotation"></NavigationProperty>
    <NavigationProperty Name="ReferenceProperties"
Relationship="com.sap.apptot.PropertyToPropertyAssociation" FromRole="Property"
ToRole="ReferenceProperty"></NavigationProperty>
</EntityType>
<EntityType Name="Annotation">
    <Documentation>
        <Summary>Details of annotation entity</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="Name"></PropertyRef>
    </Key>
    <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Name of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="PackageName" Type="Edm.String" Nullable="true"
MaxLength="50" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Package name of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Description of entity</Summary>
        </Documentation>
    </Property>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.AnnotationToDescriptionAssociation"
FromRole="Annotation" ToRole="Description"></NavigationProperty>
</EntityType>
<EntityType Name="ObjectAssociation">
    <Documentation>
        <Summary>Object Association Entity Type Summary</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="PrimaryEntity"></PropertyRef>
        <PropertyRef Name="AssociatedEntity"></PropertyRef>
        <PropertyRef Name="Relationship"></PropertyRef>
    </Key>
    <Property Name="AssociationEntityType" Type="Edm.String"
Nullable="false" MaxLength="50" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Object Association Entity Type Summary</Summary>
        </Documentation>
    </Property>
    <Property Name="PrimaryEntity" Type="Edm.String"
Nullable="false" MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>

```

```

        <Summary>Object Association Primary Entity Summary</
Summary>
        </Documentation>
    </Property>
    <Property Name="PrimaryTenant" Type="Edm.String"
Nullable="false" MaxLength="32" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Object Association Primary Tenant Summary</
Summary>
            </Documentation>
        </Property>
        <Property Name="AssociatedEntity" Type="Edm.String"
Nullable="false" MaxLength="81" sap:creatable="true" sap:updatable="false">
            <Documentation>
                <Summary>Object Association Associated Entity Summary</
Summary>
                </Documentation>
            </Property>
            <Property Name="AssociationType" Type="Edm.String"
Nullable="false" MaxLength="50" sap:creatable="true" sap:updatable="false">
                <Documentation>
                    <Summary>Object Association Type Summary</Summary>
                </Documentation>
            </Property>
            <Property Name="Relationship" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="true" sap:updatable="false">
                <Documentation>
                    <Summary>Object Association Relationship Summary</
Summary>
                </Documentation>
            </Property>
            <Property Name="AssociationExpiryTime" Type="Edm.String"
Nullable="true" MaxLength="50" sap:creatable="true" sap:updatable="false">
                <Documentation>
                    <Summary>Object Association Expire Time Summary</Summary>
                </Documentation>
            </Property>
            <Property Name="AssociationCreationTime" Type="Edm.String"
Nullable="true" MaxLength="50" sap:creatable="true" sap:updatable="false">
                <Documentation>
                    <Summary>Object Association Creation Time Summary</
Summary>
                </Documentation>
            </Property>
            <Property Name="AssociatedTenant" Type="Edm.String"
Nullable="false" MaxLength="32" sap:creatable="true" sap:updatable="false">
                <Documentation>
                    <Summary>Object Association Associated Tenant Summary.</
Summary>
                </Documentation>
            </Property>
            <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="true" sap:updatable="true">
                <Documentation>
                    <Summary>Description of entity</Summary>
                </Documentation>
            </Property>
            <NavigationProperty Name="Descriptions"
Relationship="com.sap.apiot.ObjectAssociationToDescriptionAssociation"
FromRole="ObjectAssociation" ToRole="Description"></NavigationProperty>
        </EntityType>
        <EntityType Name="Value">
            <Documentation>
                <Summary>Values supported in Entity</Summary>
            </Documentation>
            <Key>
                <PropertyRef Name="Value"></PropertyRef>
            </Key>

```

```

        <Property Name="Value" Type="Edm.String" Nullable="false"
MaxLength="254" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Values supported in Entity</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of Values</Summary>
            </Documentation>
        </Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.ValueToDescriptionAssociation" FromRole="Value"
ToRole="Description"></NavigationProperty>
    </EntityType>
    <EntityType Name="Package">
        <Documentation>
            <Summary>Details of package entity type</Summary>
        </Documentation>
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Package name of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of entity</Summary>
            </Documentation>
        </Property>
        <Property Name="Scope" Type="Edm.String" Nullable="true"
MaxLength="10" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Scope of package</Summary>
            </Documentation>
        </Property>
        <Property Name="Status" Type="Edm.String" Nullable="true"
MaxLength="10" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Status of package</Summary>
            </Documentation>
        </Property>
        <NavigationProperty Name="ThingTypes"
Relationship="com.sap.appiot.PackageToThingTypeAssociation" FromRole="Package"
ToRole="ThingType"></NavigationProperty>
        <NavigationProperty Name="ThingTemplates"
Relationship="com.sap.appiot.PackageToThingTemplateAssociation"
FromRole="Package" ToRole="ThingTemplate"></NavigationProperty>
        <NavigationProperty Name="PropertySetTypes"
Relationship="com.sap.appiot.PackageToPropertySetTypeAssociation"
FromRole="Package" ToRole="PropertySetType"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.PackageToDescriptionAssociation" FromRole="Package"
ToRole="Description"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.appiot.PackageToAnnotationAssociation" FromRole="Package"
ToRole="Annotation"></NavigationProperty>
        <NavigationProperty Name="PropertyTypes"
Relationship="com.sap.appiot.PackageToPropertyTypeAssociation"
FromRole="Package" ToRole="PropertyType"></NavigationProperty>
    </EntityType>
    <EntityType Name="DYN_ENT_TemplateProperties">
        <Documentation>

```

```

        <Summary>Details of TemplateProperties Entity Set</Summary>
    </Documentation>
    <Property Name="PstName" Type="Edm.String" Nullable="true"
sap:creatable="true" sap:updatable="false"></Property>
    <Property Name="PropertyName" Type="Edm.String" Nullable="true"
sap:creatable="true" sap:updatable="false"></Property>
    <Property Name="PropertyValue" Type="Edm.String" Nullable="true"
sap:creatable="false" sap:updatable="false"></Property>
    <NavigationProperty Name="DYN_ENT_NamedPST"
Relationship="com.sap.apptot.TemplatePropertiesToNamedPST"
FromRole="DYN_ENT_TemplateProperties" ToRole="DYN_ENT_NamedPST"></
NavigationProperty>
</EntityType>
<EntityType Name="ThingTemplate">
    <Documentation>
        <Summary>Details of thing template</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="Name"></PropertyRef>
    </Key>
    <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Name of the Entity</Summary>
        </Documentation>
    </Property>
    <Property Name="ThingType" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Details of thing name</Summary>
        </Documentation>
    </Property>
    <Property Name="PackageName" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Details of Associated Thing Template Package</
Summary>
        </Documentation>
    </Property>
    <Property Name="HasFile" Type="Edm.Boolean" Nullable="true"
sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>If the Template has file</Summary>
        </Documentation>
    </Property>
    <Property Name="FileData" Type="Edm.String" Nullable="true"
sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Details of Associated Thing Template Package</
Summary>
        </Documentation>
    </Property>
    <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Details of thing template description</Summary>
        </Documentation>
    </Property>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.ThingTemplateToDescriptionAssociation"
FromRole="ThingTemplate" ToRole="Description"></NavigationProperty>
    <NavigationProperty Name="DYN_ENT_TemplateProperties"
Relationship="com.sap.apptot.ThingTemplateToTemplateProperties"
FromRole="ThingTemplate" ToRole="DYN_ENT_TemplateProperties"></
NavigationProperty>
</EntityType>
<EntityType Name="DYN_ENT_NamedPST">
    <Documentation>

```

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        <Summary>Dynamic Property</Summary>
    </Documentation>
    <Property Name="DYN_ENT_PstName" Type="Edm.String"
Nullable="false" MaxLength="81" sap:creatable="true" sap:updatable="false"></
Property>
</EntityType>
<EntityType Name="PropertyType">
    <Documentation>
        <Summary>Details of Property Type Entity</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="Name"></PropertyRef>
    </Key>
    <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Name of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Description of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="Type" Type="Edm.String" Nullable="false"
MaxLength="30" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Type of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="PropertyLength" Type="Edm.String"
Nullable="true" MaxLength="30" sap:creatable="true" sap:updatable="true">
        <Documentation>
            <Summary>Length of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="QualityCode" Type="Edm.String" Nullable="true"
MaxLength="1" sap:creatable="true" sap:updatable="true">
        <Documentation>
            <Summary>Quality code of entity</Summary>
        </Documentation>
    </Property>
    <Property Name="UnitOfMeasure" Type="Edm.String" Nullable="true"
MaxLength="5" sap:creatable="true" sap:updatable="true">
        <Documentation>
            <Summary>Unit of measure of entity</Summary>
        </Documentation>
    </Property>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.PropertyTypeToDescriptionAssociation"
FromRole="PropertyType" ToRole="Description"></NavigationProperty>
    <NavigationProperty Name="Values"
Relationship="com.sap.apptot.PropertyTypeToValueAssociation"
FromRole="PropertyType" ToRole="Value"></NavigationProperty>
</EntityType>
<EntityType Name="ThingType">
    <Documentation>
        <Summary>Details of thing type</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="Name"></PropertyRef>
    </Key>
    <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
        <Documentation>
            <Summary>Details of thing name</Summary>
        </Documentation>

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        </Property>
        <Property Name="PackageName" Type="Edm.String" Nullable="false"
MaxLength="50" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Details of thing package name</Summary>
          </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Details of thing type description</Summary>
          </Documentation>
        </Property>
        <Property Name="ExtendedThingType" Type="Edm.String"
Nullable="true" MaxLength="81" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Thing type which is extended by current thing
type</Summary>
          </Documentation>
        </Property>
        <Property Name="CopySource" Type="Edm.String" Nullable="true"
MaxLength="81" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <Summary>Thing Type which is copied by current Thing
Type</Summary>
          </Documentation>
        </Property>
        <NavigationProperty Name="PropertySets"
Relationship="com.sap.apptot.ThingTypeToPropertySetAssociation"
FromRole="ThingType" ToRole="PropertySet"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.ThingTypeToDescriptionAssociation"
FromRole="ThingType" ToRole="Description"></NavigationProperty>
        <NavigationProperty Name="ThingTemplates"
Relationship="com.sap.apptot.ThingTypeToThingTemplateAssociation"
FromRole="ThingType" ToRole="ThingTemplate"></NavigationProperty>
        <NavigationProperty Name="ObjectAssociations"
Relationship="com.sap.apptot.ThingTypeToObjectAssociation" FromRole="ThingType"
ToRole="ObjectAssociation"></NavigationProperty>
      </EntityType>
      <Association Name="ThingTypeToPropertySetAssociation">
        <End Type="com.sap.apptot.ThingType" Multiplicity="1"
Role="ThingType"></End>
        <End Type="com.sap.apptot.PropertySet" Multiplicity="*"
Role="PropertySet"></End>
      </Association>
      <Association Name="PropertySetTypeToDescriptionAssociation">
        <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
Role="PropertySetType"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
      </Association>
      <Association Name="PropertyToDescriptionAssociation">
        <End Type="com.sap.apptot.Property" Multiplicity="1"
Role="Property"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
      </Association>
      <Association Name="ObjectAssociationToDescriptionAssociation">
        <End Type="com.sap.apptot.ObjectAssociation" Multiplicity="1"
Role="ObjectAssociation"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
      </Association>
      <Association Name="PackageToPropertySetTypeAssociation">
        <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>

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        <End Type="com.sap.apptot.PropertyType" Multiplicity="*"
Role="PropertySetType"></End>
    </Association>
    <Association Name="PropertyTypeToValueAssociation">
        <End Type="com.sap.apptot.PropertyType" Multiplicity="1"
Role="PropertyType"></End>
        <End Type="com.sap.apptot.Value" Multiplicity="*" Role="Value"></
End>
    </Association>
    <Association Name="PropertySetToPropertySetTypeAssociation">
        <End Type="com.sap.apptot.PropertySet" Multiplicity="1"
Role="PropertySet"></End>
        <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
Role="PropertySetType"></End>
    </Association>
    <Association Name="PropertyToPropertyAssociation">
        <End Type="com.sap.apptot.Property" Multiplicity="1"
Role="Property"></End>
        <End Type="com.sap.apptot.Property" Multiplicity="*"
Role="ReferenceProperty"></End>
    </Association>
    <Association Name="PackageToAnnotationAssociation">
        <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>
        <End Type="com.sap.apptot.Annotation" Multiplicity="*"
Role="Annotation"></End>
    </Association>
    <Association Name="PropertySetToPropertyAssociation">
        <End Type="com.sap.apptot.PropertySet" Multiplicity="1"
Role="PropertySet"></End>
        <End Type="com.sap.apptot.Property" Multiplicity="*"
Role="Property"></End>
    </Association>
    <Association Name="ThingTypeToThingTemplateAssociation">
        <End Type="com.sap.apptot.ThingType" Multiplicity="1"
Role="ThingType"></End>
        <End Type="com.sap.apptot.ThingTemplate" Multiplicity="*"
Role="ThingTemplate"></End>
    </Association>
    <Association Name="PropertySetToThingTypeAssociation">
        <End Type="com.sap.apptot.PropertySet" Multiplicity="*"
Role="PropertySet"></End>
        <End Type="com.sap.apptot.ThingType" Multiplicity="1"
Role="ThingType"></End>
    </Association>
    <Association Name="PropertySetToDescriptionAssociation">
        <End Type="com.sap.apptot.PropertySet" Multiplicity="1"
Role="PropertySet"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
    </Association>
    <Association Name="PropertySetTypeToAnnotationAssociation">
        <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
Role="PropertySetType"></End>
        <End Type="com.sap.apptot.Annotation" Multiplicity="*"
Role="Annotation"></End>
    </Association>
    <Association Name="PropertySetTypeToPropertyAssociation">
        <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
Role="PropertySetType"></End>
        <End Type="com.sap.apptot.Property" Multiplicity="*"
Role="Property"></End>
    </Association>
    <Association Name="PropertyTypeToDescriptionAssociation">
        <End Type="com.sap.apptot.PropertyType" Multiplicity="1"
Role="PropertyType"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>

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        </Association>
        <Association Name="PackageToDescriptionAssociation">
            <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>
            <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
        </Association>
        <Association Name="ThingTypeToObjectAssociation">
            <End Type="com.sap.apptot.ThingType" Multiplicity="1"
Role="ThingType"></End>
            <End Type="com.sap.apptot.ObjectAssociation" Multiplicity="*"
Role="ObjectAssociation"></End>
        </Association>
        <Association Name="AnnotationToDescriptionAssociation">
            <End Type="com.sap.apptot.Annotation" Multiplicity="1"
Role="Annotation"></End>
            <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
        </Association>
        <Association Name="PackageToPropertyTypeAssociation">
            <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>
            <End Type="com.sap.apptot.PropertyType" Multiplicity="*"
Role="PropertyType"></End>
        </Association>
        <Association Name="TemplatePropertiesToNamedPST">
            <End Type="com.sap.apptot.DYN_ENT_TemplateProperties"
Multiplicity="1" Role="DYN_ENT_TemplateProperties"></End>
            <End Type="com.sap.apptot.DYN_ENT_NamedPST" Multiplicity="*"
Role="DYN_ENT_NamedPST"></End>
        </Association>
        <Association Name="ThingTypeToDescriptionAssociation">
            <End Type="com.sap.apptot.ThingType" Multiplicity="1"
Role="ThingType"></End>
            <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
        </Association>
        <Association Name="PackageToThingTypeAssociation">
            <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>
            <End Type="com.sap.apptot.ThingType" Multiplicity="*"
Role="ThingType"></End>
        </Association>
        <Association Name="PropertyToAnnotationAssociation">
            <End Type="com.sap.apptot.Property" Multiplicity="1"
Role="Property"></End>
            <End Type="com.sap.apptot.Annotation" Multiplicity="*"
Role="Annotation"></End>
        </Association>
        <Association Name="ValueToDescriptionAssociation">
            <End Type="com.sap.apptot.Value" Multiplicity="1" Role="Value"></
End>
            <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
        </Association>
        <Association Name="PackageToThingTemplateAssociation">
            <End Type="com.sap.apptot.Package" Multiplicity="1"
Role="Package"></End>
            <End Type="com.sap.apptot.ThingTemplate" Multiplicity="*"
Role="ThingTemplate"></End>
        </Association>
        <Association Name="ThingTemplateToDescriptionAssociation">
            <End Type="com.sap.apptot.ThingTemplate" Multiplicity="1"
Role="ThingTemplate"></End>
            <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
        </Association>
        <Association Name="ThingTemplateToTemplateProperties">

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        <End Type="com.sap.appiot.ThingTemplate" Multiplicity="1"
Role="ThingTemplate"></End>
        <End Type="com.sap.appiot.DYN_ENT_TemplateProperties"
Multiplicity="*" Role="DYN_ENT_TemplateProperties"></End>
    </Association>
    <EntityContainer Name="ThingConfigurationContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="PropertySets"
EntityType="com.sap.appiot.PropertySet">
            <Documentation>
                <Summary>Details of property set entity set type</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="PropertySetTypes"
EntityType="com.sap.appiot.PropertySetType">
            <Documentation>
                <Summary>Details of property set type entity set</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.Description">
            <Documentation>
                <Summary>Details of description entity set type</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Properties"
EntityType="com.sap.appiot.Property">
            <Documentation>
                <Summary>of property entity set type</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Annotations"
EntityType="com.sap.appiot.Annotation">
            <Documentation>
                <Summary>Details of annotation entity set</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="ObjectAssociations"
EntityType="com.sap.appiot.ObjectAssociation">
            <Documentation>
                <Summary>ObjectAssociation Entity Set Summary</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Values" EntityType="com.sap.appiot.Value">
            <Documentation>
                <Summary>Values supported in Entity</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Packages" EntityType="com.sap.appiot.Package">
            <Documentation>
                <Summary>Details of thing type entity set</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="DYN_ENT_TemplateProperties"
EntityType="com.sap.appiot.DYN_ENT_TemplateProperties">
            <Documentation>
                <Summary>Details of TemplateProperties Entity Set</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="ThingTemplates"
EntityType="com.sap.appiot.ThingTemplate">
            <Documentation>
                <Summary>Details of Thing Template Entity Set</Summary>
            </Documentation>
        </EntitySet>

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        <EntitySet Name="DYN_ENT_NamedPST"
EntityType="com.sap.apptot.DYN_ENT_NamedPST">
        <Documentation>
        <Summary>Details of NamedPST EntitySet</Summary>
        </Documentation>
    </EntitySet>
    <EntitySet Name="PropertyTypes"
EntityType="com.sap.apptot.PropertyType">
        <Documentation>
        <Summary>Details of Property Type Entity</Summary>
        </Documentation>
    </EntitySet>
    <EntitySet Name="ThingTypes"
EntityType="com.sap.apptot.ThingType">
        <Documentation>
        <Summary>Details of thing type entity set</Summary>
        </Documentation>
    </EntitySet>
    <AssociationSet Name="ThingTypeToPropertySetAssociation"
Association="com.sap.apptot.ThingTypeToPropertySetAssociation">
        <End EntitySet="ThingTypes" Role="ThingType"></End>
        <End EntitySet="PropertySets" Role="PropertySet"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySetTypeToDescriptionAssociation"
Association="com.sap.apptot.PropertySetTypeToDescriptionAssociation">
        <End EntitySet="PropertySetTypes" Role="PropertySetType"></
End>
        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="PropertyToDescriptionAssociation"
Association="com.sap.apptot.PropertyToDescriptionAssociation">
        <End EntitySet="Properties" Role="Property"></End>
        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="ObjectAssociationToDescriptionAssociation"
Association="com.sap.apptot.ObjectAssociationToDescriptionAssociation">
        <End EntitySet="ObjectAssociations"
Role="ObjectAssociation"></End>
        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="PackageToPropertySetTypeAssociation"
Association="com.sap.apptot.PackageToPropertySetTypeAssociation">
        <End EntitySet="Packages" Role="Package"></End>
        <End EntitySet="PropertySetTypes" Role="PropertySetType"></
End>
    </AssociationSet>
    <AssociationSet Name="PropertyTypeToValueAssociation"
Association="com.sap.apptot.PropertyTypeToValueAssociation">
        <End EntitySet="PropertyTypes" Role="PropertyType"></End>
        <End EntitySet="Values" Role="Value"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySetToPropertySetTypeAssociation"
Association="com.sap.apptot.PropertySetToPropertySetTypeAssociation">
        <End EntitySet="PropertySets" Role="PropertySet"></End>
        <End EntitySet="PropertySetTypes" Role="PropertySetType"></
End>
    </AssociationSet>
    <AssociationSet Name="PropertyToPropertyAssociation"
Association="com.sap.apptot.PropertyToPropertyAssociation">
        <End EntitySet="Properties" Role="Property"></End>
        <End EntitySet="Properties" Role="ReferenceProperty"></End>
    </AssociationSet>
    <AssociationSet Name="PackageToAnnotationAssociation"
Association="com.sap.apptot.PackageToAnnotationAssociation">
        <End EntitySet="Packages" Role="Package"></End>
        <End EntitySet="Annotations" Role="Annotation"></End>
    </AssociationSet>

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        <AssociationSet Name="PropertySetToPropertyAssociation"
Association="com.sap.apptot.PropertySetToPropertyAssociation">
            <End EntitySet="PropertySets" Role="PropertySet"></End>
            <End EntitySet="Properties" Role="Property"></End>
        </AssociationSet>
        <AssociationSet Name="ThingTypeToThingTemplateAssociation"
Association="com.sap.apptot.ThingTypeToThingTemplateAssociation">
            <End EntitySet="ThingTypes" Role="ThingType"></End>
            <End EntitySet="ThingTemplates" Role="ThingTemplate"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySetToThingTypeAssociation"
Association="com.sap.apptot.PropertySetToThingTypeAssociation">
            <End EntitySet="PropertySets" Role="PropertySet"></End>
            <End EntitySet="ThingTypes" Role="ThingType"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySetToDescriptionAssociation"
Association="com.sap.apptot.PropertySetToDescriptionAssociation">
            <End EntitySet="PropertySets" Role="PropertySet"></End>
            <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySetTypeToAnnotationAssociation"
Association="com.sap.apptot.PropertySetTypeToAnnotationAssociation">
            <End EntitySet="PropertySetTypes" Role="PropertySetType"></
End>
            <End EntitySet="Annotations" Role="Annotation"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySetTypeToPropertyAssociation"
Association="com.sap.apptot.PropertySetTypeToPropertyAssociation">
            <End EntitySet="PropertySetTypes" Role="PropertySetType"></
End>
            <End EntitySet="Properties" Role="Property"></End>
        </AssociationSet>
        <AssociationSet Name="PropertyTypeToDescriptionAssociation"
Association="com.sap.apptot.PropertyTypeToDescriptionAssociation">
            <End EntitySet="PropertyTypes" Role="PropertyType"></End>
            <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
        <AssociationSet Name="PackageToDescriptionAssociation"
Association="com.sap.apptot.PackageToDescriptionAssociation">
            <End EntitySet="Packages" Role="Package"></End>
            <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
        <AssociationSet Name="ThingTypeToObjectAssociation"
Association="com.sap.apptot.ThingTypeToObjectAssociation">
            <End EntitySet="ThingTypes" Role="ThingType"></End>
            <End EntitySet="ObjectAssociations"
Role="ObjectAssociation"></End>
        </AssociationSet>
        <AssociationSet Name="AnnotationToDescriptionAssociation"
Association="com.sap.apptot.AnnotationToDescriptionAssociation">
            <End EntitySet="Annotations" Role="Annotation"></End>
            <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
        <AssociationSet Name="PackageToPropertyTypeAssociation"
Association="com.sap.apptot.PackageToPropertyTypeAssociation">
            <End EntitySet="Packages" Role="Package"></End>
            <End EntitySet="PropertyTypes" Role="PropertyType"></End>
        </AssociationSet>
        <AssociationSet Name="TemplatePropertiesToNamedPST"
Association="com.sap.apptot.TemplatePropertiesToNamedPST">
            <End EntitySet="DYN_ENT_TemplateProperties"
Role="DYN_ENT_TemplateProperties"></End>
            <End EntitySet="DYN_ENT_NamedPST" Role="DYN_ENT_NamedPST"></
End>
        </AssociationSet>
        <AssociationSet Name="ThingTypeToDescriptionAssociation"
Association="com.sap.apptot.ThingTypeToDescriptionAssociation">
            <End EntitySet="ThingTypes" Role="ThingType"></End>

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        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="PackageToThingTypeAssociation"
Association="com.sap.appiot.PackageToThingTypeAssociation">
        <End EntitySet="Packages" Role="Package"></End>
        <End EntitySet="ThingTypes" Role="ThingType"></End>
    </AssociationSet>
    <AssociationSet Name="PropertyToAnnotationAssociation"
Association="com.sap.appiot.PropertyToAnnotationAssociation">
        <End EntitySet="Properties" Role="Property"></End>
        <End EntitySet="Annotations" Role="Annotation"></End>
    </AssociationSet>
    <AssociationSet Name="ValueToDescriptionAssociation"
Association="com.sap.appiot.ValueToDescriptionAssociation">
        <End EntitySet="Values" Role="Value"></End>
        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="PackageToThingTemplateAssociation"
Association="com.sap.appiot.PackageToThingTemplateAssociation">
        <End EntitySet="Packages" Role="Package"></End>
        <End EntitySet="ThingTemplates" Role="ThingTemplate"></End>
    </AssociationSet>
    <AssociationSet Name="ThingTemplateToDescriptionAssociation"
Association="com.sap.appiot.ThingTemplateToDescriptionAssociation">
        <End EntitySet="ThingTemplates" Role="ThingTemplate"></End>
        <End EntitySet="Descriptions" Role="Description"></End>
    </AssociationSet>
    <AssociationSet Name="ThingTemplateToTemplateProperties"
Association="com.sap.appiot.ThingTemplateToTemplateProperties">
        <End EntitySet="ThingTemplates" Role="ThingTemplate"></End>
        <End EntitySet="DYN_ENT_TemplateProperties"
Role="DYN_ENT_TemplateProperties"></End>
    </AssociationSet>
</EntityContainer>
</Schema>
</edmx:DataServices>
</edmx:Edmx>

```

Related Information

[Thing Configuration \[page 358\]](#)

8.2.2 Thing Type

Thing type is used to group the property sets that describes a thing.

For example, you can define a thing type Automobiles. You can create different things, for example, different automobiles identified by their license plates or vehicle identification numbers. You can associate properties to a property set type. You can assign a property set type to a thing type as property sets.

Resource Path: `http://<server address>[:<port number>][[/path]]/ThingConfiguration`

Example for a base URI in a cloud foundry environment: `https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
<i>POST</i>	Create a Thing Type [page 381]	/ThingConfiguration/<version>/ Packages('<package name>')/ ThingTypes	<thingconf >.c
<i>GET</i>	Read Details of a Thing Type [page 386]	/ThingConfiguration/<version>/ ThingTypes('<thing type name>')	<thingconf >.r
<i>GET</i>	Read all Thing Types [page 390]	/ThingConfiguration/<version>/ ThingTypes	<thingconf >.r
<i>GET</i>	Read Thing Types of a Package [page 394]	/ThingConfiguration/<version>/ Packages('package name')/ ThingTypes	<thingconf >.r
<i>PATCH</i>	Update a Thing Type [page 397]	/ThingConfiguration/<version>/ ThingTypes('<thing type name>')	<thingconf >.u
<i>DELETE</i>	Delete a Thing Type [page 400]	/ThingConfiguration/v1/ ThingTypes('<thing type name>')	<thingconf >.d

i Note

- <thingconf> refers to the thing configuration application name.
- <version> refers to the version of the method, /v1 or /v2

Thing Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Unique name of the thing type
Descriptions	Array of description objects	No	-	Description of the thing type for each language with the corresponding ISO language code
PropertySets	Array of property set objects	No	-	Array of property sets that belong to the thing type

i Note

If you include `Descriptions` along with the `CopySource` field, the method assigns these descriptions for the newly created thing type. If you do not include `Descriptions` along with the `CopySource` field, the method copies descriptions defined in the source thing type to the newly created thing type.

Property	Type	Mandatory	Maximum Length	Description
ThingTypeCategory	String	No	Fixed	Category of thing type Only the following values are supported: • <i>ASSET</i> – Indicates the root thing • <i>COMPONENT</i> – Indicates the sub-items of the <i>ASSET</i> i Note You can define this only using /v2 version of the create method.
CopySource	String	No	81	Name of the thing type You can use this field to specify the already existing thing type name, structure of which is copied to the new thing type to be created. i Note • You can use this field only in the /v1 version of the create method. • You cannot specify any value other than the thing type name in this field. • You cannot create copy of a thing type that belongs to a package with scope=private. • In a request payload to copy an existing thing type, you can only specify the name of the new thing type, CopySource field, and Descriptions field.

Property Set Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	50	Unique identifier of the property (that belongs to the propertySetType) defined in a thing type
PropertySetType	String	Yes	81	Name of the property set type referred

Property	Type	Mandatory	Maximum Length	Description
Descriptions	Array	No	-	Description of the property set for each language with the corresponding ISO language code

i Note

For reasons of data protection and privacy, it is not allowed to assign a property set to a rule vocabulary if the property set type to which the property set belongs has been classified as holding personal data, or sensitive data.

Also, if an initially non-classified property set is assigned to a rule vocabulary that is used by rules, any later classification of the property set as personal, or sensitive data leads to the deactivation of all affected rules. For more information on creating a rule vocabulary, see [Create a Vocabulary](#).

Description Object Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

i Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Mapping \[page 829\]](#)

[Thing Template \[page 413\]](#)

[Property Set Type \[page 442\]](#)

[Property Type \[page 484\]](#)

[Extended Thing Type \[page 378\]](#)

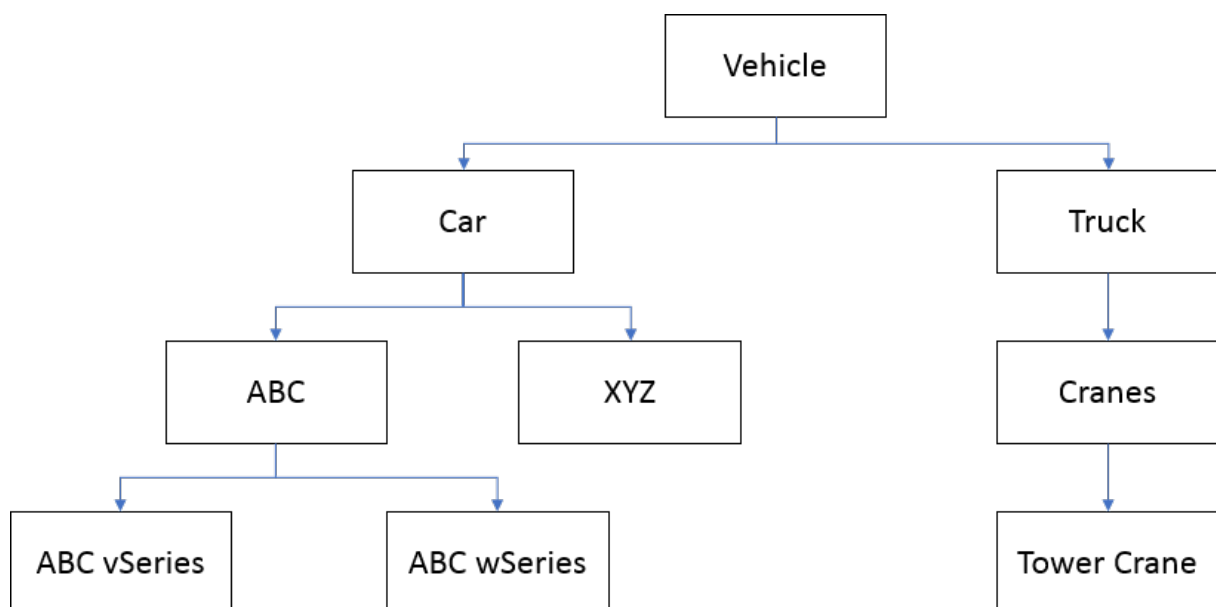
[Thing Type Category \[page 380\]](#)

8.2.2.1 Extended Thing Type

In an IoT scenario, multiple thing types may have few of the property sets in common. In such a scenario, you can create a thing type with all the commonly used property sets and then extend it to create child thing types that will inherit all the property sets from the extended thing type. In addition, you can define new property sets for the child thing type. You can extend a thing type within the same package or extend a thing type from a package to which you have access.

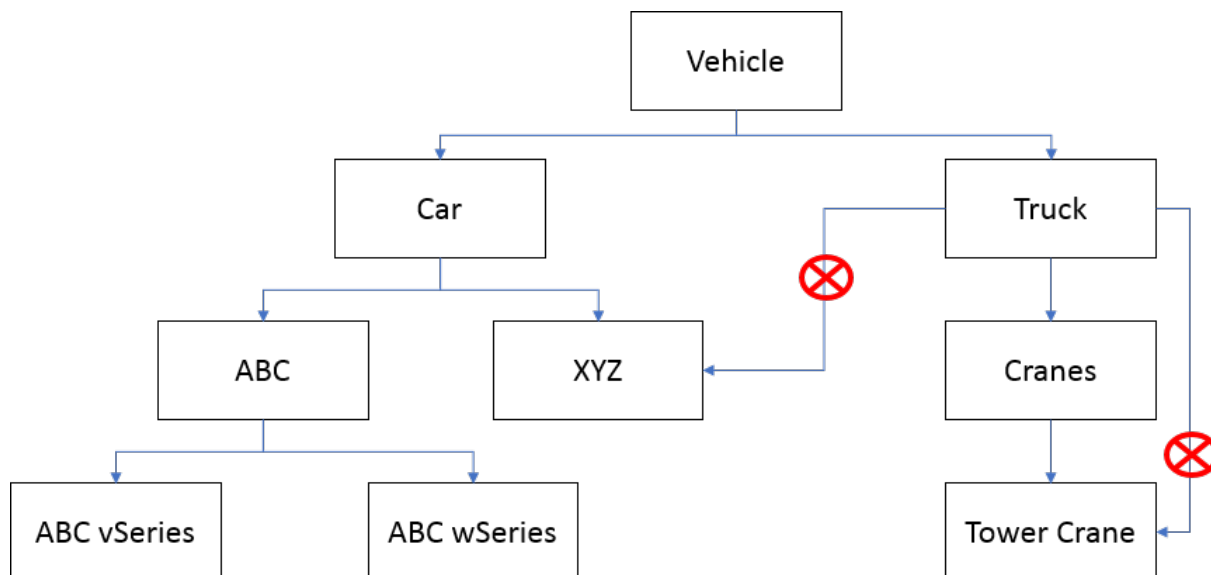
Multi-Level Thing Type Extension

Starting with version 1.46, you can extend thing types to multiple levels using OData service. The following diagram illustrates the multi-level extension of thing types:



In the above example, **Vehicle** is the extended thing type. The child thing types **Car** and **Truck** inherits all property sets from the extended thing type.

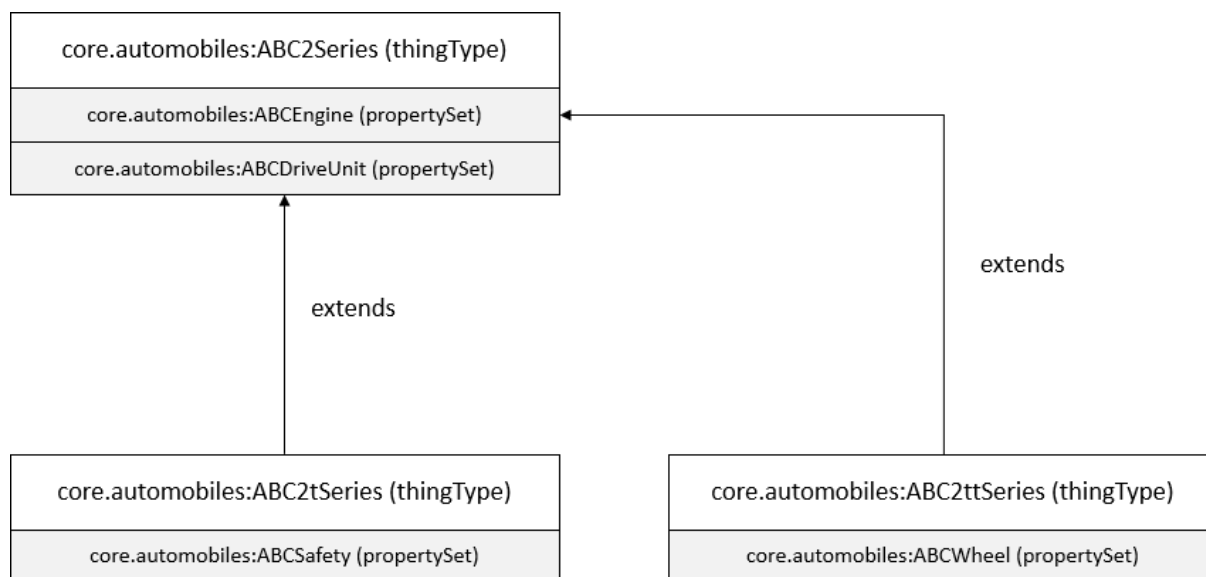
The following diagram illustrates the multiple thing type extension and the cyclic dependency, which is not supported:



In the above example,

- The child thing type **XYZ** cannot inherit the property sets from both the extended thing types **Car** and **Truck**.
- You cannot create a cyclic dependency by extending the thing type **Truck** to create the child thing type **Tower Crane**.

Here is another example of extended thing type and the inheritance of its property sets.



As the example in the diagram shows, there are two thing types with a specialized property set each, dealing with safety and wheel properties, respectively. Both thing types refer to the same base thing type providing

property sets dealing with engine and drive unit properties. As a result of the extension, the two child thing types have the following property sets:

- `core.automobiles:ABC2tSeries`
 - `core.automobiles:Safety`
 - `core.automobiles:Engine`
 - `core.automobiles:DriveUnit`
- `core.automobiles:ABC2ttSeries`
 - `core.automobiles:Wheel`
 - `core.automobiles:Engine`
 - `core.automobiles:DriveUnit`

→ Recommendation

For performance reasons, we recommend to extend the thing types up to a maximum of five levels.

i Note

The property sets across the child thing type and the extended thing type must be unique.

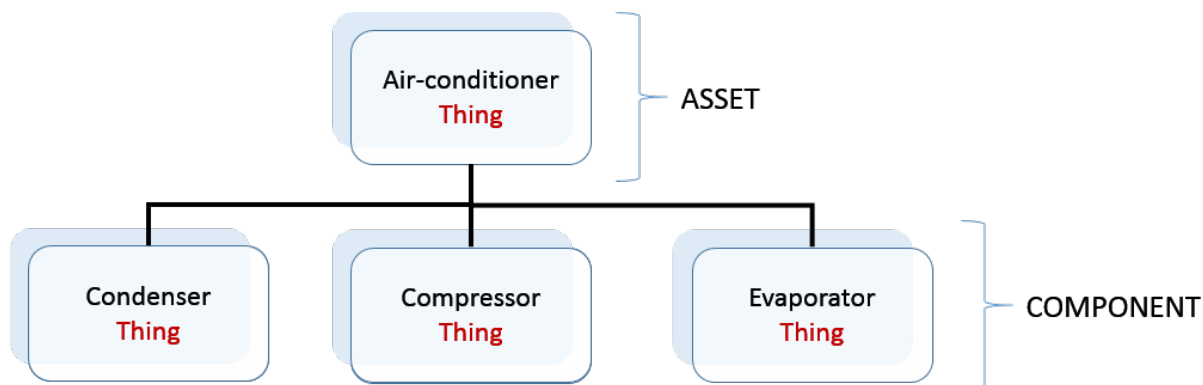
8.2.2.2 Thing Type Category

Thing Type Category

A thing in the Internet of Things (IoT) scenario, may refer to multiple connected things. For example, an air-conditioner is used to monitor and regulate the air temperature, which is achieved by multiple internal parts of the air-conditioner, such as condenser, compressor, evaporator, and so on. The condenser facilitates heat transfer and the compressor pressurizes the refrigerant gas as part of the process to turn it back into a liquid. To depict this example in a thing model scenario, we can categorize the different parts of the air-conditioner in a hierarchical structure in the definition of a thing type. The following are the supported thing type categories:

- **ASSET** – Indicates the root thing (thing of things). In the example of an air-conditioner, the air-conditioner is an asset.
- **COMPONENT** – Indicates the sub-items of the asset. In the example of an air-conditioner, the condenser, compressor, and evaporator are the components.

The following diagram illustrates the thing model with thing type categories:



i Note

You can define thing type category for a thing type only using /v2 version of the create method.

8.2.2.3 Create a Thing Type

With this method, you create thing types in a specific package.

i Note

In the configuration, you can define any number of thing types. However, you can create only one thing type per `POST` request. You can create more number of thing types for a package through multiple `POST` requests.

→ Recommendation

You can define up to 10 thing types for a package.

Naming convention for thing type

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Naming convention for property set

- Only the following characters are supported:
 - Uppercase and lowercase alphabets `a` through `z` and `A` through `Z`
 - Numeric digits `0` through `9`
 - Punctuation marks underscore (`_`), hyphen (`-`), colon (`:`), and full-stop (`.`)
- Maximum length is 50 characters.
- Property set names have to be unique for a given set of thing types.
- Property sets must be unique for a thing type. You can create multiple property sets with unique names for a thing type using the same property set type.

Request

URI

Version	URI
v1	/ThingConfiguration/v1/ Packages ('<package name>')/ThingTypes
v2	/ThingConfiguration/v2/ Packages ('<package name>')/ThingTypes

i Note

Thing types created using the /v1 version are accessible using the /v2 version, and vice versa. However, the only difference between the /v1 and /v2 versions is that you can define and retrieve thing type category for a thing type only using /v2 version.

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <thingconf>.c

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is EN.

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	string	Unique name of the package

Request Example

```
/ThingConfiguration/v1/Packages ('core.automobiles')/ThingTypes
```

Payload

Format: *JSON*

Example 1

```
/ThingConfiguration/v1/Packages ('core.automobiles')/ThingTypes
```

Creates the thing type `core.automobiles:ABCXSeries` in the package `core.automobiles`.

```
{
  "Name": "core.automobiles:ABCXSeries",
  "Descriptions": [
    {
```

```

        "LanguageCode": "en",
        "Description": "ABCXSeries electric car"
    },
    {
        "LanguageCode": "de",
        "Description": "ABCXSeries Elektroauto"
    }
],
"PropertySets": [
    {
        "Name": "CarEngine",
        "PropertySetType": "core.automobiles:Engine",
        "Descriptions": [
            {
                "LanguageCode": "en",
                "Description": "Car Engine Properties"
            },
            {
                "LanguageCode": "de",
                "Description": "Automotoreigenschaften"
            }
        ]
    },
    {
        "Name": "CarStyle",
        "PropertySetType": "core.automobiles:Style",
        "Descriptions": [
            {
                "LanguageCode": "en",
                "Description": "Car style properties"
            },
            {
                "LanguageCode": "de",
                "Description": "Fahrzeugstileigenschaften"
            }
        ]
    }
]
}

```

Example 2

/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes

Creates the thing type `core.automobiles:ABC2Series` which is extended from the thing type `core.automobiles:ABCXSeries` in the package `core.automobiles`.

```

{
    "Name": "core.automobiles:ABC2Series",
    "ExtendedThingType": "core.automobiles:ABCXSeries",
    "Descriptions": [
        {
            "LanguageCode": "en",
            "Description": "ABC2Series electric car"
        },
        {
            "LanguageCode": "de",
            "Description": "ABC2Series Elektroauto"
        }
    ],
    "PropertySets": [
        {
            "Name": "wheel",
            "PropertySetType": "core.automobiles:Wheel",
            "Descriptions": [
                {
                    "LanguageCode": "en",

```

```

        "Description": "Car wheel properties"
      },
      {
        "LanguageCode": "de",
        "Description": "Felgen Eigenschaften"
      }
    ]
  }
]
}

```

Example 3

/ThingConfiguration/v2/Packages('core.automobiles')/ThingTypes

Creates the thing type `core.automobiles:ABCXSeries` of category [ASSET](#).

```

{
  "Name": "core.automobiles:ABCXSeries",
  "ThingTypeCategory": "ASSET",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "ABCXSeries electric car"
    },
    {
      "LanguageCode": "de",
      "Description": "ABCXSeries Elektroauto"
    }
  ],
  "PropertySets": [
    {
      "Name": "CarEngine",
      "PropertySetType": "core.automobiles:Engine",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Car Engine Properties"
        },
        {
          "LanguageCode": "de",
          "Description": "Automotoreigenschaften"
        }
      ]
    }
  ]
}

```

Example 4

/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes

Creates the thing type `core.automobiles:ABCYSeries` copied from the already existing thing type `core.automobiles:ABCXSeries`. The method copies the entire structure of the source thing type to the new thing type. However, you can include the descriptions of the thing type in the `Descriptions` field along with the `CopySource` field. In which case, the method creates new thing type with these descriptions instead of copying it from the source thing type.

```

{
  "Name": "core.automobiles:ABCYSeries",
  "CopySource": "core.automobiles:ABCXSeries"
}

```

i Note

Ensure that the source thing type belongs to a package with scope=tenant as you cannot create copy of a thing type that belongs to a package with scope=private.

Response

Response Status and Error Codes

Code	Description
201	Thing type created successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples.

The following is the response payload after creating a thing type `core.automobiles:ABCXSeries`.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABCXSeries')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABCXSeries')",
      "type": "com.sap.apiot.ThingType"
    },
    "Name": "core.automobiles:ABCXSeries",
    "PackageName": "core.automobiles",
    "Description": "",
    "ExtendedThingType": null,
    "PropertySets": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABCXSeries')/PropertySets"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABCXSeries')/Descriptions"
      }
    },
    "ThingTemplates": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABCXSeries')/ThingTemplates"
      }
    }
  }
}
```

```

    }
  }
}

```

The following is the response payload after creating the thing type `core.automobiles:ABC2Series` which is extended from the thing type `core.automobiles:ABCXSeries`.

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "type": "com.sap.apptot.ThingType"
    },
    "Name": "core.automobiles:ABC2Series",
    "PackageName": "core.automobiles",
    "Description": "",
    "ExtendedThingType": "core.automobiles:ABCXSeries",
    "PropertySets": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/PropertySets"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/Descriptions"
      }
    },
    "ThingTemplates": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ThingTemplates"
      }
    }
  }
}

```

8.2.2.4 Read Details of a Thing Type

With this method, you can retrieve details of a thing type with a specific name.

Request

URI: `/ThingConfiguration/v1/ThingTypes('<Name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	string	Name of the thing type

Query String Parameters

Parameter	Required	Data Type	Description
\$expand	No	string	Includes the related resources inline while retrieving the requested resources. The associations of a thing type that can be retrieved using \$expand are Description, PropertySet, and Properties of PropertySet.

Request Example

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')
```

Retrieves details of the thing type `core.automobiles:ABC2Series`

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')?
$expand=PropertySets/Properties
```

Retrieves the property sets along with the properties for the thing type `core.automobiles:ABC2Series`

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created thing type instance. The system generates a new value and replaces the old value every time a thing type is updated.

Response Status and Error Codes

Code	Description
200	Details of a specific thing type retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')

Retrieves details of the thing type core.automobiles:ABC2Series.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "type": "com.sap.apptot.ThingType"
    },
    "Name": "core.automobiles%3AABC2Series",
    "PackageName": "core.automobiles",
    "Description": "ABC2Series electric car",
    "ExtendedThingType": null,
    "CopySource": null,
    "PropertySets": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/PropertySets"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/Descriptions"
      }
    },
    "ThingTemplates": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ThingTemplates"
      }
    },
    "ObjectAssociations": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ObjectAssociations"
      }
    }
  }
}
```

Example 2

/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')?
\$expand=Descriptions

Retrieves details of the thing type `core.automobiles:ABC2Series` along with the detailed list of descriptions.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
      "type": "com.sap.apptot.ThingType"
    },
    "Name": "core.automobiles%3AABC2Series",
    "PackageName": "core.automobiles",
    "Description": "",
    "ExtendedThingType": null,
    "CopySource": null,
    "PropertySets": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/PropertySets"
      }
    },
    "Descriptions": {
      "results": [
        {
          "LanguageCode": "en",
          "Description": "ABC2Series electric car"
        },
        {
          "LanguageCode": "de",
          "Description": "ABC2Series Elektroauto"
        }
      ]
    },
    "ThingTemplates": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ThingTemplates"
      }
    },
    "ObjectAssociations": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ObjectAssociations"
      }
    }
  }
}
```

Example 3

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')?
$expand=PropertySets
```

Retrieves details of the thing type `core.automobiles:ABC2Series` with the detailed list of property sets.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
```

```

        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
        "type": "com.sap.apiot.ThingType"
    },
    {
        "Name": "core.automobiles%3AABC2Series",
        "PackageName": "core.automobiles",
        "Description": "Vehicle thing type",
        "ExtendedThingType": null,
        "CopySource": null,
        "PropertySets": {
            "results": [
                {
                    "Name": "engine",
                    "ThingType": "core.automobiles%3AABC2Series",
                    "Description": "",
                    "PropertySetType": "core.automobiles:Engine",
                    "DataCategory": "TimeSeriesData",
                    "Operation": ""
                },
                {
                    "Name": "car",
                    "ThingType": "core.automobiles%3AABC2Series",
                    "Description": "",
                    "PropertySetType": "core.automobiles:Car",
                    "DataCategory": "TimeSeriesData",
                    "Operation": ""
                }
            ]
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series') /
Descriptions"
            }
        },
        "ThingTemplates": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series') /
ThingTemplates"
            }
        },
        "ObjectAssociations": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series') /
ObjectAssociations"
            }
        }
    }
}

```

8.2.2.5 Read all Thing Types

With this method, you can retrieve all thing types.

This method retrieves all thing types to which the user has access authorization. It includes thing types from all packages from the same tenant.

In addition, you can retrieve a subset of all thing types, according to the filter criteria provided. For a collective request for a set of thing types, you have these options:

- You can restrict the set of thing types to be retrieved by filter criteria based on the thing type name, description, and extended thing type name.
- You can define that the set of matching thing types shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/ThingTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
<code>Accept-Language</code>	No	Language of the thing type description. The default language is en .

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.
<code>\$inlinecount</code>	No	String	Total number of thing types available; permissible values are allpages and none . The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of thing types available. • If you use this with <code>\$filter</code> parameter, the result contains the total count of thing types based on the defined filter condition.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; only valid field is the thing type name. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid fields are thing type name, description, and extended thing type name. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using \$filter. Valid fields are thing type name, description, and extended thing type name. For more information, see Filter Conditions (\$filter) [page 1550].
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are thing type name, package name, description, and extended thing type name.

Request Example

```
/ThingConfiguration/v1/ThingTypes
```

Retrieves all thing types

```
/ThingConfiguration/v1/ThingTypes?$select=Name, PackageName
```

Retrieves all thing types. The result set only contains selected fields - name of the thing type and name of the package.

```
/ThingConfiguration/v1/ThingTypes?$filter=Name eq 'core.automobiles:Vehicle'
```

Retrieves details of a thing type with the specific name.

```
/ThingConfiguration/v1/ThingTypes?$filter=Description eq 'ABC2 Car Series'
```

Retrieves all thing types with a specific description.

Response

Response Status and Error Codes

Code	Description
200	Details of all thing types retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://thing-configuration-odata-
v010-2003.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles.%3ABC2Series')",
          "uri": "https://thing-configuration-odata-
v010-2003.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles.%3ABC2Series')",
          "type": "com.sap.apptot.ThingType"
        },
        "Name": "core.automobiles:ABC2Series",
        "PackageName": "core.automobiles",
        "Description": "test thing type",
        "ExtendedThingType": "",
        "PropertySets": {
          "_deferred": {
            "uri": "https://thing-configuration-odata-
v010-2003.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles.%3ABC2Series')/PropertySets"
          }
        },
        "Descriptions": {
          "_deferred": {
            "uri": "https://thing-configuration-odata-
v010-2003.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles.%3ABC2Series')/Descriptions"
          }
        }
      }
    ],
    "_next": "https://thing-configuration-odata-
v010-2003.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/ThingTypes?
$format=json&$skiptoken=20&$filter=Name eq 'core.automobiles:ABC2Series'"
  }
}
```

8.2.2.6 Read Thing Types of a Package

With this method, you can retrieve all thing types or a specific thing type of a package with specific ID.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/Packages('<PackageName>')/ThingTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
PackageName	Yes	String	Unique name of the package

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$inlinecount	No	String	Total number of thing types available; permissible values are allpages and none . The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of thing types available. - If you use this with <code>\$filter</code> parameter, the result contains the total count of thing types based on the defined filter condition.

Parameter	Required	Data Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are name. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid fields are thing type name, description, and extended thing type name. The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. You can use the string functions such as substringof , startswith , and endswith to search data using \$filter. Valid fields are thing type name, description, and extended thing type name.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are thing type name, package name, description, and extended thing type name.

Request Example

```
/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes
```

Retrieves all thing types of the package `core.automobiles`

```
/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes?$filter=Name eq 'core.automobiles:ABC2Series'
```

Retrieves details of a thing type specified in the filter condition.

```
/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes?$select=Name, Description
```

Retrieves all thing types of the package. The result set only contains the selected fields, name of the thing type and its description.

```
/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes?$filter=ExtendedThingType eq 'core.automobiles:ParentTT'
```

Retrieves all thing types that are extended from a specific thing type.

Response

Response Status and Error Codes

Code	Description
200	Details of a specific thing type are retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

/ThingConfiguration/v1/Packages('core.automobiles')/ThingTypes

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')",
        "type": "com.sap.apptot.ThingType"
      },
      "Name": "core.automobiles%3AABC2Series",
      "PackageName": "core.automobiles",
      "Description": "ABC2Series electric car",
      "ExtendedThingType": "",
      "CopySource": null,
      "PropertySets": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/PropertySets"
        }
      },
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/Descriptions"
        }
      },
      "ThingTemplates": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ThingTemplates"
        }
      },
      "ObjectAssociations": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTypes('core.automobiles%3AABC2Series')/ObjectAssociations"
        }
      }
    }
  ]
}
```

```

    },
    {
      "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')",
        "type": "com.sap.apptot.ThingType"
      },
      "Name": "core.automobiles%3AABCXSeries",
      "PackageName": "core.automobiles",
      "Description": "ABCXSeries electric car",
      "ExtendedThingType": "",
      "CopySource": null,
      "PropertySets": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')/PropertySets"
        }
      },
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')/Descriptions"
        }
      },
      "ThingTemplates": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')/ThingTemplates"
        }
      },
      "ObjectAssociations": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTypes('core.automobiles%3AABCXSeries')/ObjectAssociations"
        }
      }
    }
  ]
}

```

8.2.2.7 Update a Thing Type

With this method, you can to update the specified thing type.

You can update the thing type as follows:

- Add new property sets, edit already existing property sets, or delete the existing property sets
- Add new extended thing type or delete the assigned extended thing type

The **ETag** value is mandatory to update a thing type. You must retrieve the **ETag** value of the thing type using the **GET (/ThingConfiguration/v1/ThingTypes('<thing type name>'))** service. The **ETag** value is assigned to the request header parameter **If-Match** in the **PATCH** request. If you do not include the **ETag** value in the request header or if the **ETag** value is not correct, the server displays an error message.

Note

You cannot update the thing type name using the `PATCH` request. The thing type name in the request payload is optional. However, if you specify the thing type name in the request payload, it must be the same as the one specified in the request URL.

After updating a thing type, the system generates a new `ETag` value for the thing type and replaces the old value with the new value.

Note

- You cannot change the name of the thing type using `PATCH` request.
- You can add a new extended thing type, only if the thing type to be updated is not an extension of another thing type. If you are not editing the existing extended thing type, you must still specify the extended thing type details in the request payload. If you do not specify the details, the system deletes the extended thing type. If the thing type to be updated is already an extension of another thing type, you can change the extended thing type. For example, assume that the thing type **ABC** is an extension of the thing type **Car**. When you update the thing type **ABC**, you can remove the extended thing type **Car** and add a new extended thing type **Vehicle**.
- The valid operations are `ADD`, `DELETE`, and `UPDATE`.
 - You cannot delete the property sets if they are inherited from the parent thing type. You can only delete the property set from the parent thing type.
 - You cannot delete the property sets if data exists for the child thing type that has inherited this property set.

Request

URI: `/ThingConfiguration/v1/ThingTypes('<thing type name>')`

Operation Type: `CRUD`

HTTP Method: `PATCH`

Permissions: `<thingconf>.u`

Request Headers

Header	Required	Values
<code>Accept-Language</code>	No	Language of the thing type description. The default language is en .
<code>If-Match</code>	Yes	Latest <code>ETag</code> value of a specific thing type that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
<code>thing type name</code>	Yes	String	Name of the thing type

Request Example

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')
```

Response

Response Headers

Name	Description
Etag	Identifies the updated thing type

Response Status and Error Codes

Code	Description
204	Thing type updated successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples:

Example 1

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')
```

The following request payload is used to add a new property set for the thing type `core.automobiles:ABC2Series`.

```
{
  "Name": "core.automobiles:ABC2Series",
  "PropertySets": [
    {
      "Name": "ABCCarWheel",
      "PropertySetType": "core.automobiles:Wheel",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Car wheel properties"
        }
      ],
      "Operation": "ADD"
    }
  ]
}
```

Example 2

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')
```

The following request payload is used to change the extended thing type from `core.automobiles:ABCSeries` to `core.automobiles:XYZSeries` and add a new property set for the thing type `core.automobiles:ABC2Series`.

```
{
  "ExtendedThingType": "core.automobiles:XYZSeries",
  "Descriptions": [],
  "PropertySets": [
    {
      "Name": "wheel_fr",
      "PropertySetType": "core.automobiles:Wheel",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Wheel Front Right"
        }
      ],
      "Operation": "ADD"
    }
  ]
}
```

8.2.2.8 Delete a Thing Type

With this method, you can delete a thing type with a specific name.

The `ETag` value is mandatory to delete a thing type. You must retrieve the `ETag` value of the thing type using the `GET (/ThingConfiguration/v1/ThingTypes('<thing type name>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `ETag` value in the request header, the server sends HTTP response code 428. If the `ETag` value is not correct, the server sends HTTP response code 412.

Note

- You cannot delete a thing type if one of the following reasons is true:
 - Extended to another thing type
 - Things are already created
- If you delete a thing type which has been mapped to one or more sensor types, the system automatically deletes all mappings referring to that thing type.

Request

URI: `/ThingConfiguration/v1/ThingTypes('<thing type name>')`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<thingconf>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific thing type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
thing type name	Yes	String	Unique name of the thing type

Request Example

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')
```

Response

Response Status and Error Codes

Code	Description
204	Thing type deleted successfully

8.2.3 Thing Type Association

Association between thing types

Overview

Association is a way of grouping objects, where every object is related to one or more objects in a unique way. You can create association between thing types, which in turn enables you to create association between thing instances of the associated thing types. However, the scope of the association between thing types depends on the scope of the package to which the thing types belong.

For example, a **Truck** carries multiple **Cars**. The thing type **Truck** has 1:N association with the thing type **Car** as illustrated in the following diagram.



A **Bogie** is part of an **Engine**. The thing type **Bogie** has 1:1 association with the thing type **Engine** as illustrated in the following diagram.



Types of Association

The following are the predefined association types:

- onetomany
- onetoone
- manytomany
- manytoone

Types of Relationship

The following are the predefined relationship types:

- **IS A**: Car is a type of vehicle. You can associate the thing type **Car** with the thing type **Vehicle** and assign the **IS A** relationship.
- **HAS A**: Car has wheels. You can associate the thing type **Wheel** with the thing type **Car** and assign the **HAS A** relationship.
- **PART OF**: Bogie is part of the engine. You can associate the thing type **Bogie** with the thing type **Engine** and assign the **PART OF** relationship.

OData Version: 2.0

Root URI: `://<server address>[:<port number>][<path>]/ThingConfiguration`

Example for a base URI in a cloud foundry environment: `https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create Thing Type Association [page 404]	<code>/v1/ThingType('<thing type name')/ObjectAssociations</code>	<code><thingconf>.c</code>
GET	Read Association Details of a Thing Type [page 407]	<code>/v1/ThingType('<thing type name')/ObjectAssociations</code>	<code><thingconf>.r</code>

HTTP Method	Operation	URI	Scope
DELETE	Delete Thing Type Association [page 412]	/v1/ ObjectAssociations(P PrimaryEntity='<thing type name>',AssociatedEntity='<thin g type name>',Relationship='<relation ship name>')	<thingconf>.d

Thing Type Association Object Properties

Property	Type	Mandatory	Maximum Length	Description
AssociatedEntity	String	Yes	81	Thing type associated with the primary thing type
Descriptions	Array of description objects	No	-	Description of the thing type association for each language with the corresponding ISO language code
AssociationType	String	Yes	20	Type of association between the primary thing type and the associated thing type
Relationship	String	Yes	50	Type of relationship between the primary thing type and the associated thing type
ExpiryTime	TimeStamp	No	50	Expiry time after which the association between the thing types becomes invalid
CreationTime	TimeStamp	No	50	Time when the association is created, which is the current time

Thing Type Association Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description

Property	Data Type	Maximum Length	Description
Description	String	60	Description of the object

8.2.3.1 Create Thing Type Association

With this service, you can create association between thing types based on the predefined relationship and association types. The expiry time of the thing type association must be greater than the current time. The association is valid until the defined expiry time, after which, the association is invalid. To extend the validity of the association, you can delete the associated entity and recreate the association with a different expiry time. If you do not specify the expiry time, the association is valid indefinitely. You can only associate thing types that belong to the same package.

i Note

The primary thing type and the associated thing type must have unique association type and relationship. For example, the thing type **ACBXSeries** is associated with the primary thing type **Truck** with an expiry date **28-10-2018**. The relationship is **IS A** and the association type is **onetoone**. You cannot create another association between the thing types **Truck** and **ABCXSeries** with relationship **IS A** and association type **manytoone**.

Request

URI: `/ThingConfiguration/v1/ThingTypes('<thing type name>')/ObjectAssociations`

Operation Type: CRUD

HTTP Method: [POST](#)

Permissions: `<thingconf>.c`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Unique name of the thing type which represents the primary thing type	Path

Request Example

`/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations`

Payload

Format: [JSON](#)

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples:

Example 1

/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations

In the below example payload, the thing type `core.automobiles:ABCXSeries` and `core.automobiles:ABC2Series` are associated with the primary thing type `core.automobiles:Truck`. The relationship and association type are `IS A` and `onetoone`, respectively. At the same time, you can create an association between the thing types `core.automobiles:Truck` and `core.automobiles:ABCXSeries` with different relationship and association type as illustrated in Example 2.

```
{
  "Associations": [
    {
      "AssociatedEntity": "core.automobiles:ABCXSeries",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Association between Truck and ABCXSeries"
        }
      ],
      "AssociationType": "onetoone",
      "Relationship": "IS A",
      "ExpiryTime": "2018-10-16T08:26:56.229Z"
    }, {
      "AssociatedEntity": "core.automobiles:ABC2Series",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Association between Truck and ABC2Series"
        }
      ],
      "AssociationType": "onetoone",
      "Relationship": "IS A",
      "ExpiryTime": "2018-10-16T08:26:56.229Z"
    }
  ]
}
```

Example 2

/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations

```
{
  "Associations": [
    {
      "AssociatedEntity": "core.automobiles:ABCXSeries",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Association between Truck and ABCXSeries"
        }
      ],
      "AssociationType": "manytoone",
      "Relationship": "HAS A",
      "ExpiryTime": "2018-10-16T08:26:56.229Z"
    }
  ]
}
```

Response

Response Status and Error Codes

Code	Description
201	Association created successfully

Payload

The following is the response payload after creating the thing type association.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='PART%20OF')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='PART%20OF')",
          "type": "com.sap.apptot.ObjectAssociation"
        },
        "AssociationEntityType": "ThingType",
        "PrimaryEntity": "core.automobiles:Truck",
        "PrimaryTenant": "TenantP",
        "AssociatedEntity": "core.automobiles:ABCXSeries",
        "AssociationType": "onetoone",
        "Relationship": "IS A",
        "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
        "AssociationCreationTime": "2017-12-13T05:17:37.640Z",
        "AssociatedTenant": "TenantP",
        "Description": "association between Truck and ABCXSeries",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='PART%20OF')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABC2Series',Relationship='PART%20OF')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABC2Series',Relationship='PART%20OF')",
          "type": "com.sap.apptot.ObjectAssociation"
        },
        "AssociationEntityType": "ThingType",
        "PrimaryEntity": "core.automobiles:Truck",
        "PrimaryTenant": "TenantP",
        "AssociatedEntity": "core.automobiles:ABC2Series",
        "AssociationType": "onetoone",
        "Relationship": "IS A",
        "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
        "AssociationCreationTime": "2017-12-13T05:17:37.640Z",
        "AssociatedTenant": "TenantP",
        "Description": "association between Truck and ABC2Series",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='core.automobiles%3ATruck',AssociatedEntity='core.automobiles%3AABC2Series',Relationship='PART%20OF')/Descriptions"
          }
        }
      }
    ]
  }
}
```

```

        "type": "com.sap.apptot.ObjectAssociation"
      },
      "AssociationEntityType": "ThingType",
      "PrimaryEntity": "core.automobiles:Truck",
      "PrimaryTenant": "TenantP",
      "AssociatedEntity": "core.automobiles:ABC2Series",
      "AssociationType": "onetoone",
      "Relationship": "IS A",
      "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
      "AssociationCreationTime": "2017-12-13T05:17:37.640Z",
      "AssociatedTenant": "TenantP",
      "Description": "association between Truck and ABC2Series",
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations(PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABC2Series',Relationship='PART
%20OF')/Descriptions"
        }
      }
    }
  ]
}

```

Related Information

[Thing Type Association \[page 401\]](#)

8.2.3.2 Read Association Details of a Thing Type

With this service, you can retrieve all thing types associated with the specified thing type. In addition, you can retrieve the association details of a specific associated thing type.

Request

URI: /ThingConfiguration/v1/ThingTypes('<thing type name>')/ObjectAssociations

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thingconf>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Unique name of the thing type which represents the primary thing type	Path

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$inlinecount	No	String	Total number of thing types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of thing types available. • If you use this with \$filter parameter, the result contains the total count of thing types based on the defined filter condition.

Parameter	Required	Type	Description
\$filter	No	String	Filter condition to be applied; the only valid fields are <code>AssociatedEntity</code>, <code>Relationship</code>, and <code>AssociationType</code>. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are <code>AssociatedEntity</code>, <code>Relationship</code>, and <code>AssociationType</code>.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are <code>AssociatedEntity</code>, <code>AssociationType</code>, <code>Relationship</code>, <code>AssociationCreationTime</code>, <code>AssociatedTenant</code>, <code>AssociationExpiryTime</code>, <code>Description</code>, and <code>AssociationEntityType</code>.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are <code>AssociatedEntity</code>, <code>AssociationType</code>, <code>Relationship</code>, <code>AssociationExpiryTime</code>, and <code>AssociationCreationTime</code>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.

Request Example

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations
```

Response

Response Status and Error Codes

Code	Description
200	Association details retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples:

Example 1

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations
```

Retrieves all the associated thing types of the primary thing type `core.automobiles:Truck`

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations(ParentEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations(ParentEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')",
        "type": "com.sap.apptot.ObjectAssociation"
      },
      "AssociationEntityType": "ThingType",
      "PrimaryEntity": "core.automobiles:Truck",
      "PrimaryTenant": "TenantP",
      "AssociatedEntity": "core.automobiles:ABCXSeries",
      "AssociationType": "onetoon",
      "Relationship": "IS A",
      "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
      "AssociationCreationTime": "2017-12-12T10:18:37Z",
      "AssociatedTenant": "TenantP",
      "Description": "association between Truck and ABCXSeries",
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations(ParentEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')/Descriptions"
```



```

    }
  },
  {
    "__metadata": {
      "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations (PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles:ABC2Series',Relationship='IS%20A')",
      "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations (PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles:ABC2Series',Relationship='IS%20A')",
      "type": "com.sap.apptot.ObjectAssociation"
    },
    "AssociationEntityType": "ThingType",
    "PrimaryEntity": "core.automobiles%3ATruck",
    "PrimaryTenant": "TenantP",
    "AssociatedEntity": "core.automobiles:ABC2Series",
    "AssociationType": "onetoone",
    "Relationship": "IS A",
    "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
    "AssociationCreationTime": "2017-12-12T10:18:37Z",
    "AssociatedTenant": "TenantP",
    "Description": "association between Truck and ABC@Series",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations (PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABC2Series',Relationship='IS
%20A')/Descriptions"
      }
    }
  }
]
}
}

```

Example 2

/ThingConfiguration/v1/ThingTypes('core.automobiles:Truck')/ObjectAssociations?
\$filter=AssociatedEntity eq 'core.automobiles:ABCXSeries' and Relationship eq 'IS
A'

Retrieves details of the specified associated thing type

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations (PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')",
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations (PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')",
          "type": "com.sap.apptot.ObjectAssociation"
        },
        "AssociationEntityType": "ThingType",
        "PrimaryEntity": "core.automobiles:Truck",
        "PrimaryTenant": "TenantP",

```

```

        "AssociatedEntity": "core.automobiles:ABCXSeries",
        "AssociationType": "onetoone",
        "Relationship": "IS A",
        "AssociationExpiryTime": "2018-10-16T08:26:56.229Z",
        "AssociationCreationTime": "2017-12-12T10:27:30Z",
        "AssociatedTenant": "TenantP",
        "Description": "association between Truck and ABCXSeries",
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ObjectAssociations(PrimaryEntity='core.automobiles
%3ATruck',AssociatedEntity='core.automobiles%3AABCXSeries',Relationship='IS
%20A')/Descriptions"
            }
        }
    }
}
]
}
}

```

Related Information

[Thing Type Association \[page 401\]](#)

8.2.3.3 Delete Thing Type Association

With this service, you can delete the association between the specified thing types.

The ETag value is mandatory to delete association of a thing type. You must retrieve the ETag value of the associated thing type using the GET (/ThingConfiguration/v1/ThingTypes('<thing type name>')/ObjectAssociations?\$filter=AssociatedEntity eq '<thing type name>' and Relationship eq '<relationship>') service. The ETag value is assigned to the request header parameter If-Match in the PUT request. If you do not include the ETag value in the request header or if the ETag value is not correct, the server displays an error message.

You can delete the association between the thing types only if an association is not created between the thing instances belonging to the associated thing types.

Request

URI: /ThingConfiguration/v1/ObjectAssociations(PrimaryEntity='<thing type name>',AssociatedEntity='<thing type name>',Relationship='<relationship name>')

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <thingconf>.d

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Unique name of the primary thing type to which other thing types are associated	Path
Name	Yes	String	Unique name of the thing type which is associated with the primary thing type	Path
Relationship	Yes	String	Unique relationship between the associated thing types	Path

Request Example

```
/ThingConfiguration/v1/  
ObjectAssociations (PrimaryEntity='core.automobiles:Truck',AssociatedEntity='core.automobiles:ABCXSeries',Relationship='IS A')
```

The thing type `core.automobiles:ABCXSeries` is no more associated with the thing type `core.automobiles:Truck`

.

Response

Response Status and Error Codes

Code	Description
204	Associated thing type is no more associated with the primary thing type

Related Information

[Thing Type Association \[page 401\]](#)

8.2.4 Thing Template

Overview

A thing type is a configuration object and a thing is a data object which is an instance of a thing type. A thing template is a format to maintain property values that remain the same across many thing instances. For example, URL of the thing image, thresholds of thing property values, and model number of a thing remain the same across many things. You can use the thing template to create things and hence use it as a reference to

copy data across things. You can create a thing template based on a thing type. However, the scope of the thing template depends on the scope of the package.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>][/path]/ThingConfiguration`

Example for a base URI in a cloud foundry environment: `https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create a Thing Template [page 416]	<code>/v1/ Packages ('<package name>') / ThingTemplates</code>	<code><thingconf>.c</code>
GET	Read all Thing Templates for a Package [page 424]	<code>/v1/ Packages ('<package name>') / ThingTemplates</code>	<code><thingconf>.r</code>
GET	Read all Thing Templates of a Thing Type [page 432]	<code>/v1/ ThingTypes ('<thing type name>') / ThingTemplates</code>	<code><thingconf>.r</code>
GET	Read Details of a Thing Template [page 435]	<code>/v1/ThingTemplates/ ('<thing template name>')</code>	<code><thingconf>.r</code>
PATCH	Update a Thing Template [page 438]	<code>/v1/ ThingTemplates ('<th ing template name>')</code>	<code><thingconf>.u</code>
DELETE	Delete a Thing Template [page 440]	<code>/v1/ ThingTemplates ('<th ing template name>')</code>	<code><thingconf>.d</code>

i Note

`<thingconf>` refers to the thing configuration application name.

Thing Template Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Unique name of the thing template
Descriptions	Array	No	-	Description of the thing template for each language with the corresponding ISO language code
DYN_ENT_TemplateProperties	Array of property set objects	Yes	-	Array of property sets that belong to the thing type
HasFile	Boolean	No	Fixed	Indicates whether to attach a file in the thing template. If the value of this property is true, you can add the content of a file in the fileData property.
FileData		No		Content of the file in encoded format. The content of the file is attached to a thing when you create the thing using the thing template. For example, the image for a thing can be specified in this property in an encoded format. While creating a thing using the thing template, the content (image of the thing) is attached to the thing.

Thing Template Descriptions

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request

payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Thing Type \[page 374\]](#)

8.2.4.1 Create a Thing Template

With this method, you can create a thing template for a thing type which belongs to the specified package.

You can create more than one thing template for a thing type and hence, thing template and thing type have a many-to-one relationship. The scope of the thing template is based on the scope of the package to which the thing type belongs. This is because the thing template is created for the thing type.

i Note

Package name in the request payload is optional. However, if you are specifying the package in the request payload, it must be the same as the one specified in the request URL.

Only the following data categories of property set type are supported in thing templates:

- MasterData
- ReferencePropertyData

i Note

You can only create a reference property set type for a property set of data category **TimeSeriesData**. However, you cannot directly assign a property set type of data category **ReferencePropertyData** for a thing type. Assume, you create a reference property set type for a property set type of data category **TimeSeriesData** and you assign this property set type for a thing type. When you create a thing template for this thing type, you can assign values for the reference properties. When you create a thing using this thing template with reference property data, the data is copied to the reference properties of the thing.

- Parameters

You can create a thing template only based on the property set data or file data provided in the request payload.

- The `DYN_ENT_TemplateProperties` block in the request payload must contain at least one property set without which the service displays an error message and does not create the template.
- In the `DYN_ENT_TemplateProperties` block of the request payload, if you do not specify the properties for the property set, the service verifies the corresponding property set type. If the properties are defined for the property set type, the service creates a template and assigns null values for the properties.
- In the `DYN_ENT_TemplateProperties` block of the request payload, if the property set specified belongs to a property set type for which you have not defined any properties, the service verifies if the file data is specified in the request payload:
 - If file data is specified, the service creates the thing template.
- If file data is not specified, the service does not create the thing template.

Naming convention

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/ThingTemplates`

Operation Type: CRUD

HTTP Method: *POST*

Permissions: `<thingconf>.c`

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique identifier of the package

Request Example

`/ThingConfiguration/v1/Packages('core.automobiles:ABC2Series')/ThingTemplates`

Request to create thing templates for thing types belonging to the package `core.automobiles`.

Payload

Format: *JSON*

Example 1

The following request payload is used to create a thing template `core.automobiles:ABC2SeriesTemplate` for a thing type `core.automobiles:ABC2Series`.

```
{
  "Name": "core.automobiles:ABC2SeriesTemplate",
  "ThingType": "core.automobiles:ABC2Series",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Template for ABC2Series electric car"
  },
  {
    "LanguageCode": "de",
    "Description": "Vorlage für ABC2Series Elektroauto"
  }
],
  "DYN_ENT_TemplateProperties": {
    "Car": {
      "Color": "Black"
    }
  }
}
```

Example 2

The following request payload is used to create a thing template with a file content. For example, you can attach an image for a thing using the file attributes in the request payload to create a thing template.

```
{
  "Name": "core.automobiles:ABC2SeriesTemplate",
  "ThingType": "core.automobiles:ABC2Series",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Template for ABC2Series electric car"
  }],
  {
    "LanguageCode": "de",
    "Description": "Vorlage für ABC2Series Elektroauto"
  }],
  "HasFile": true,
  "FileData":
  "iVBORw0KGgoAAAANSUHeUgAAANIAAAAZCAYAAADigVZlAAAQN0lEQVR4nO2dCXQTxxnH10LT5jVteH1N
+5q+JCKBJITLmHIfKzBHHCCYBAiEw+I2GIMhDQ0kqQolIRclSV5e
+prmqX3JawgQDL64bK8x2Ajb2Bg7NuBjjSXftmRZhyXZ1nZGleL1eGa1kg2iyua9X2TvzvHNN/
Ofb2Z2ZSi04ygZGZm
+EXADZGSCgYAbICMTDATcABmZYCDgBsJIBAMBn0BGJhgIuAEyMsGa1wQdHZ1UV1cX5XK5qM7OzgcMRuNT
rSbTEraq6strhdfzruTk5Wpz8q5c1l7Jyb6szc3K1l7RggtFxcWX2dvVB02mtmVOp3NIV2fnQFie2WyB5
QS84Tiy/YnXBFI8BMM/pDqat0XzIVM08lTSVxyytn6jAuZV4FuzmtzclJz8/
LT8vML0nJzr54HYkpLS88oTkxMMZ48mchlXrxUX1ffcBCUM8xms8lCkgk6pCT6aZvZvCrzYpbu2PfxHAg
8l+obGmOtlvaJQBAPkvI5nM5fWyyWWTU1tFuA+IqOHDvGgehVCK4pA91oGZn
+xluCAc0thtj4hCT72XOp9S0thi2FBQWPvb13z9RN6lQH5s8NYxbMDct7KXyudt7MGeeWLFwrn8iVKz7a
uDYy3Z7dbzz91p43B8ZsjYLlDKmprd3/
ffwpLjWNqbW32xcFuuEyMv2J2M1BJpMpKiExxZKZeamiralTVvqdt8OWL1l8asq4kNbRzz7NTRo7uuMPo
4Y7Rz/zFBc641luzHNDuZFDfFe5PICx25/ay2B3bogf/dd9fKCA
+CuytohoskjuylmtLXRwXGuJgy8j0F8QbdrT9bDpzQQ8jSH15+dLt0VsOThgzWj7i6Se5kOHDuIljR9mX
RrykjZj/wlVeSONHP8+FhykrJoeOsY8aNoQLAYJa9erShIPvvRsKhQTK/YleX3Pw5KlErpKt
+iLQjZer6S9IN35VX175r3gw4HU6/Z6ojes/gMKAUQiKBQKiUvvLC1/
MXL18WcKsaZOrJ4WObly7euUJSOQ7FjZ9Sh2IVC4oLh1hZk6d1LB5/dpt+9R/
hnuq4X15VwvT0jLKXS7XOHgaCAm0I2Rk
+gL2oslmewXsiUw5uX1zn8T9LVI5ZWI1jEQTxozkgECgkDrmKqfrFy8ILwJ7om
+3bNoQumTRwtDogE0fTBsf2ggwg+jVBdOCT7eYwGfnti2bQXA6ME2nr9mbnHLOWV/
fEI3WTD00jMzdZjBAKWBwX8ojCqm8vOJoYvLp9qPfHTmy5rXlJ
+BSbtzI5+5EI4ALRCHTHHpaQ8zWqOid02IoobAKRKRQDQWGeVJ4w8SQUR0e0bmB0QxEKh2IYsdbTW0zmI
xM4/Wi4q9BfQMkCikCoAEUADgEeI3xOOvedkicp14e1V2uLwSpTwxNAPwRaGC7OQFqQp9xGDT
+1ksUUubFrMoLFy/VL5g7+4ep48fa
+P0Pz9jnn4H7JCCQBbP79V1rgJDMASE9um7NqvmxMdfbVateiwd7KKswHx
+dwBKwzGq1jgDRrjQ7W5sB6hvsRUHQCYh8Sg4xwW64/oTpUQ/Cim7xz652yg9flb40R+xIn5i/
LWJKKS5N0uqwIi7cSQkXooAD6ywE8YneDyLWrdUq/
WR67+BvxcB5dtG9dGHGf7oZsgSuWFz555c0LISKcwIvH1AHSdnR0P37h5699pzIW6NrNlptFoIglJ7cOA
gcTf40711nH3g5AguEH3/4YGaZPSj/6Ix/hGmKd/hXQqIanz5qlb8WA5VwOXdLwgoIjAsk2/
Y1v0oUrXj00T+vgNSCKjgXzZ1eANF3wpI6PRALxcDDT7B1Tby+NWPGdqOPBisrKz8E
+zFFXX79Sp9fjhKQiDAqjx6kRHmfCdHDWZek+zCp+gnac6i7XhxOSUkaEXiZi7D32y73wtbKfy/
CnPDdEISUKjSkrIKqPhocp86ZPGGeDSzkIwJa1Rq5ccXyDas1X8PBBuG9Cow8UE/
yEaYYPeZybPnFcMlgGRh/6+KNhNbV1o7Mua29dysrOdblcQ4SvDHmMg5s/I2ZAxNP
+bQz5zaVaAbz0ij7kh6D7NVJnwL1NLJLXn47DCQmXjkXsQAnpFB4/
CO2KkODjEE861B9i7VcKwPldgaQJQfKi4yFWkNZbPXzZuP4iQRobaLrBiHEpubP0xq2E9989MHnLpg3rX
5hFlz3/1BMcWLaVRm/eeIieNL4KRhi450EjDxQOVaf2T+mrlI9bDZaAq3Zu37b3nbf2zvnwg/d/
DoRENbcYRmhzc84n5peDkQ0FbNHUmMGjD/LtsGsnCi5GEEnYbLH
+c1P9ox6ABiRdKzmDz9ISR0wKgx7WJE7ILtxUUxlQQfGDFtQutC7ch1OUPi8NbPWjZUtBgbIzApFMQhZ
Sccrbrav61zAqWfWR79JbJ8+eG5Q97/HccfBOI/
P4eEJADRigoJP6NBvgzBC715s2coTuwf9+0qI3rKbB3ooCQKCAkCgiJgkKCS7uWfuMbiUkpjzcvCvg9y
GIkFicwZiGerMR7oQPB+x8VEy+5OcRDiDcoCdBERI/
QsINDmH5pGiPAXUT6cQLxYjkY5D7aodzaiQnQ8iLoz
+EhPYli7FRg7ORRKTUtHSDvptTarPZhr737oFHgRj+7lmeVcRsJfrwxdkzc+DSDj50VU6Z0LR5/
drDK5a8HLt4QfhusAfaBUQz8tDHHw/atE5FEHLkods6/ZfHjsdzZWX1JwRCGoxppAbTKG
+gjeadoyZ0Duo43MbU6LmuJpTPCwk3WGFHqTyg9xiJbcIJS52AtJkWG9R89Imgew8mI91zmcfQPfeo/
D21iC9wdUZg2oaWoaG7xYvm59vFQ6qHt0ElOqybc4WTN25cuttBFBKIRpfAsstkNpvd4Xtye9/802PLFi
/
6J1y6LXpx3mUQleJARHKCAgrbVWLZ01AwQEgUEBIFhOQWDRAS5UVIFOfinrheVHw2MTmFEWgJ1yAVxvFi
KDBlaJA0uJmbrycEcw+3P0PTCDtOeJ1F8uKWCF12fr5EOzzNOL
+g0Qq9Lxz0IQQ7ceUKhSR2jzRxqb2Uj/MP46Ueb2WwyH1hREaPzln+HlFIjY1N+1NSzliRq/
Wfg99/9saunVRszLaHdu3YHg32PueAOP4Klm81k0Jht4GfZ6yPXE0tf2WxZCHZ7Q7K4XC667I77IuZC5n
```

```

ehIRzvBhqJD86s/KgM7CG7p4FUafh8pPsRAeFhu69SfWnjTgBisEi5aKDoQBj17f9FSqgWBq/
FPdVSIxIvTh/+Sok3OSI5kf7XbgrV/1yR2REIXV0dIRmX9beys7WljsdzhEeIQFBxFDLX15E7doRMzFs
+pTG+XNmFX726acPHo6Loz45fJhasmihG29CstragfZ2+wCXyzWCZau
+T0w63d9CQgcy6aACdRxDCJqKkJ9kp9Q9iK9tVGPYqQXgDkbq7wqCX6SgRmyAdmpo7w/
JAYEk1Calj2WgYjOKXL8zsRKFBNQA4hKp8+c62poaPwjfIOHLOfcX4WAYoQ02jQKLPVSdr+
+azsUkK9CagdCstnah14rvJ767XdHHSU1N64IhISbOdDO9IZYp4gNTIbGd7wCk1ch0jHodf4VJjGkHDig
9nKYNLCDWSQN/3YD6hdWgl38JOLtpA9FTEg4f6JlqwX3pAoJTRMiUgZDKAP1HcyHTrgaYR4xIVFOP/
PJgmuFFfngf52dnU
+Q0nkDLuOsVitlb293Cwhib7dTfotlWloaU3slvyANpHsUObVDHcISgt1XIWkIzpXSabhlili8zsD
+oJdpGirRS/YIDd4LJeurCTX68WKQsqXA+E9qG
+ho9FSSVIbwnVUgaJb1o108xEYgKcdLaaouKv6hrNXYOt9ut8PlGAF3hMGWAa83NjVRNpDG4XDcwWg0r
klLZ7is0hufgXQDESHhliBCx3oDdUYBIR1LqAOtGxct0DqEHYd7eHg3hMRKbD9D8KvUZ3MqTFuFbVKI
+AIwDh/4soXTj5ouxkabyfJBl
+E5G0f2isfUUjwD5RAzGbzQzWldXOqdbphNbW1VE0NHp1OD6K0TVRI7UCI GusP6Gtq9iWnnOmql0dhXk
gi3M
+BM5+pN0tELp7pvDWMRDcC4x8B6OzLzrgcL0ssOPQAcuK2N0XIffXqVI9tqJB5+8Xa7Eu96IuwuP4Suyf0
J85ejhYX0t2MSBTBh4Vmp4opJYWgxujSZWqr2+ggJAoXY2eAoO/F/CelYYXkVBIMKKB5SJC0sG13rC8/
ALt2FNpzQ6Hm9zVW0i4WVXoRP52jprufRbB0d0RBfccx0h3v8aCK1voWLTjOE+d/
GsxJEElzbAFdPdRmv/KUSwtfX+Es4ulex42kHzGd74Cc8/
ouc8LXen5PV6QD62XEaRXENrrbVI00uIPvMWEHl8F0/37DeSdb4KieRHFpeeKCSdwegGCqmurt4tFn9E
1CM1gaWd52/jQX5fU1qakprOmMB/LzU3N+OEJNYgKc735agYfbPB16f/pI5jfMgnNVR5UiYPuqxv
+5CXFz4uAguFgFuKS53hSQj7UuzrD3x09LYXQ9vN0GQ/k8aOGpe
+T0K6XV1NWaxWKYcNA1sMhgdANHLvgzo7u9zXK1n20PnzaVYQ8ZbB5SFBSPszskp0vgLjEG
+dyNL4iEBacvBovHQcFieU42ZWpEP7KiTSS75qifmF/
sS1lw30H3pB1xkEgpJIZKfj5q4yOevkEjix054fGSJfu0BwkcZEQCs3zQ2Ne8pLin5urpad8hkaltQUn
LjGbDfimQyLhjg298gDe7tb9Isoabx3wRV0/jXTvgBrfKkE
+aLE8kjzCtCqVd5FB7UCLgyQgh288tTJSEfaVJB68QRQXt/N1GBaRuPmsY/OyP5UYov+DTCvBq65/
JRCGg/AlM3tF
+4xBSzQYncw7VPColhff8ICQqotq7OfRghWKphMZstaxKTUywnTp5qPHP2vOn0mXNcKpNhPpWYxKWmpje
DZd0WtG4vjZORuRcoafEI2QO/
hASXdAajUcozpeEGF14uPpgPhWK22xRaLdUbV7eo3b9ws28+yVXsdDvtceHonC0nmPoShey89ien9jkjNL
Qaqrc1MxASw2donpaZn1JeVlyeBfdEv22320/sjMe4DJ8r8+GDo7i8K4valKrH8PgsJPkuC
+yL4tgL8JAGPucvKK2MzM7PaWltbl4AyB/wvj10WksZ9CCeCaDSC
+CQKGInq6utF90Q8oIzf5l0tuFheXvkPsI962HN6JwTJ5n6FofEiwn3hsxeShVQF9kVQRPDfSZKwN6Kam
pt3Xiu83mQymcL5a/BrE1BMspBk7kNUdO8TVeGJoCiShOR+DaiuTvKfFQbpHqmoqMzW6/
WJ8PgbOQ6XkQ1KsBd5IUfAdAbJkQhitdpWgKUg226zLYS/y0KS+TGAvdjC30KmqamFamtroywWq+gpHY/
ZbBnU3GL4FHx
+A8r5BeEhrYxM0BFwA2RkgoGAGyAjEwwE3AAZmWAg4AbIyAQDATdARiYYCLgBMjLBQMANkJEJBgJugIxM
MPBfChd6NRZ5pkMAAAAASUVORK5CYII=",
  "DYN_ENT_TemplateProperties":{
    "Car":{
      "Color":"Black"
    }
  }
}

```

Example 3

The following request payload is used to create a thing template `core.automobiles:ABC2SeriesTemplate` for a thing type `core.automobiles:ABC2Series`. Assuming the property set `car` supports multiple languages, you can create data in multiple languages for the property set when you create the thing template. Also, note that only data categories [MasterData](#) and [Parameters](#) support multiple languages for properties of type [String](#).

```

{
  "Name":"core.automobiles:ABC2SeriesTemplate",
  "ThingType":"core.automobiles:ABC2Series",
  "Descriptions":[{
    "LanguageCode":"en",
    "Description":"Template for ABC2Series electric car"
  },
  {
    "LanguageCode":"de",
    "Description":"Vorlage für ABC2Series Elektroauto"
  }],
  "DYN_ENT_TemplateProperties":{

```

```

        "car":{
            "Color": "{ \"en\": \"Blue\", \"de\": \"Blau\" }"
        }
    }
}

```

Example 4

The following request payload is used to create a thing template `core.automobiles:ABC2SeriesTemplate` for a thing type `core.automobiles:ABC2Series`. The request payload includes data for the reference property `pressureUOM`.

```

{
  "Name": "core.automobiles:ABC2SeriesTemplate",
  "ThingType": "core.automobiles:ABC2Series",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Template for ABC2Series electric car"
  },
  {
    "LanguageCode": "de",
    "Description": "Vorlage für ABC2Series Elektroauto"
  }],
  "DYN_ENT_TemplateProperties": {
    "carEngine": {
      "pressureUOM": "PA"
    }
  }
}

```

Note

`carEngine` is the property set that belongs to the property set type of data category **TimeSeriesData**.
`pressureUOM` is the reference property for the property `pressure`.

Response

Response Status and Error Codes

Code	Description
201	Thing template created successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples:

Example 1

```
core.automobiles:ABC2SeriesTemplate:
```

Example 2

```
core.automobiles:ABC2SeriesTemplate with file data:
```

422 PUBLIC

4Y7Rz/zFBC6411uzHNDuZFDFe5PICx25/aY2B3bogf/dd9fKCA
+CuytohOSkjuylmtLXRwXGuJy8j0F8Qbdrt9bDpzQQ8jSHl5+dLt0VsOThgzwj7i6Se5kOHDuIljR9mX
RrykjZj/wlVeSONHP8+FhykrJoeOsY8aNoQLAYJa9erShIPvvRsKhQTK/YleX3Pw5KlErpKt
+iLQjZeR6S9IN35VXl75r3gw4HU6/Z6ojes/gMKAUQiKBQKiUvvLC1/
MXLl8wKcsaZOrJ4WOblY7euUJSOQ7FjZ9Sh2IVC4oLhIhZk6d1LB5/dpt+9R/
hnuq4Xl5VwvT0jLKXS7XOHgaCAm0I2Rk
+gL2oslmewXsiUw5uXlZn8T9LVI5ZWI1jEQTxozkgECgkDrmKqfrFy8ILwJ7om
+3bNoQumTRwtDoQE0fTBsf2ggwg+jVBdOCT7eYwGfnti2bQXA6ME2nr9mbnHLOWV/
fEI3WTD00jMzdZjBAKWBwX8ojCqm8vOJoYvLp9qPfHTmy5rXlJ
+BSbtzI5+5EI4ALRCTHHHPaQ8zWqOidO2IooBAKRKRQDQwGevJ4w8SQR0e0bmB0QxEKh2IYsdbTW0zmI
xM4/Wi4q9BfQmKcKikCoAEUADgEeI3xOOVedkicpl4e1V2uLwSpTwxNAPwRaGC7OQFqQp9xGDT
+1ksUUubFrMoLFy/VL5g7+4ep48fa
+P0Pz9jnn4H7JCCQBbP79VlrgJdMASE9um7NqvmxMdfbVateiwd7KKswHx
+dwBKwzGq1jgDRrjQ7W5sB6hvsRUHQCYh8Sg4xwW64/oTpUQ/CIm7xz652yg9flb40R+xIn5i/
LWJKSKs5NOuwqiI7cSQkXooAD6ywE8YneDyLwRuDuq/
WR67+BvxcB5dtG9dGHgF7oZsgSuWFz555c0LTSKcwIvHlAHSdnR0P37h5699pzIW6NrNlptFoIglJ7cOA
gcTf40711nH3g5AguEH3/4YGaZPSj/6Ix/hGmKd/hXQqIanz5qlb8WA5VwOXdLwgoIjAsk2/
Ylv0odUrXj0OT+vgNSCKjgXzZLeANF3wpI6PRALxcDDt7BlTby+NWPgdqQPBisrKz8E
+zFFXX79Sp9fjhKQIDAqjx6kRHmfCdHDWZek+zCp+gnac6i7XhxOSUKAExiZI7D32y73wtbKfy/
CnPddEISUkYjSrKjPthocP86ZPGGeDSzkIWJa1Rq5ccXyDaslX8PBBuG9Cow8UE/
yEAYPeZybPnFcm1gGRh/+6KNhNbVl07Mua29dysrOdblcQ4SvDHmMg5s/I2ZAXNP
+bQz5zaVaABz0ij7kh6D7NVJnwL1NLJLXn47DCQmXjkXSqAnpFB4/
CO2KkODjEE861B9i7VcKwPldgaQJQfKi4yFwKNZbPXzZuP4iQRobaLrBIhEpubP0xq2E9989MHnLpg3rX
5hFlz3/1BMcWLaVRm/eeIieNL4KRhi450EjDxQOVaf2T+mrli9bDZaAq3Zu37b3nbf2zvnwg/d/
DoRENbcYRmhzc84n5peDkQ0FbNHUmMGjD/LtsGesnC55GEnYbLH
+clP9ox6ABiRdKzmDz9ISR0wKgx7WJE7ILtXUUXlQQfGDfTqutC7ch1OUPiI8NbPWjZUtBgbIzApFMQhZ
Sccrbrav61zAqWfWR79JbJ8+eG5Q97/HccfB0I/
P4eEJADRigoJP6NBvgzBC715s2coTuwf9+0q13rKbB3ooCQCKAcCgiJgkKCS7uWfuMbiUkpjzcvCvg9y
GIkFicwZiGerMR7oQPB+x8VEy+5OcRDiDcoCdBERI/
QsINdmH5pGiPAxUT6cQLxYjkY5D7aozdaiQNQ8iLoz
+EhPY1i7FRg7ORRKTUtHSDvptTarPZhr737oFHgRj+7lmeVcRsJfrwxdkzc+DSDj50VU6Z0LR5/
drDK5a8HLt4QfhusAfaBUQz8tDHHw/ate5FEHlkods6/ZfHjsdzZWXlJwRCGoxppAbTKG
+gjeadoyZ0Duo43MbU6LmuJpTPCwk3WGFHqTyg9xiJbcIJS52AtJkWG9R89Imgew8mI9lzmcfQPfeo/
D21iC9wdUZg2oaWoaG7xYvm59vFQ6qHt0ElOqyCb4WTN25cuttBFBKIRpfAsstkNpvd4Xtye9/802PLFi
/
6JlY6LXpx3mUQleJARHKCAgrbVWLZ01AwQEgUEBIFhOQWDRAS5UVIFOfinrheVHw2MTmFEWgJlyAVxvFi
KDBlaJA0uJmbrycEcw+3P0PTCDtOeJlF8uKWCF12f5EOZzNOL
+g0Qq9Lxz0IQQ7ceUkHSR2jzRxb2Uj/MP46Ueb2WwyH1hREaPzln+HlFIjY1N+1NSzliRq/
Wfg99/9saunVRszLaHdu3YHg32PueAOP4Klm8lK0Jht4GfZ6yPXE0tf2WxZCHZ7Q7K4XC667I77IuZC5n
eIrxzVBhgJD86s/KgM7CG7p4FUafh8pPsRAeFhu69SfWnjTgBisEi5aKDoQBj17f9FSggWBq/
FPdVSiXvTh/+Sok3OSI5kf7XbgyR/lyR2REIXV0dIRmX9beys7WljzsdzEeIQFBxFDLX15E7doRMzFs
+pTG+XNmFX726acPho6Loz45fJhasmihG29CstraqfZ2+wCXyzWCZau
+T0w63d9CQgcy6aACdRxDcJqKk9kp9Q9iK9tVGPYqQXgDkbq7wqCX6SgRmyAdmpo7w/
JAYEk1Calj2WgYjOKXL8zsrKFBKNQA4hKp8+c62poaPwjfIOHLOfcX4WAYoQ02jQKLPSdr+
+azsUkK9Cagdcstnah14rvJ767XdhHSU1n64ThISbOdDO9TZyp4gNTIbGd7wck1ch0jHodf4VJjGkHDig
9nKYNLCDWSQN/3YD6hdWgl38JOLtpA9FTEG4f6JlqwX3pAoJTRMiUgZDKAP1HcyHTrgaYR4xIVFOp/
PJGmuFFfngf52dnU
+Q0nkDLuOsVltb293Cwhib7dTfotlWloaU3slvyANpHsUObVDHcISgtlXIWkIzpxSabhlli8zsd
+oJdpGirRS/YIDd4LJeurCTX68WKQsqXA+E9qG
+ho9FSSVibwnVUgajB1o108xYgKCdLaaooUkV6hrNXYOt9ut8PlGAF3hMGWaa83NjVRNpDG4XDcwWg0r
klLZ7is0hufgXQDESHhliBCx3oDdUYBIR1LqAotGxct0DqEHYd7eHg3hMRKbD9D8KvUZ3MqTFuFbVKI
+AIdwDh/4soXTj5ouxkabyfJBl
+E5G0f2isfUUjwD5RAzGbzQzWldXOqdbphNbW1VE0NHp1OD6K0TVRI7UCI GusP6Gtq9iWnnOmqu10dhXk
gi3M
+BM5+pN0tELp7pvdWMDcC4x8B6OzLzrgcLossOPQAcuK2N0XIffXqVI9tqJB5+8Xa7Eu96IuwuP4Suyf0
J85ejhYX0t2MSBTBhh4Vmp4opJYWgxjzZWqr2+ggJAoXy2eAoO/F/CelYXkVBIMKKB5SJC0sG13rC8/
Alt2fNpzQ6HM9zW0i4WVXoRP5ZjprufRbB0d0Rbfccx0h3v8aCK1voWLTjOE+d/
GsxJEElzbAFdPdRmV/KUSwtfX+Es4ulex42kHzGd74Cc8/
ouc8LXen5PV6QD62XEaRXENrrbVI00uIPvMWEh18F0/37DeSdb4KieRHFpeeKCSdwegGCqmurt4tFn9E
1CMigaWd52/jQX5fU1qakprOmMB/LzU3N+OEJNYgKc735agYfbPB16f/pI5jfMgnNVr5UiYPuqxV
+5CXFz4uAguFgFuKs53hSQj7UuzrD3x09LYXQ9vN0GQ/k8aOGpe
+T0K6XV1NWaxWKYcNA1sMhgdaNHlvgzo7u9zXK1n20PnzaVYQ8ZbB5SFBSPzszkp0vgLjEG
+dyNL4iEBacvBovHQCfIeU42ZWpEP7KiTSS75qimF/
ss11wc30H3pB1xkEgpJIZKfj5q4yOevkEjix054fsgJfu0BwkcZEqCs3zQ2Ne8pLin5urpad8hkaltQU
LjGbDfimQyLhjg298gDe7tb9Isoabx3wRV0/jXTvgBrfKkE
+aLE8kjzCtCqVd5FB7UCLgyQgh288tTJSEfaVJB68QRQxt/N1GBaRuPmsY/OyP5UYov+DTCvBq65/
JRCGq/AlM3tF
+4xBSzQYncw7VPCOlhff8ICQqotq7OfRghWKphMZstaxKTUywnTp5qPHP2vOn0mXNcKpNhPpWYxKWmpje

```

DZd0WtG4vjZORuRcoafEI2QO/
hASXdAajUcozpEGF14uPpgPhWK22xRaLdUbV7eo3b9ws28+yVXsdDvtceHonC0nmPoShey89ien9jkjNL
QaqrclMxASw2donpaZn1JeVlyeBfdEv2232O/sjMe4DJ8r8+GDo7i8K4valKrH8PgsJPkuC
+yL4tgL8JAGPucvKK2MzM7PaWltbl4AyB/wvj10WksZ9CCeCaDSC
+CQkGIng6utF90Q8oIzf5l0tuFheXvkPsI962HN6JwtJ5n6FofEiwn3hsxeShVQF9kVQRPDfSZKwN6Kam
pt3Xiu83mQymcL5a/BrE1BMspBk7kNUdO8TVeGJoCiShOR+DaiuTvKfFQbpHqmoqMzW6/
WJ8PgbOQ6XkQlKsBd5IUfADabJkQhitdpWgKUg226zLYS/y0KS+TGAvdjc3OKmqamFamtroywWq+gpHY/
ZbBnU3GL4FHx
+A8r5BeEhrYxM0BFwA2RkgoGAGyAjEwWE3AAZmWAg4AbIyAQDATdARiYYCLgBMjLBQMANKJEJBgJugIxM
MPBfChd6NRZ5pkMAAAAASUVORK5CYII=",
  "Description": "Template for ABC2Series Car",
  "Descriptions": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTemplates('core.automobiles
%3AABC2SeriesTemplate')/Descriptions"
    }
  },
  "DYN_ENT_TemplateProperties": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTemplates('core.automobiles
%3AABC2SeriesTemplate')/DYN_ENT_TemplateProperties"
    }
  }
}
}

```

Related Information

[Thing Template \[page 413\]](#)

8.2.4.2 Read all Thing Templates for a Package

With this method, you can retrieve all thing templates created in the specified package.

You can retrieve a subset of all thing templates, according to the filter criteria provided. For a collective request for a set of thing templates, you have these options:

- You can restrict the set of thing templates to be retrieved by filter criteria based on the thing template name and description.
- You can define that the set of matching thing templates shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/ThingTemplates`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique identifier of the package

Query Request Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are thing template name, thing type name, package name, and description. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Type	Description
\$filter	No	String	Filter condition to be applied; valid fields are thing template name, thing type name, package name, and description. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using <i>\$filter</i>. Valid fields are thing template name and description. For more information, see Filter Conditions (\$filter) [page 1550].
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are thing template name, thing type name, package name, and description.

Request Example

```
/ThingConfiguration/v1/Packages('core.automobiles')/ThingTemplates
```

Retrieves all thing templates created in the package `core.automobiles`.

i Note

If file details are added in the thing template, file attributes *hasFile* and *fileData* are included in the response payload.

Response

Response Status and Error Codes

Code	Description
200	Details of all thing templates retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) format for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.automobiles%3AABC2SeriesTemplate",
        "ThingType": "core.automobiles%3AABC2Series",
        "PackageName": "core.automobiles",
        "HasFile": null,
        "FileData": null,
        "Description": "Template for ABC2Series electric car",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')/DYN_ENT_TemplateProperties"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABCXSeriesTemplate')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABCXSeriesTemplate')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.automobiles%3AABCXSeriesTemplate",
        "ThingType": "core.automobiles%3AABCXSeries",
        "PackageName": "core.automobiles",
        "HasFile": null,
        "FileData": null,
        "Description": "Template for ABCXSeries electric ar",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABCXSeriesTemplate')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
```

```

        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.automobiles%3AABCXSeriesTemplate')/
DYN_ENT_TemplateProperties"
    }
}
]
}
}

```

Related Information

[Thing Template \[page 413\]](#)

8.2.4.3 Read all Thing Templates

With this method, you can retrieve all thing templates.

You can retrieve a subset of all thing templates, according to the filter criteria provided. For a collective request for a set of thing templates, you have these options:

- You can restrict the set of thing templates to be retrieved by filter criteria based on the thing template name, thing type name, package name, and description.
- You can define that the set of matching thing templates shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/ThingTemplates`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

None

Request Parameters

None

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.
<code>\$orderby</code>	No	String	Field name to be used for sorting the result set in ascending order; valid fields are thing template name, thing type name, package name, and description. To sort the result set, use asc for the ascending order and desc for the descending order.
<code>\$filter</code>	No	String	Filter condition to be applied; valid fields are thing template name, thing type name, package name, and description. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using <code>\$filter</code>. Valid fields are thing template name and description. For more information, see Filter Conditions (\$filter) [page 1550].
<code>\$select</code>	No	String	Select condition for the data fields to be included in the result set; valid fields are thing template name, thing type name, package name, and description.

Request Example

/ThingConfiguration/v1/ThingTemplates

Retrieves all thing templates.

Note

If file details are added in the thing template, file attributes *hasFile* and *fileData* are included in the response payload.

Response

Response Status and Error Codes

Code	Description
200	Details of all thing templates retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* format for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3Atemplate1')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3Atemplate1')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.automobiles:template1",
        "ThingType": "core.automobiles:ABCXSeries",
        "PackageName": "core.automobiles",
        "HasFile": null,
        "FileData": null,
        "Description": "Description in English",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3Atemplate1')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3Atemplate1')/DYN_ENT_TemplateProperties"
          }
        }
      }
    ]
  }
}
```

```

        "__metadata": {
          "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.computers%3Atemplate2')",
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.computers%3Atemplate2')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.computers:template2",
        "ThingType": "core.computers:CompXYZ",
        "PackageName": "core.computers",
        "HasFile": null,
        "FileData": null,
        "Description": "Description in English",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.computers%3Atemplate2')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.computers%3Atemplate2')/DYN_ENT_TemplateProperties"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.fourwheelers%3Atemplate3')",
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.fourwheelers%3Atemplate3')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.fourwheelers:template3",
        "ThingType": "core.fourwheelers:carTT",
        "PackageName": "core.fourwheelers",
        "HasFile": null,
        "FileData": null,
        "Description": "Description in English",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.fourwheelers%3Atemplate3')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.fourwheelers%3Atemplate3')/DYN_ENT_TemplateProperties"
          }
        }
      }
    ]
  }
}

```

Related Information

[Thing Template \[page 413\]](#)

8.2.4.4 Read all Thing Templates of a Thing Type

With this method, you can retrieve all thing templates created for a thing type.

You can retrieve a subset of all thing templates, according to the filter criteria provided. For a collective request for a set of thing templates, you have these options:

- You can restrict the set of thing templates to be retrieved by filter criteria based on the thing template name and description.
- You can define that the set of matching thing templates shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/ThingTypes('<thing type name>')/ThingTemplates`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description
<code>thing type name</code>	Yes	String	Name of the thing type

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.

Parameter	Required	Type	Description
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are thing template name, thing type name, package name, and description. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are thing template name, thing type name, package name, and description. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using <code>\$filter</code>. Valid fields are thing template name and description. For more information, see Filter Conditions (\$filter) [page 1550].
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are thing template name, thing type name, package name, and description.

Request Example

```
/ThingConfiguration/v1/ThingTypes('core.automobiles:ABC2Series')/ThingTemplates
```

Retrieves all thing templates created for the thing type `core.automobiles:ABC2Series`.

i Note

If file details are added in the thing template, file attributes *hasFile* and *fileData* are included in the response payload.

Response

Response Status and Error Codes

Code	Description
200	Details of all thing templates retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* format for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
          "type": "com.sap.apptot.ThingTemplate"
        },
        "Name": "core.automobiles%3AABC2SeriesTemplate",
        "ThingType": "core.automobiles%3AABC2Series",
        "PackageName": "core.automobiles",
        "HasFile": null,
        "FileData": null,
        "Description": "Template for ABC2Series electric car",
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')/Descriptions"
          }
        },
        "DYN_ENT_TemplateProperties": {
          "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')/DYN_ENT_TemplateProperties"
          }
        }
      },
      {
        "__metadata": {
```



```

        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.automobiles%3AABC2SeriesTemplate2')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.automobiles%3AABC2SeriesTemplate2')",
        "type": "com.sap.apptot.ThingTemplate"
    },
    "Name": "core.automobiles%3AABC2SeriesTemplate2",
    "ThingType": "core.automobiles%3AABC2Series",
    "PackageName": "core.automobiles",
    "HasFile": null,
    "FileData": null,
    "Description": "Template 2 for ABC2Series electric car",
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.automobiles%3AABC2SeriesTemplate2')/Descriptions"
        }
    },
    "DYN_ENT_TemplateProperties": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
ThingTemplates('core.automobiles%3AABC2SeriesTemplate2')/
DYN_ENT_TemplateProperties"
        }
    }
}
]
}
}

```

Related Information

[Thing Template \[page 413\]](#)

8.2.4.5 Read Details of a Thing Template

With this method, you can retrieve details of the specified thing template.

Request

URI: /ThingConfiguration/v1/ThingTemplates('<thing template name>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thingconf>.r

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description
thing template name	Yes	String	Name of the thing template

Request Example

```
/ThingConfiguration/v1/ThingTemplates('core.automobiles:ABC2SeriesTemplate')
```

Retrieves the details of the thing template `core.automobiles:ABC2SeriesTemplate`.

i Note

If file details are added in the thing template, file attributes *hasFile* and *fileData* are included in the response payload.

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created thing template instance. The system generates a new value and replaces the old value every time a thing template is updated.

Response Status and Error Codes

Code	Description
200	Details of thing template retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* format for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/ThingTemplates('core.automobiles%3AABC2SeriesTemplate')",
      "type": "com.sap.apiot.ThingTemplate"
    },
    "Name": "core.automobiles%3AABC2SeriesTemplate",
  }
}
```

```

    "ThingType": "core.automobiles:ABC2Series",
    "PackageName": "core.automobiles",
    "HasFile": true,
    "FileData":
"iVBORw0KGgoAAAANSUgAAANIAAAAZCAYAAADigVZlAAQn0lEQVR4nO2dCXQTxxnHl0LT5jVteHlN
+5q+JCKBJITLmHlFkzBHHCCYBAiEw+I2GIMhDQ0kqQolIRc1SV5e
+prmqX3JawgQDL64bK8x2Ajb2Bg7NuBjJSXftmRZhyXZlnZGleLleGa1kg2iyua9X2TzvzHNN/
Ofb2Z2ZSiO4ygZGZm
+EXADZGSCgYAbICMTDATcABmZYCDgBsJIBAMBn0BGJhgIuAEyMsGA1wQdHZ1UV1cX5XK5qM7OzgcMRuNT
rSbTEraq6strhdfzruTk5Wpz8q5c1l7Jyb6szc3K1l7RggtFxcWX2dvVB02mtmVOp3NIV2fnQFie2WyB5
QS84TIy/YnXBFBI8BMM/pDqat0XzIVM08lTSVxyytn6jAuZV4FuzmtzclJz8/
LT8vML0nJzr54HYkpLS88oTkxMMZ48mchlXrxUXlffBCUM8xms8lCkgk6pCT6aZvZvCrzYpbu2PfxHAg
8l+obGm0t1vaJQBAPkvI5nM5fWyyWWTU1tfuA+IqOHDvGgehVCK4pA9loGZn
+xlucAc0thtj4hCT72XOp9S0thi2FBQWPvb13z9RN6lQH5s8NYxbMDct7KXyudt7MGeeWLFwrn8iVKz7a
uDYz3Z7dbzz9lp43B8ZsjYLlDKmprd3/
ffwPljWNqbw32xcFuuEyMv2J2M1BJpMpKiExxZKZeamiraltvqvdt8OWL1l8asq4kNbRzz7NTRo7uuMPo
4Y7Rz/zFbc64lluzHNDuZFDfFe5PICx25/ay2B3bogf/dd9fKCA
+CuytohOSkjuYlmtLXRwXGuJgy8j0F8QbdrT9bDpzQQ8jSHl5+dLt0VsOThgzjw7i6Se5kOHDuIljR9mX
RrykjZj/wlVeSONHP8+FhykrJoeOsY8aNoQLAYJa9erShIPvrRsKhQTK/YleX3Pw5KlErpKt
+iLQjZeR6S9Jn35VXl75r3gw4HU6/Z6ojes/gMKAUQiKBQKiUvvLC1/
MXLl8WcKsaZOrJ4Wobly7euUJsOQ7FjZ9Sh2IVC4oLhzhZk6d1LB5/dpt+9R/
hnuq4Xl5VwvT0jLKXS7XOHgaCAm0I2Rk
+gL2oslmewXsiUw5uXlZn8T9LVI5ZWI1jEQTxozkgECgkDrmKqfrFy8ILwJ7om
+3bNoQumTRwtDoQE0fTBsf2ggwg+jVBdOCT7eYwGfnti2bQXA6ME2nr9mbnHLOWV/
fEI3Wtd00jMzdZjBAKWBwX8ojCqm8vOJoYvLp9qPfHTmy5rXlJ
+BSbtzI5+5EI4ALRCTHHHPaQ8zWgOidO2IooBAKRKRdQDwGevJ4w8SQR0e0bmB0QxEXh2IYsdbTW0zmI
xM4/Wi4q9BfQMkCikCoAEUADgEeI3xOOVedkicp14e1V2uLwSpTwXNAPwRaGC7OQFqQp9xGDT
+1ksUUubFrMoLFy/VL5g7+4ep48fa
+P0Pz9jnn4H7JCCQBbP79V1rgJDMASE9um7NqvmxMdfbVateiwd7KKswHx
+dwBKwzGq1jgDRrjQ7W5sB6hvsRUhQQCyh8Sg4xwW64/oTpUQ/CIm7xz652yg9flb40R+xIn5i/
LWJKKSk5NouwgIi7cSQkXooAD6ywE8YneDyLWrDuq/
WR67+BvxcB5dtG9dGHgF7oZsgSuWFz555c0LISKcwIvHlAHSdnR0P37h5699pzIW6NrNlptFoIglJ7cOA
gcTf40711nH3g5AguEH3/4YGaZPSj/6Ix/hGmKd/hXQqIanz5q1b8WA5VwOXDLwgoIjAsk2/
Y1v0odUrXj0OT+vgNSCkjgXzZleANF3wpI6PRALxcDDt7BlTby+NWPGdqOPBisrKz8E
+zFFXX79Sp9fjhrQIDAqjx6kRHmfcDHDWZek+zCp+gnac6i7XhxOSUKAExiZl7D32y73wtbKfy/
CnPDdEISUKJjsrKiqPhocp86ZPGGeDSzkIWJa1Rq5ccXyDas1X8PBBuG9Cow8UE/
yEaYYPeZybPnFcMlGGRh/6+KNhNbV1o7Mua29dysrOdblcQ4SvDHmMg5s/I2ZAXNP
+bQz5zaVaABz0ij7kh6D7NVJnwL1NLJLXn47DCQmXjkXSqAnpFB4/
CO2KkODjEE861B9i7VcKwPlDgaQJQfKi4yFWkNZbPXzZuP4iQRobaLrBIhEpubP0xq2E9989MHnLpg3rX
5hFlz3/1BMcWLaVRm/eeIieNL4KRhi450EjDxQOvAf2T+mrli9bDZaAq3Zu37b3bnbf2zvnwg/d/
DoRENbcYRmhzc84n5peDkQ0FbNHUMGjD/LtsGesnC5GEEEnYbLH
+c1P9ox6ABiRdKzmDz9ISR0wKgx7WJE7ILtxUuXlQQfGDftQutC7ch1OUPi8NbPWjZUtBgbIzApFMQhZ
Sccrbrav61zAqWfWR79JbJ8+eG5Q97/HccfBOI/
P4eEJADRigoJP6NBvgzBC715s2coTuwf9+0qi3rKbB3ooCQKCAkCgiJgkKCS7uWfuMbiUkpjzcvCvg9y
GIkFicwZiGERMR7oQPb+x8VEy+5OcRDiDcoCdBERI/
QsINdmH5pGiPaxUT6cQLxYjky5D7aozdaiQNQ8iLoz
+EhPY1i7FRg7ORKKTUtHSDvptTarPZhr737oFHgRj+7lmeVcRsJfrwxdkzc+DSDj50VU6Z0LR5/
drDK5a8HLt4QfhusAfaBUQz8tDHHw/ate5FEHLkods6/ZfHjsdzZWX1JwRCGoxppAbTKG
+gjeadoyZ0Duo43MbU6LmuJpTPCwk3WGFHqTyg9xiJbcIJS52AtJkWG9R89Imgew8mi9lzmcfQPfeo/
D21ic9wdUZg2oaWoaG7xYvm59vFQ6qHt0El0QyCb4WTN25cuttBFBKIRpfAsstkNpvd4Xtye9/802PLFi
/
6J1y6LXpx3mUQleJARHKCAgrbVWLZ01AwQEGUEBIFhOQWDRAS5UVIFOfinrheVHw2MTmFEWgJ1yAVxvFi
KDBlaJA0uJmbrycEcw+3P0PTCDtOeJlF8uKWCF12fr5EOZzNOL
+g0Qq9Lxz0IQQ7ceUkHsr2jzRxb2Uj/MP46Ueb2WwyH1hREaPzln+HlFIjY1N+1NSz1lrq/
Wfg99/9saunVrsZLaHdu3YHg32PueAOP4Klm8lk0Jht4GfZ6yPXE0tf2Wx2CHZ7Q7K4XC667I77IuZC5n
ehIRzvBhqJD86s/KgM7CG7p4FUafh8pPsRAeFhu69SfWnjTgBisEi5aKdoQBj17f9FSggWBq/
FPdVSixIvTh/+Sok3OSI5kf7XbgvR/1yR2REIXV0DIRmX9beys7WljsdzhEeIQFBxFDLX15E7doRMzFs
+PtG+XNmFX726acPho6Loz45fJhasmihG29CstraqfZ2+wCXyzWCZau
+T0w63d9CQgcy6aACdRxDcJgKk9kp9Q9iK9tVGPyqQXgDkbg7wqCX6SgRmyAdmpo7w/
JAYEk1Calj2WgYjOKXL8zsrKFBKNQA4hKp8+c62poaPwjfi0HLOfcX4WAYoq02jQKLPVSdr+
+azsUkK9CagdCstnah14rvJ767XdhHSULn64IhISbOdDO9IZYp4gNTIbGd7wCk1ch0jHodf4VJjgKhdig
9nKYNLCDWSQN/3YD6hdWgl38JOLtpA9FTEG4f6Jlqwx3pAoJTRMiUgZDKAP1HcyHTrgaYR4xIVFop/
PJgmUFFngf52dnU
+Q0nkDLuOsVitlb293Cwhib7dTfotlWloaU3s1vyANpHsUObVDHcISgt1XIwkiZpXSabh1li8zsD
+oJdpGirRS/YIDd4LJeurCTX68WKQsqXA+E9qG
+ho9FSSVibwnVUgajB1o108xEYgKcdLaaouKv6hrNXYot9ut8PlGAF3hMGWAa83NjVRNpDG4XDcwWg0r
klLZ7iS0hufgXQDESHhliBCx3oDdUYBIR1LqAoTGxct0DqEHYD7eHg3hMRKbD9D8KvUz3MqTFuFbVKI
+AiDwDh/4soXTj5ouxkabyfJB1

```

```
+E5G0f2isfUUjwD5RAzGbzQzWldXOqdbphNbW1VE0NHp1OD6KOTVRI7UCIigusP6Gtq9iWnnOmqu10dhXk
gi3M
+BM5+pN0tELp7pvDWMRDcC4x8B6OzLzrgcLossOPQAcuK2N0XIffXqVI9tqJB5+8Xa7Eu96IuwuP4Suyf0
J85ejhYX0t2MSBTBHh4Vmp4opJYWgxujSZWqr2+ggJAoXY2eAoO/F/Ce1YYXkvBIMKKB5Sjc0sG13rC8/
ALt2fNpzQ6HM9zVW0i4WVXoRP5ZjprufRbB0d0RBfccx0h3v8aCK1voWLTjOE+d/
GsxJEeLzbAFdPdRMv/KUSwtfX+Es4ulex42kHzGd74Cc8/
ouc8LXen5PV6QD62XEaRXENrrbVI00uIPvMWExH18F0/37DeSDb4KieRHFpeeKCSdwegGCqmurt4tFn9E
1CMigaWd52/jQX5fU1qakprOmMB/LzU3N+OEJNYgKc735agYfbPB16f/pI5jfMgnNVr5UiYPuqxV
+5CXFz4uAguFgFuKS53hSQj7UuzrD3x09LYXQ9vN0GQ/k8aOGpe
+T0K6XV1NWaxWKYcNA1sMhgdaNHLvgzo7u9zXK1n20PnzaVYQ8ZbB5SFBSPszskp0vgLjEG
+dyNL4iEBacvBovHqcFIeU42ZWpEP7KiTSS75qifmF/
ss11wc30H3pB1xkEgPJIZKfj5q4yOevkEjix054fsgJfu0BwkcZEgCs3zQ2Ne8pLin5urpad8hkaltQU
LjGbDfimQyLhjg298gDe7tb9Isoabx3wRV0/jXTvgBrfKkE
+aLE8kjjzCtcQvD5FB7UCLgyQgh288tTJSEfaVJB68QRQxt/N1GBaRuPmsY/OyP5UYov+DTCvBq65/
JRCGq/Alm3tF
+4xBSzQYncw7VPCOlhff8ICQqotq7OfRghWKphMZstaxKTUywnTp5qPHP2vOn0mXNcKpNhPpWYxKWmpje
DZd0WtG4vjZORuRcoafEI2QO/
hASXdAajUcozpEGF14uPpgPhWK22xRaLdUbV7eo3b9ws28+yVXsdDvtceHonC0nmPoShey89ien9jkjNL
Qaqrc1MxASw2donpaZn1JeVlyeBfdEv22320/sjMe4DJ8r8+GDo7i8K4valKrH8PgsJPkuC
+yL4tgL8JAGPucvKK2MzM7PaWltbl4AyB/wvj10WksZ9CCeCaDSC
+CQkGInq6utF90Q8oIzf5l0tuFheXvkPsI962HN6JwtJ5n6FofEiwn3hsxeShVQF9kVQRPdFSZKwN6Kam
pt3Xiu83mQymcL5a/BrE1BMspBk7kNUdO8TveGJoCiShOR+DaiuTvKfFQbpHqmoqMzW6/
WJ8PgbOQ6XkQlKsBd5IUFaDAbJkQhitdpWgKUg226zLYS/y0KS+TGAvdj30KmqamFamtroywWq+gpHY/
ZbBnU3GL4FHx
+A8r5BeEhrYxM0BFwA2RkgoGAGyAjEwwE3AAZmWAg4AbIyAQDATdARiYYCLgBMjLBQMANKJEJBgJugIxM
MPBfChd6NRZ5pkMAAAAASUVORK5CYII=",
  "Description": "Template for ABC2Series electric car",
  "Descriptions": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTemplates('core.automobiles
%3AABC2SeriesTemplate')/Descriptions"
    }
  },
  "DYN_ENT_TemplateProperties": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/ThingTemplates('core.automobiles
%3AABC2SeriesTemplate')/DYN_ENT_TemplateProperties"
    }
  }
}
}
```

Related Information

[Thing Template \[page 413\]](#)

8.2.4.6 Update a Thing Template

With this method, you can update a thing template.

The `ETag` value is mandatory to update a thing template. You must retrieve the `ETag` value of the thing template using the `GET (/ThingConfiguration/v1/ThingTemplates('<thing template name>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PUT` request. If you do not include the `ETag` value in the request header or if the `ETag` value is not correct, the server displays an error message.

Note

- You cannot modify a thing template if you have already created things using the template.
- It is mandatory that you must add the `DYN_ENT_TemplateProperties` block when you update the template even if the properties within the block are not updated.

Only the following functions are supported using this service:

- You can change the description of the template.
- You can add new properties in the template.
- You can change the values of the properties in the template.
- You can add, delete, or change the file data for a template.

Note

You cannot update the thing template name using the `PATCH` request. The thing template name in the request payload is optional. However, if you specify the thing template name in the request payload, it must be the same as the one specified in the request URL.

After updating a thing type, the system generates a new `ETag` value for the thing type and replaces the old value with the new value.

Request

URI: `/ThingConfiguration/v1/ThingTemplates('<thing template name>')`

Operation Type: CRUD

HTTP Method: `PUT`

Permissions: `<thingconf>.u`

Request Headers

Header	Required	Values
<code>If-Match</code>	Yes	Latest ETag value of a specific thing type that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
<code>thing template name</code>	Yes	String	Name of the thing template

Request Example

`/ThingConfiguration/v1/ThingTemplates('core.automobiles:ABC2SeriesTemplate')`

Request to update the details of the thing template `core.automobiles:ABC2SeriesTemplate`. In this example, the description is updated.

Payload

Format: *JSON*

```
{
  "Name": "core.automobiles:ABC2SeriesTemplate",
  "ThingType": "core.automobiles:ABC2Series",
  "PackageName": "core.automobiles",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Template for ABC Series Car"
  }],
  "DYN_ENT_TemplateProperties": {
    "Car": {
      "RotationSpeed": "10"
    }
  }
}
```

Response

Response Headers

Name	Description
Etag	Identifies the updated thing template

Response Status and Error Codes

Code	Description
200	Thing template updated successfully

Related Information

[Thing Template \[page 413\]](#)

8.2.4.7 Delete a Thing Template

With this method, you can delete a thing template.

The ETag value is mandatory to delete a thing template. You must retrieve the ETag value of the thing template using the GET (/ThingConfiguration/v1/ThingTemplates('<thing template name>')) service. The ETag value is assigned to the request header parameter If-Match in the DELETE request. If you do not include the ETag value in the request header or if the ETag value is not correct, the server displays an error message.

i Note

You cannot delete a thing template if one of the following is true:

- You have already created things using the thing template.
- File information is included in the thing template and you have created a thing using the template. You must delete the file and the thing before deleting the template.

Request

URI: `/ThingConfiguration/v1/ThingTemplates('<thing template name>')`

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: `<thingconf>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific thing type that is updated using the PUT request.

Request Parameters

Parameter	Required	Data Type	Description
thing template name	Yes	String	Name of the thing template

Request Example

`/ThingConfiguration/v1/ThingTemplates('core.automobiles:ABC2SeriesTemplate')`

Response

Response Status and Error Codes

Code	Description
200	Thing template deleted successfully

Related Information

[Thing Template \[page 413\]](#)

8.2.5 Property Set Type

Property set type is a group of attributes that are used to describe things.

Overview

Property set types enable groups of properties to be assigned to a thing. Property set types are assigned to thing types to describe a thing and they are referred as property sets. Property set type can be assigned to one of the available data categories such as [MasterData](#), [TimeSeriesData](#), [DerivedData](#), and [Parameters](#). For example, Car, Wheel, and Engine are valid property set types. The colour and model of the car, pressure and rotation speed of the wheel, and capacity and transmission of an engine are some of the properties that you can define for the corresponding property set type.

The following are the supported predefined annotations for a property set type:

- `com.sap.apptot.security:pii`
 - You can assign this annotation to a property set type that contains data to identify a person or subject. Data such as nick name, birthdate, and email address are few examples that can be categorized as data that identifies a person.
- `com.sap.apptot.security:spi`
 - You can assign this annotation to a property set type that contains critical data of a person. Data such as identification number, ethnic origin, and biometric data are few examples that can be categorized as critical data of a person.

Note

For reasons of data protection and privacy, it is not allowed to assign a property set to a rule vocabulary if the property set type to which the property set belongs has been classified as holding personal data, or sensitive data.

Also, if an initially non-classified property set is assigned to a rule vocabulary that is used by rules, any later classification of the property set as personal, or sensitive data leads to the deactivation of all affected rules. For more information on creating a rule vocabulary, see [Create a Vocabulary](#).

Resource Path: `http://<server address>[:<port number>][[/path]]/ThingConfiguration`

Example for a base URI in a cloud foundry environment: `https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create a Property Set Type [page 451]	<code>/v1/Packages('<package name>')/PropertySetTypes</code>	<code><thingconf>.c</code>
GET	Read Details of a Property Set Type [page 459]	<code>/v1/PropertySetTypes('<property set type name>')</code>	<code><thingconf>.r</code>

HTTP Method	Operation	URI	Scope
GET	Read all Property Set Types [page 464]	/v1/PropertySetTypes	<thingconf>.r
GET	Read all Property Set Types of a Package [page 469]	/v1/Packages ('<package name>') /PropertySetTypes	<thingconf>.r
PATCH	Update a Property Set Type [page 473]	/v1/PropertySetTypes ('<property set type name>')	<thingconf>.u
DELETE	Delete a Property Set Type [page 476]	/v1/PropertySetTypes ('<property set type name>')	<thingconf>.d

i Note

<thingconf> refers to the thing configuration application name.

Property Set Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	string	Yes	81	Name of the property set type
Descriptions	Array of description objects	No	-	Description of the property set type for each language with the corresponding ISO language code
DataCategory	enum	Yes	-	Data category of the property set type
Annotations	Array of annotation objects	No	-	Array of attributes used to qualify property set type.

i Note

If you include `Descriptions` along with `CopySource`, the method assigns these descriptions for the newly created property set type. If you do not include `Descriptions` along with `CopySource`, the method copies descriptions defined in the source property set type to the newly created property set type.

Property	Type	Mandatory	Maximum Length	Description
Properties	Array of properties	No	-	Array of properties of data category <i>MasterData</i> or <i>TimeSeriesData</i>

i Note

- If you're subscribed to SAP IoT (oneproduct service plan), you can create time series data or derived data for a property of type GeoJSON, for example, using the Device Connectivity endpoints as described in the [Send Measures using REST](#) or [Send Measures using MQTT](#) topics.
- However, if you're subscribed to SAP Leonardo IoT (standard service plan), you can create time series data or derived data for a property of type GeoJSON only via data ingestion from SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service).
- In both the cases you need to configure a Device Model property of data type **String** which needs to be mapped to the [GeoJSON](#) property.

→ Recommendation

For property set type of data category *TimeSeriesData* or *DerivedData*, you can define up to 500 properties. However, for better performance, we highly recommend you to define not more than 200 properties per property set type.

Property	Type	Mandatory	Maximum Length	Description
ReferredPropertySetType	string	No	81	Name of the property set type for which you are defining the reference property data. i Note You can only define a referred property set type for a property set type of data category ReferencePropertyData.
CopySource	string	No	81	Name of the property set type You can use this property to specify the already existing property set type name, structure of which is copied to the new property set type to be created. i Note - You can use this field only in the /v1 version of the create method. - You cannot specify any value other than the property set type name in this field. - You cannot copy the property set type of data category ReferencePropertyData. - You cannot create copy of a property set type that belongs to a package with scope=private. - In a request payload to copy an existing property set type, you can only specify the name of the new property set type, CopySource, and Descriptions. All other fields described in this table are not supported.

Property	Type	Mandatory	Maximum Length	Description
IsMultiLingual	Boolean	No	Fixed	Indicates whether multiple languages are supported for all string type properties of the property set type. • If the value of this field is true, you can create data in multiple languages for the string type properties. • If the value of this field is false, you cannot create data in multiple languages for the string type properties. Properties of data type other than String does not support data in multiple languages. This field is supported only for the data categories MasterData and Parameters.

Data Category Enumeration Values

The following table describes the list of supported data categories you can use to define the property set type while configuring the package. The different data categories are used to store different types of data.

Value	Description
MasterData	Indicates the property set type for storing master data
DerivedData	Indicates the property set type for storing derived data
TimeSeriesData	Indicates the property set type for storing time series data
Parameters	Indicates the property set type for storing parameter values
ReferencePropertyData	Indicates the property set type for storing reference property data

If the value of the property type changes very frequently, for example, if the data changes for every second or for every hour, it is recommended to use data categories [TimeSeriesData](#) and [DerivedData](#) for the property set type. For example, you could model the speed of a car as [TimeSeriesData](#) and velocity or acceleration as [DerivedData](#). The data categories [Parameters](#) and [MasterData](#) are technically the same. You can model the parameters of a thing as data category [Parameters](#). These parameters do not change often over time. If you have data of category [TimeSeriesData](#), you can derive data of category [DerivedData](#) using data of category [Parameters](#). For example, speed of the car is available as [TimeSeriesData](#) for a specific time interval. You can derive acceleration for a specific time interval as [DerivedData](#) by applying certain [Parameters](#) data on [TimeSeriesData](#) speed of the car.

Properties Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	string	Yes	50	Unique name of the property

Property	Type	Mandatory	Maximum Length	Description
Type	string	Yes (For more information on supported data types, refer to Value Data Types for Property Types and Properties [page 1566])	30	Type used by the property Data type <i>LargeString</i> is applicable only for data categories <i>TimeSeriesData</i> and <i>DerivedData</i> .
PropertyLength	string	Yes	30	Storage length for the property specified as an integer value
QualityCode	integer	No	1	Indicates if the property has a quality code attached. A value 0 implies there is no quality code attached; value 1 implies that the property has a quality code available.

Quality code is supported only for property set type of data category *TimeSeriesData* and *DerivedData*. You can only attach a quality code for a property of data type *Numeric*, *NumericFlexible*, and *String*.

Note

- To qualify measurement values for being ingested and stored, SAP IoT supports the **Quality Code** concept as an additional information for each value. For example, OPC UA quality codes is one of the industry standards and you can refer to the list of OPC UA quality codes at <https://documentation.mindsphere.io/resources/html/getting-connected/en-US/115287412875.html>.
- Only if the property has a quality code attached, an additional property `<property_name>_QC` is supported for storing the quality code value. The property `<property_name>_QC` is of data type *Numeric*.

Property	Type	Mandatory	Maximum Length	Description
Descriptions	Array	No	-	Description of the property for each language with the corresponding ISO language code i Note If you do not define a description here and reuse a property type to define the property, the system uses the description defined in the property type. If you define a description here and reuse a property type to define the property, the system uses the description defined here and not the description defined in the property type.
UnitOfMeasure	string	No	5	Indicates the unit of measure in which the property value is measured i Note The value stored in this field is based on the business scenarios and the consuming applications. Therefore, the validation of this field is performed by the consuming applications.
PropertyType	string	No	-	You can reuse the property type object to define the properties of the property set type.

Property	Type	Mandatory	Maximum Length	Description
IsMultiLingual	Boolean	No	Fixed	Indicates whether multiple languages are supported for string type properties. - If the value of this field is true, you can create data in multiple languages for string type properties. - If the value of this field is false, you cannot create data in multiple languages for string type properties.
i Note If the property set type to which the string type property belongs does not support multiple languages, then you cannot define the field IsMultiLingual for the property. If you do not want to maintain data in multiple languages for the string type property though the property set type to which the string type property belongs, you must define IsMultiLingual=false for the property.				
Annotations	Array of annotations	No	-	Array of attributes used to qualify properties of a property set type. .

Annotation Object Properties

Property	Type	Mandatory	Description
Name	String	Yes	Name of the annotation

Reference Property Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	string	Yes	50	Reference property type identifier defined in a property set type of data category ReferencePropertyData
ReferenceProperty	string	Yes	30	Name of the property type defined in the referred property set type

Property	Type	Mandatory	Maximum Length	Description
AttributeType	string	Yes	81	Attribute type of the reference property type. The following values are supported: - com.sap.iot.core.LowLowerThreshold - com.sap.iot.core.LowerThreshold - com.sap.iot.core.UpperThreshold - com.sap.iot.core.UpperUpperThreshold - com.sap.iot.core.UoM - com.sap.iot.core.TargetValue

Property Set Type and Properties Description

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Data Protection and Privacy \[page 327\]](#)

8.2.5.1 Create a Property Set Type

With this method, you can create property set types in the specified package.

Overview

When you create a property set type, you can assign predefined annotations or user-defined annotations for the properties of the property set type. It is optional to provide the ADD operation in the request payload. However, if you provide the ADD operation for one of the annotations, then you must provide the ADD operation for all the annotations of that property. DELETE operation is not supported for the annotation of a property when you create the property set type.

Based on the scope of the package, the property set type can be reused as follows:

- Only in the thing types within a package, if the scope of the package is private
- Only in the thing types within a tenant, if the scope of the package is tenant

Note

- In the configuration, you can define any number of property set types. However, you can create only one property set type per `POST` request. You can create a higher number of property set types for a package through multiple `POST` requests.

- If you're subscribed to SAP IoT (oneproduct service plan), you can create time series data or derived data for a property of type GeoJSON only using the Device Connectivity endpoints as described in the [Send Measures using REST](#) or [Send Measures using MQTT](#) topics.
- If you're subscribed to SAP Leonardo IoT (standard service plan), you can create time series data or derived data for a property of type GeoJSON only via data ingestion from SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service).

→ Recommendation

You can define up to 10 property set types for a package.

For property set type of data category *TimeSeriesData* or *DerivedData*, you can define up to 500 properties. However, for better performance, we highly recommend you to define not more than 200 properties per property set type.

Naming convention for property set type and reference property set type

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Naming convention for properties

- Only the following characters are supported:
 - Uppercase and lowercase alphabets *a* through *z* and *A* through *Z*
 - Numeric digits 0 through 9
 - Punctuation marks underscore (`_`), hyphen (`-`), colon (`:`), and full-stop (`.`)

i Note

However, punctuation marks hyphen (`-`), colon (`:`), and full-stop (`.`) are not supported for data categories *TimeSeriesData* and *DerivedData*.

- Maximum length is 50 characters.
- Property names have to be unique for a given set of property set types.
- Property name must not start with a digit only for data categories *TimeSeriesData* and *DerivedData*.
- For properties that shall be used in rule processing scenarios, additional naming conventions are in effect. For more information, see [Naming Conventions for Rule Processing](#).

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/PropertySetTypes`

Operation Type: CRUD

HTTP Method: *POST*

Permissions: `<thingconf>.c`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the property set type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Request Example

`/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes`

Payload

Format: JSON

Example 1

`/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes`

Creates a property set type `core.automobiles:Engine` in the package `core.automobiles`.

```
{
  "Name": "core.automobiles:Engine",
  "DataCategory": "TimeSeriesData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Sensory parameters for Engine"
  }],
  "Properties": [{
    "Name": "Temperature",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Temperature of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "1",
    "UnitOfMeasure": "AA"
  },
  {
    "Name": "Pressure",
    "Descriptions": [{
```

```

        "LanguageCode": "en",
        "Description": "Pressure of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "0",
    "UnitOfMeasure": "BA"
}
]
}

```

Example 2

/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes

Creates a property set type `core.automobiles:Engine` in the package `core.automobiles`. The property `EngineTemperature` is referred to the property type `core.automobiles:Temperature`.

Note

You can enable the property that is referred to a property type to support multiple languages.

```

{
  "Name": "core.automobiles:Engine",
  "DataCategory": "TimeSeriesData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Sensory parameters for Engine"
  }],
  "Properties": [{
    "Name": "EngineTemperature",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Temperature of the Engine"
    }],
    "PropertyType": "core.automobiles:Temperature"
  },
  {
    "Name": "Pressure",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Pressure of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "0",
    "UnitOfMeasure": "BA"
  }
]
}

```

Example 3

/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes

Creates a reference property set type `core.automobiles:EngineReference` in the package `core.automobiles`.

```

{
  "Name": "core.automobiles:EngineReference",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Sensory parameters (reference) for Engine"
  }],
  "DataCategory": "ReferencePropertyData",
}

```

```

    "ReferredPropertySetType": "core.automobiles:Engine",
    "Properties": [{
      "Name": "TemperatureRefUoM",
      "AttributeType": "com.sap.iot.core.UoM",
      "ReferenceProperty": "Temperature"
    }, {
      "Name": "PressureRefLThreshold",
      "AttributeType": "com.sap.iot.core.LowerThreshold",
      "ReferenceProperty": "Pressure"
    }]
  }
}

```

Example 4

```
/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes
```

Creates a property set type `core.automobiles:BusEngine` copied from the already existing property set type `core.automobiles:Engine`. The method copies the entire structure of the source property set type to the new property set type. However, you can include the descriptions of the property set type in the `Descriptions` field along with the `CopySource` field. In which case, the method creates a new property set type with these descriptions instead of copying it from the source property set type.

```

{
  "Name": "core.automobiles:BusEngine",
  "CopySource": "core.automobiles:Engine"
}

```

Note

Ensure that the source property set type belongs to a package with `scope=tenant` as you cannot create copy of a property set type that belongs to a package with `scope=private`.

Example 5

```
/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes
```

Creates a property set type `core.automobiles:Car` in the package `core.automobiles` which supports multiple languages for the string type properties. In the following example, the string type properties **Color**, **Model**, and **LicenseNumber** support multiple languages by default as the property set type `core.automobiles:car` supports multiple languages. However, if you do not want the string type property **Model** to support multiple languages, you must add the field `IsMultiLingual = False` for the property.

```

{
  "Name": "core.automobiles:Style",
  "DataCategory": "MasterData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Master data parameters for Car"
  }],
  "IsMultiLingual": "true",
  "Properties": [{
    "Name": "Color",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Color of the Car"
    }],
    "Type": "String",
    "PropertyLength": ""
  },
  {
    "Name": "Model",
    "Descriptions": [{

```

```

        "LanguageCode": "en",
        "Description": "Model of the Car"
    }],
    "Type": "String",
    "PropertyLength": "",
    "IsMultiLingual": "false"
},
{
    "Name": "ModelNumber",
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Model of the Car"
    }],
    "Type": "Numeric",
    "PropertyLength": ""
},
{
    "Name": "LicenseNumber",
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "License number of the Car"
    }],
    "Type": "String",
    "PropertyLength": ""
}
]
}

```

Example 6

/ThingConfiguration/v1/Packages('core.automobiles')/PropertySetTypes

Creates a property set type `core.automobiles:Engine` in the package `core.automobiles` along with annotations for the properties. `core.automobiles:Pressure108` is a user-defined annotation and `com.sap.apiot.analytics:dimension` is an SAP delivered predefined annotation.

Note

You can assign multiple unique annotations for a property. However, you cannot assign the same annotation more than once for a property.

```

{
    "Name": "core.automobiles:Engine",
    "DataCategory": "TimeSeriesData",
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Sensory parameters for Engine"
    }],
    "Properties": [{
        "Name": "Temperature",
        "Descriptions": [{
            "LanguageCode": "en",
            "Description": "Temperature of the Engine"
        }],
        "Type": "Numeric",
        "PropertyLength": "",
        "QualityCode": "1",
        "UnitOfMeasure": "AA",
        "Annotations": [{
            "Name": "core.automobiles:Pressure108"
        }]
    },
    {
        "Name": "Pressure",
        "Descriptions": [{

```

```

        "LanguageCode": "en",
        "Description": "Pressure of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "0",
    "UnitOfMeasure": "BA",
    "Annotations": [{
        "Name": "com.sap.apptot.analytics:dimension"
    }]
}
]
}

```

Note

In the above example, it is not mandatory to provide the ADD operation for the annotation of the properties Temperature and Pressure. However, if you provide the ADD operation for the property Temperature, you must provide the ADD operation for the property Pressure as well.

Response

Response Status and Error Codes

Code	Description
201	Property set types created successfully for a specific package

Response Payload

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) definition for this method has the structure as illustrated in the following examples.

The following is the response payload after creating the property set type `core.automobiles:Engine`.

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
      "type": "com.sap.apptot.PropertySetType"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "TimeSeriesData",
    "Description": null,
    "ReferredPropertySetType": null,
    "NumberOfProperties": null,
    "IsMultilingual": null,
    "Properties": {

```

```

        "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/
Properties"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/
Descriptions"
        }
    },
    "Annotations": {
        "__deferred": {
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/
Annotations"
        }
    }
}

```

The following is the response payload after creating the reference property set type `core.automobiles:EngineReference`.

```

{
    "d": {
        "__metadata": {
            "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngineReference')",
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngineReference')",
            "type": "com.sap.apptot.PropertySetType"
        },
        "Name": "core.automobiles:EngineReference",
        "PackageName": "core.automobiles",
        "DataCategory": "ReferencePropertyData",
        "Description": null,
        "ReferredPropertySetType": "core.automobiles:Engine",
        "NumberOfProperties": null,
        "IsMultiLingual": null,
        "Properties": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngineReference')/
Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngineReference')/
Descriptions"
            }
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngineReference')/
Annotations"
            }
        }
    }
}

```


Related Information

[Data Protection and Privacy \[page 327\]](#)

8.2.5.2 Read Details of a Property Set Type

With this method, you can read the details of the specified property set type.

Request

URI: `/ThingConfiguration/v1/PropertySetTypes('<property set type name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the property set type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Request Example

```
/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')
```

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created property set type instance. The system generates a new value and replaces the old value every time a property set type is updated.

Response Status and Error Codes

Code	Description
200	Details of the specified property set type retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The JSON for this method has the structure as depicted in the following examples:

Example 1

```
(/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine'))
```

Retrieves details of the property set type `core.automobiles:Engine`.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "type": "com.sap.apiot.PropertySetType"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "TimeSeriesData",
    "Description": "Sensory Parameters for Engine",
    "ReferredPropertySetType": null,
    "CopySource": null,
    "NumberOfProperties": null,
    "IsMultilingual": null,
    "Properties": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Properties"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Descriptions"
      }
    },
    "Annotations": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Annotations"
      }
    }
  }
}
```

Example 2

/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')?\$format=json?
\$expand=Descriptions

Retrieves details of the property set type `core.automobiles:Engine` along with descriptions in all specified languages.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "type": "com.sap.apptot.PropertySetType"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "TimeSeriesData",
    "Description": null,
    "ReferredPropertySetType": null,
    "CopySource": null,
    "NumberOfProperties": null,
    "IsMultiLingual": null,
    "Properties": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Properties"
      }
    },
    "Descriptions": {
      "results": [{
        "LanguageCode": "en",
        "Description": "Sensory parameters for Engine"
      }]
    },
    "Annotations": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Annotations"
      }
    }
  }
}
```

Example 3

/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')?\$format=json?
\$expand=Properties

Retrieves details of the property set type `core.automobiles:Engine` along with its properties.

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
      "type": "com.sap.apptot.PropertySetType"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "TimeSeriesData",
    "Description": "Sensory parameters for Engine",
  }
}
```

```

    "ReferredPropertySetType": null,
    "CopySource": null,
    "NumberOfProperties": null,
    "IsMultiLingual": null,
    "Properties": {
      "results": [{
        "Name": "variable_1",
        "PropertySetType": "core.automobiles:Engine",
        "Description": "Temperature of the Engine",
        "Type": "Numeric",
        "PropertyType": "",
        "PropertyLength": "",
        "QualityCode": "1",
        "UnitOfMeasure": null,
        "ReferenceProperty": null,
        "AttributeType": "",
        "Operation": "",
        "IsMultiLingual": null
      },
      {
        "Name": "variable_2",
        "PropertySetType": "core.automobiles:Engine",
        "Description": "Pressure of the Engine",
        "Type": "Numeric",
        "PropertyType": "",
        "PropertyLength": "",
        "QualityCode": "1",
        "UnitOfMeasure": null,
        "ReferenceProperty": null,
        "AttributeType": "",
        "Operation": "",
        "IsMultiLingual": null
      }
    ]
  },
  "Descriptions": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Descriptions"
    }
  },
  "Annotations": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Annotations"
    }
  }
}

```

Example 4

```

/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')?$format=json?
$expand=Properties/Annotations

```

Retrieves details of the property set type `core.automobiles:Engine` along with its properties and annotations defined for the properties.

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",

```

```

        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
        "type": "com.sap.apptot.PropertySetType"
    },
    "Name": "core.automobiles%3AEngine",
    "PackageName": "core.automobiles",
    "DataCategory": "TimeSeriesData",
    "Description": "Sensory parameters for Engine",
    "ReferredPropertySetType": null,
    "CopySource": null,
    "NumberOfProperties": null,
    "IsMultiLingual": null,
    "Properties": {
        "results": [{
            "__metadata": {
                "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='variable_1',PropertySetType='core.automobiles%3AEngine')",
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='variable_1',PropertySetType='core.automobiles%3AEngine')",
                "type": "com.sap.apptot.Property"
            },
            "Name": "Temperature",
            "PropertySetType": "core.automobiles:Engine",
            "Description": "Temperature of the Engine",
            "Type": "String",
            "PropertyLength": "",
            "QualityCode": "1",
            "UnitOfMeasure": null,
            "ReferenceProperty": "",
            "AttributeType": "",
            "Operation": "",
            "PropertyType": "",
            "IsMultiLingual": null,
            "Descriptions": {
                "__deferred": {
                    "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='variable_1',PropertySetType='core.automobiles%3AEngine')/
Descriptions"
                }
            },
            "Annotations": {
                "results": [{
                    "Name": "core.automobiles:Pressure108",
                    "PackageName": "core.automobiles",
                    "Description": null
                }]
            },
            "ReferenceProperties": {
                "__deferred": {
                    "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='variable_1',PropertySetType='core.automobiles%3AEngine')/
ReferenceProperties"
                }
            }
        }],
        {
            "__metadata": {
                "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles%3AEngine')",
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles%3AEngine')",
                "type": "com.sap.apptot.Property"
            }
        }
    ]
}

```

```

    },
    "Name": "Pressure",
    "PropertySetType": "'core.automobiles%3AEngine",
    "Description": "",
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "1",
    "UnitOfMeasure": "",
    "ReferenceProperty": "",
    "AttributeType": "",
    "Operation": "",
    "PropertyType": "",
    "IsMultiLingual": null,
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles%3AEngine')/
Descriptions"
      }
    },
    "Annotations": {
      "results": [{
        "Name": " com.sap.apptot.analytics:dimension",
        "PackageName": "core.automobiles",
        "Description": null
      }]
    },
    "ReferenceProperties": {
      "__deferred": {
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles%3AEngine')/
ReferenceProperties"
      }
    }
  }
]
},
"Descriptions": {
  "__deferred": {
    "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/
Descriptions"
  }
},
"Annotations": {
  "__deferred": {
    "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/
Annotations"
  }
}
}
}
}

```

8.2.5.3 Read all Property Set Types

With this method, you can read all property set types.

This method retrieves all property set types to which the user has access authorization. It includes property set types from all packages from the same tenant.

In addition, you can retrieve a subset of all property set types, according to the filter criteria provided. For a collective request for a set of property set types, you have these options:

- You can restrict the set of property set types to be retrieved by filter criteria based on the property set type name, package name, data category, and description.
- You can define that the set of matching property set types shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/PropertySetTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
<code>Accept-Language</code>	No	Language of the property set type description. The default language is en .
<code>sap-iot-propertiescount</code>	No	Include a new field <code>NumberOfProperties</code> in the response payload Only if you specify the value true for this parameter, the system includes the count of properties in a new field <code>NumberOfProperties</code> in the response payload. If you specify false or do not use this header parameter, the system does not return the count of properties in the response payload.

Query Request Parameters

Parameter	Required	Data Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Data Type	Description
\$inlinecount	No	String	Total number of property set types available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of property set types available. • If you use this with \$filter parameter, the result contains the total count of property set types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; only valid fields are property set type name, package name, data category, and description. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using \$filter. Valid fields are property set type name, package name, data category, and description.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are property set type name, package name, data category, description, and referred property set type name.

Request Example

```
/ThingConfiguration/v1/PropertySetTypes
```

Response

Response Status and Error Codes

Code	Description
200	Details of all property set types retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
        "type": "com.sap.apptot.PropertySetType"
      },
      "Name": "core.automobiles:Engine",
      "PackageName": "core.automobiles",
      "DataCategory": "TimeSeriesData",
      "Description": "Sensory parameters for Engine",
      "ReferredPropertySetType": "",
      "IsMultiLingual": null,
      "Properties": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Properties"
        }
      },
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Descriptions"
        }
      },
      "Annotations": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Annotations"
        }
      }
    }],
    "__next": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes?$format=json&$skiptoken=20"
  }
}
```

The following is an example payload with the count of properties included in the response payload:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
        "type": "com.sap.apptot.PropertySetType"
      },
      "Name": "core.automobiles:Engine",
      "PackageName": "core.automobiles",

```

```

        "DataCategory": "TimeSeriesData",
        "Description": "Sensory parameters for Engine",
        "ReferredPropertySetType": "",
        "IsMultiLingual": null,
        "NumberOfProperties": 6,
        "Properties": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Descriptions"
            }
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Annotations"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Car')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Car')",
            "type": "com.sap.apptot.PropertySetType"
        },
        "Name": "core.automobiles:Car",
        "PackageName": "core.automobiles",
        "DataCategory": "TimeSeriesData",
        "Description": "Sensory parameters for Car",
        "ReferredPropertySetType": "",
        "IsMultiLingual": null,
        "NumberOfProperties": 4,
        "Properties": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Car')/Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Car')/Descriptions"
            }
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Annotations"
            }
        }
    }
]
}

```

```
}
```

8.2.5.4 Read all Property Set Types of a Package

With this method, you can read all property set types of the specified package.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/PropertySetTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
<code>Accept-Language</code>	No	Language of the property set type description. The default language is en .
<code>sap-iot-propertiescount</code>	No	Include a new field <code>NumberOfProperties</code> in the response payload. Only if you specify the value true for this parameter, the system includes the count of properties in a new field <code>NumberOfProperties</code> in the response payload. If you specify false or do not use this header parameter, the system does not return the count of properties in the response payload.

Request Parameters

Parameter	Required	Data Type	Description
<code>package name</code>	Yes	String	Unique name of the package

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Type	Description
\$inlinecount	No	String	Total number of property set types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of property set types available. • If you use this with \$filter parameter, the result contains the total count of property set types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid fields are property set type name, data category, and description. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are property set type name, data category, and description.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are property set type name, package name, data category, description, and referred property set type name.

Request Example

```
/ThingConfiguration/v1/Packages('<core.automobiles>')/PropertySetTypes
```

Response

Response Status and Error Codes

Code	Description
200	Details of all property set types retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')",
        "type": "com.sap.apptot.PropertySetType"
      },
      "Name": "core.automobiles:Engine",
      "PackageName": "core.automobiles",
      "DataCategory": "TimeSeriesData",
      "Description": "Sensory parameters for Engine",
      "ReferredPropertySetType": "",
      "IsMultiLingual": null,
      "Properties": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Properties"
        }
      },
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles%3AEngine')/Descriptions"
        }
      },
      "Annotations": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Annotations"
        }
      }
    }]
  }
}
```

The following is an example payload with the count of properties included in the response payload:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')",
        "type": "com.sap.apptot.PropertySetType"
      },
      "Name": "core.automobiles:Engine",
      "PackageName": "core.automobiles",
      "DataCategory": "TimeSeriesData",
      "Description": "Sensory parameters for Engine",

```

```

        "ReferredPropertySetType": "",
        "IsMultiLingual": null,
        "NumberOfProperties": 6,
        "Properties": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Descriptions"
            }
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Annotations"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Style')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Style')",
            "type": "com.sap.apptot.PropertySetType"
        },
        "Name": "core.automobiles:Style",
        "PackageName": "core.automobiles",
        "DataCategory": "MasterData",
        "Description": "Master data parameters for Car",
        "ReferredPropertySetType": "",
        "IsMultiLingual": null,
        "NumberOfProperties": 4,
        "Properties": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Style')/Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Style')/Descriptions"
            }
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertySetTypes('core.automobiles:Engine')/Annotations"
            }
        }
    }
]
}
}

```

8.2.5.5 Update a Property Set Type

With this method, you can update the details of the specified property set type.

You can update the property set type as follows:

- You can assign annotation, delete or change the annotation assignment for a property set type
- You can add new properties, edit the existing properties, or delete the existing properties.
- You can assign or unassign the annotation for a property of a property set type.
- You can add the field `IsMultiLingual=true` to support multiple languages for its string type properties, if the property set type was not already supporting multiple languages. This is possible only if there is no data already existing for those properties.
- You can only increase the length of the property length, if data already exists for the property and the data type is **String**. For any other data types, you cannot change the property.
- You can add new properties by reusing the property types, if the following conditions are true:
 - Property type and property set type belongs to the same package
- You can change the data category of a property set type, irrespective of the data available for the properties. The only allowed possibility is [DerivedData](#) to [TimeSeriesData](#) and vice-versa.

The `ETag` value is mandatory to update a property set type. You must retrieve the `ETag` value of the property set type using the `GET (/ThingConfiguration/v1/PropertySetTypes('<property set type name>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `ETag` value in the request header or if the `ETag` value is not correct, the server displays an error message.

After updating a property set type, the system generates a new `ETag` value for the property set type and replaces the old value with the new value.

Note

- You cannot change the name of the property set type.
- You cannot change the value of the `IsMultiLingual` field for a property set type, if data already exists for its properties.
- The valid operations for the properties are `ADD`, `DELETE`, and `UPDATE`.
 - You cannot change the value of the field `IsMultiLingual` for a string type property, if data already exists for that property.
 - You can add the field `IsMultiLingual=true` or `IsMultiLingual=false` for the string type property, if data does not exist and the property set type supports multiple languages.
 - For a property set type of data category [TimeSeriesData](#) or [DerivedData](#), you cannot change or delete a property, if data already exists for that property or for any of the properties of the property set type. You can change or delete a property only if all the properties of the property set type have no data.
 - For a property set type of data category [MasterData](#) or [Parameters](#), you can change or delete a property without data even though the other properties of the property set type have data.
 - You cannot delete a property or change the type or the length of a property, if the property is referred in the reference property set type. You must first remove the reference by deleting the property in the reference property set type and then delete the property in the property set type.
- The valid operations for the annotations of the property set type are `ADD`, `DELETE`, and `UPDATE`.
 - You can add annotation for a property set type if nothing is already assigned and even though the data exists for the properties

- You cannot add multiple annotations for the property set type
- You cannot add, delete, or change the annotation for a property set type if it is referred in another property set type
- You cannot delete or change the already assigned annotation, if data exists for the properties of the property set type
- The valid operations for the annotations of the property are ADD and DELETE.
 - You can assign new annotations for a property even though the data exists for the property. It is not mandatory to specify the ADD operation field when you assign annotations for a property. However, if you want to provide the ADD operation, you must provide for all annotations of the property. If one or more annotations in the request payload is already assigned for the property and if you provide the ADD operation field, the service displays an error message.
 - You can unassign an annotation already assigned for a property by explicitly providing the DELETE operation in the request payload. If the property already contains data, you cannot delete the annotation.
 - If you do not provide the operation field in the request payload, the service checks if the annotations provided in the request payload are already assigned for the property. The service assigns only the unassigned annotation(s) provided in the request payload for the property.
 - For example, assume annotations A1 and A2 are already assigned for the property Prop1. If you update the property Prop1 of the property set type with annotations A1 and A3, and without DELETE operation field, the service assigns annotation A3 for the property and the annotation A1 is ignored as it is already assigned.
 - You can assign or unassign multiple annotations for one or more properties in a single payload.
- If you are updating a reference property set type, you cannot change the referred property set type.

Request

URI: `/ThingConfiguration/v1/PropertySetTypes('<property set type name>')`

Operation Type: CRUD

HTTP Method: [PATCH](#)

Permissions: `<thingconf>.u`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the property set type description. The default language is en .
If-Match	Yes	Latest ETag value of a specific property set type name that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Request Example

```
/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')
```

Payload

Format: JSON

Only media type JSON is supported. The JSON for this method has the structure as described in the following examples:

Example 1: The following example deletes the property `Temperature` for the property set type `core.automobiles:Engine`.

```
{
  "DataCategory": "TimeSeriesData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Data for m4"
  }],
  "Properties": [
    {
      "Name": "Temperature",
      "Operation": "DELETE"
    }
  ]
}
```

Example 2: The following request payload assigns a new annotation for the property `Pressure` of the property set type `core.automobiles:Engine`.

```
{
  "DataCategory": "TimeSeriesData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Data for m4"
  }],
  "Properties": [
    {
      "Name": "Pressure",
      "Operation": "UPDATE",
      "Annotations": [{
        "Name": "core.automobiles:Pressure108",
        "Operation": "ADD"
      }]
    }
  ]
}
```

Example 3: The following request payload deletes an already assigned annotation for the property `Pressure` of the property set type `core.automobiles:Engine`.

```
{
  "DataCategory": "TimeSeriesData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Data for m4"
  }],
  "Properties": [
    {
      "Name": "Pressure",
      "Operation": "UPDATE",
      "Annotations": [{
        "Name": "core.automobiles:Pressure108",
        "Operation": "DELETE"
      }]
    }
  ]
}
```

i Note

You cannot update the property set type name using the `PATCH` request. The property set type name specified in the request payload is ignored for update.

Response

Response Headers

Name	Description
Etag	Identifies the updated property set type

Response Status and Error Codes

Code	Description
204	Details of the specified property set type updated successfully

8.2.5.6 Delete a Property Set Type

With this method, you can delete the specified property set type.

The [ETag](#) value is mandatory to delete a property set type. You must retrieve the [ETag](#) value of the property set type using the `GET (/ThingConfiguration/v1/PropertySetTypes('<property set type name>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the [PATCH](#) request. If you do not include the `ETag` value in the request header or if the `ETag` value is not correct, the server displays an error message.

Request

URI: `/ThingConfiguration/v1/PropertySetTypes('<property set type name>')`

Operation Type: CRUD

HTTP Method: [DELETE](#)

Permissions: `<thingconf>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific property set type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Unique name of the property set type

Request Example

```
/ThingConfiguration/v1/PropertySetTypes('<property set type name>')
```

Response

Response Status and Error Codes

Code	Description
204	Property set type deleted successfully

8.2.5.7 Read all Properties of a Property Set Type

With this method, you can retrieve all properties that belong a property set type.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: /ThingConfiguration/v1/PropertySetTypes('<property set type name>')/Properties

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thingconf>.r

Request Headers

Header	Required	Values
Accept-Language	No	Language of the property set type description. The default language is en.

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$inlinecount	No	String	Total number of property set types available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of property set types available. • If you use this with \$filter parameter, the result contains the total count of property set types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; only valid fields are property name, description, type, property length, quality code, and unit of measure. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; only valid fields are property name, description, type, property length, quality code, and unit of measure. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are property name, type, property set type.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the response payload are supported.

Request Example

```
/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Properties
```

Retrieves all properties that belong to the property set type `core.automobiles:Engine`

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

```
/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Properties
```

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Properties(Name='Temperature',PropertySetType='core.automobiles:Engine')",

```

```

        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Temperature',PropertySetType='core.automobiles:Engine')",
        "type": "com.sap.apptot.Property"
    },
    "Name": "Temperature",
    "PropertySetType": "core.automobiles:Engine",
    "Description": "Temperature of the Engine",
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "1",
    "UnitOfMeasure": "AA",
    "ReferenceProperty": null,
    "AttributeType": null,
    "Operation": null,
    "PropertyType": null,
    "IsMultilingual": null,
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Temperature',PropertySetType='core.automobiles:Engine')/
Descriptions"
        }
    },
    "Annotations": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Temperature',PropertySetType='core.automobiles:Engine')/
Annotations"
        }
    },
    "ReferenceProperties": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Temperature',PropertySetType='core.automobiles:Engine')/
ReferenceProperties"
        }
    }
},
{
    "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles:Engine')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties(Name='Pressure',PropertySetType='core.automobiles:Engine')",
        "type": "com.sap.apptot.Property"
    },
    "Name": "Pressure",
    "PropertySetType": "core.automobiles:Engine",
    "Description": "Pressure of the Engine",
    "Type": "Numeric",
    "PropertyLength": null,
    "QualityCode": "0",
    "UnitOfMeasure": "BA",
    "ReferenceProperty": null,
    "AttributeType": null,
    "Operation": null,
    "PropertyType": null,
    "IsMultilingual": null,
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/

```

```

Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')/
Descriptions"
    }
  },
  "Annotations": {
    "__deferred": {
      "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')/
Annotations"
    }
  },
  "ReferenceProperties": {
    "__deferred": {
      "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')/
ReferenceProperties"
    }
  }
}
]
}
}

```

Example 2

/ThingConfiguration/v1/PropertySetTypes('core.automobiles:Engine')/Properties?
\$expand=ReferenceProperties

```

{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Temperature',PropertySetType='core.automobiles:Engine')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Temperature',PropertySetType='core.automobiles:Engine')",
        "type": "com.sap.apptot.Property"
      },
      "Name": "Temperature",
      "PropertySetType": "core.automobiles:Engine",
      "Description": "Temperature of the Engine",
      "Type": "Numeric",
      "PropertyLength": null,
      "QualityCode": "1",
      "UnitOfMeasure": "AA",
      "ReferenceProperty": null,
      "AttributeType": null,
      "Operation": null,
      "PropertyType": null,
      "IsMultilingual": null,
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Temperature',PropertySetType='core.automobiles:Engine')/
Descriptions"
        }
      },
      "Annotations": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/

```

```

Properties (Name='Temperature',PropertySetType='core.automobiles:Engine')/
Annotations"
    }
  },
  "ReferenceProperties": {
    "results": [{
      "Name": "TemperatureRefUoM",
      "PropertySetType": "core.automobiles:EngineReference",
      "Description": "Reference Temperature of the Engine",
      "Type": null,
      "PropertyLength": null,
      "QualityCode": null,
      "UnitOfMeasure": null,
      "ReferenceProperty": "Temperature",
      "AttributeType": "com.sap.iot.core.UoM",
      "Operation": null,
      "PropertyType": null,
      "IsMultilingual": null
    }]
  }
},
{
  "_metadata": {
    "_id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')",
    "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')",
    "type": "com.sap.apptot.Property"
  },
  "Name": "Pressure",
  "PropertySetType": "core.automobiles:Engine",
  "Description": "Pressure of the Engine",
  "Type": "Numeric",
  "PropertyLength": null,
  "QualityCode": "0",
  "UnitOfMeasure": "BA",
  "ReferenceProperty": null,
  "AttributeType": null,
  "Operation": null,
  "PropertyType": null,
  "IsMultilingual": null,
  "Descriptions": {
    "_deferred": {
      "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')/
Descriptions"
    }
  },
  "Annotations": {
    "_deferred": {
      "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='Pressure',PropertySetType='core.automobiles:Engine')/
Annotations"
    }
  },
  "ReferenceProperties": {
    "results": [{
      "Name": "PressureRefLThreshold",
      "PropertySetType": "core.automobiles:EngineReference",
      "Description": "Reference Pressure of the Engine",
      "Type": null,
      "PropertyLength": null,
      "QualityCode": null,
      "UnitOfMeasure": null,

```



```

        "ReferenceProperty": "Pressure",
        "AttributeType": "com.sap.iot.core.LowerThreshold",
        "Operation": null,
        "PropertyType": null,
        "IsMultilingual": null
    ]]
    }
}
]
}
}

```

Example 3

```

/ThingConfiguration/v1/PropertySetTypes('core.automobiles:EngineReference')/
Properties?$expand=ReferenceProperties

```

```

{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='TemperatureRefUoM', PropertySetType='core.automobiles:EngineRefer
ence')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='TemperatureRefUoM', PropertySetType='core.automobiles:EngineRefer
ence')",
        "type": "com.sap.apptot.Property"
      },
      "Name": "TemperatureRefUoM",
      "PropertySetType": "core.automobiles:EngineReference",
      "Description": "Reference Temperature of the Engine",
      "Type": null,
      "PropertyLength": null,
      "QualityCode": null,
      "UnitOfMeasure": null,
      "ReferenceProperty": "Temperature",
      "AttributeType": "com.sap.iot.core.UoM",
      "Operation": null,
      "PropertyType": null,
      "IsMultilingual": null,
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='TemperatureRefUoM', PropertySetType='core.automobiles:EngineRefer
ence')/Descriptions"
        }
      },
      "Annotations": {
        "__deferred": {
          "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='TemperatureRefUoM', PropertySetType='core.automobiles:EngineRefer
ence')/Annotations"
        }
      },
      "ReferenceProperties": {
        "results": []
      }
    }],
    {
      "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/

```

```

Properties (Name='PressureRefLThreshold',PropertySetType='core.automobiles:EngineR
eference')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='PressureRefLThreshold',PropertySetType='core.automobiles:EngineR
eference')",
        "type": "com.sap.apptot.Property"
    },
    "Name": "PressureRefLThreshold",
    "PropertySetType": "core.automobiles:EngineReference",
    "Description": "Reference Pressure of the Engine",
    "Type": null,
    "PropertyLength": null,
    "QualityCode": null,
    "UnitOfMeasure": null,
    "ReferenceProperty": "Pressure",
    "AttributeType": "com.sap.iot.core.LowerThreshold",
    "Operation": null,
    "PropertyType": null,
    "IsMultilingual": null,
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='PressureRefLThreshold',PropertySetType='core.automobiles:EngineR
eference')/Descriptions"
        }
    },
    "Annotations": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Properties (Name='PressureRefLThreshold',PropertySetType='core.automobiles:EngineR
eference')/Annotations"
        }
    },
    "ReferenceProperties": {
        "results": []
    }
}
]
}
}

```

8.2.6 Property Type

The property type defines the properties of a thing and they have a specific data type assigned. You can group the properties under a property set type. In addition, you can refer property types to define properties while creating a property set type. For example, the color and model of the car, pressure and rotation speed of the wheel, or capacity and transmission of an engine are some of the property types.

Resource Path: [http://<server address>\[:<port number>\]\[/path\]/ThingConfiguration](http://<server address>[:<port number>][/path]/ThingConfiguration)

Example for a base URI in a cloud foundry environment: <https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration>

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create a Property Type [page 488]	/v1/Packages ('<package name>') / PropertyTypes	<thingconf>.c
GET	Read Details of a Property Type [page 492]	/v1/PropertyTypes ('<property type name>')	<thingconf>.r
GET	Read all Property Types [page 498]	/v1/PropertyTypes	<thingconf>.r
GET	Read all Property Types of a Package [page 502]	/v1/Packages ('package name') / PropertyTypes	<thingconf>.r
PATCH	Update a Property Type [page 506]	/v1/PropertyTypes ('<property type name>')	<thingconf>.u
DELETE	Delete a Property Type [page 509]	/v1/PropertyTypes ('<property type name>')	<thingconf>.d

Property Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Name of the property type and it must be unique within a package
Descriptions	Array	No	-	Description of the property type for each language with the corresponding ISO language code
Type	string	Yes (For more information on supported data types, refer to Value Data Types for Property Types and Properties [page 1566])	30	Type used by the property type i Note Data type <i>LargeString</i> is applicable only for data categories <i>TimeSeriesData</i> and <i>DerivedData</i>.
PropertyLength	string	Yes		Storage length for the property type specified as an integer value

Property	Type	Mandatory	Maximum Length	Description
QualityCode	integer	No	1	Indicates if the property type has a quality code attached. A value 0 implies there is no quality code attached; value 1 implies that the property type has a quality code available. Quality code is supported only for property set type of data category <i>TimeSeriesData</i> and <i>DerivedData</i>. You can only attach a quality code for a property type of data type <i>Numeric</i>, <i>NumericFlexible</i>, and <i>String</i>. i Note Only if the property type has a quality code attached, an additional property <code><property_name>_QC</code> is supported for storing the quality code value.
UnitOfMeasure	string	No	5	Indicates the unit of measure in which the property type is measured

Property	Type	Mandatory	Maximum Length	Description
Values	Array of values	No	254	Pre-defined values that can be assigned for the properties defined using the property type. If you specify enumerated values in this field, you can assign only these pre-defined values for the properties while creating data for a thing. If you do not specify any value in this field, you can define your own values while creating data for a thing. In addition, you can add description for each of the enumeration values in each language with the corresponding ISO language code. Data type supported are <i>String</i>, <i>Numeric</i>, <i>NumericFlexible</i>, and <i>NumericDecimal</i>.

Property Type Descriptions

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
```

```

    "Description": "updated description in German"
  }
}

```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```

{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}

```

Example with null value

```

{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}

```

8.2.6.1 Create a Property Type

With this method, you can create a property type in the specified package.

Based on the scope of the package, the property type can be reused as follows:

- Only in the property set types within a package, if the scope of the package is *private*
- Only in the property set types within a tenant, if the scope of the package is *tenant*

Naming convention

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package. However, two property names with same characters of different textual case is allowed. For example: A value "AbcDef" is accepted when there is another value "abcDEF" that exists.

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/PropertyTypes`

Operation Type: CRUD

HTTP Method: *POST*

Permissions: `<thingconf>.c`

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Request Example

`/ThingConfiguration/v1/Packages('core.automobiles')/PropertyTypes`

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples.

The following is a request payload to create a property type `core.automobiles:Temperature` without enumeration values. In such scenario, you can assign any values for the properties while creating data for a thing instance.

```
{
  "Name": "core.automobiles:Temperature",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Temperature"
  }],
  "Type": "String",
  "PropertyLength": "128",
  "UnitOfMeasure": "C",
  "QualityCode": "1"
}
```

The following is a request payload to create a property type `core.automobiles:Temperature` with enumeration values **High**, **Medium**, and **Low** defined for the property. You can assign only these values (High, Medium, and Low) for the property while creating data for a thing.

```
{
  "Name": "core.automobiles:Temperature",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Temperature"
  }],
  "Type": "String",
  "PropertyLength": "128",
  "Values": [
```

```

        {"Value": "High"},
        {"Value": "Medium"},
        {"Value": "Low"}
    ],
    "UnitOfMeasure": "C",
    "QualityCode": "1"
}

```

The following is a request payload to create a property type `core.automobiles:Temperature` with enumeration values **High**, **Medium**, and **Low** along with their descriptions defined for the property. You can assign only these values (High, Medium, and Low) for the property while creating data for a thing.

```

{
  "Name": "core.automobiles:Temperature",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Temperature"
  }],
  "Type": "String",
  "PropertyLength": "128",
  "Values": [{
    "Value": "High",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "High temperature"
    },
    {
      "LanguageCode": "de",
      "Description": "hohe Temperatur"
    },
    {
      "LanguageCode": "fr",
      "Description": "haute température"
    },
    {
      "LanguageCode": "ch",
      "Description": "高温"
    }
  ]
}, {
  "Value": "Medium",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "medium temperature"
  },
  {
    "LanguageCode": "de",
    "Description": "Mittlere temperatur"
  },
  {
    "LanguageCode": "fr",
    "Description": "Température moyenne"
  },
  {
    "LanguageCode": "ch",
    "Description": "中等温度"
  }
]
}, {
  "Value": "Low",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Low temperature"
  },
  {
    "LanguageCode": "de",

```



```

        "Description": "niedrige Temperatur"
    },
    {
        "LanguageCode": "fr",
        "Description": "basse température"
    },
    {
        "LanguageCode": "ch",
        "Description": "低温"
    }
]
}},
"UnitOfMeasure": "C",
"QualityCode": "1"
}

```

Response

Response Status and Error Codes

Code	Description
201	Property type created successfully for a specific package

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following example.

The following is the response payload after creating the property type `core.automobiles:Temperature` in the package `core.automobiles`:

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "uri": "https://config-thing-sap-ci.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "type": "com.sap.apiot.PropertyType"
    },
    "Name": "core.automobiles:Temperature",
    "Description": "Temperature",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "C",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
      }
    }
  },

```

```

    "Values": {
      "__deferred": {
        "uri": "https://config-thing-sap-
ci.cfapps.staging.sic.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')/Values"
      }
    }
  }
}

```

Related Information

[Property Type \[page 484\]](#)

8.2.6.2 Read Details of a Property Type

With this method, you can retrieve the details of a specific property type.

Request

URI: `/ThingConfiguration/v1/PropertyTypes('<property type name>')`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<thingconf>.r`

Request Parameters

Parameter	Required	Data Type	Description
property type name	Yes	String	Name of the property type

Request Example

`/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')`

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created property type instance. The system generates a new value and replaces the old value every time a property type is updated.

Response Status and Error Codes

Code	Description
200	Details of a specific property type retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples

Example 1

```
/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')
```

Retrieves the details of the property type `core.automobiles:Temperature`

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "type": "com.sap.apptot.PropertyType"
    },
    "Name": "core.automobiles:Temperature",
    "Description": "Temperature",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "C",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
      }
    },
    "Values": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Values"
      }
    }
  }
}
```

Example 2

```
/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')?  
$expand=Descriptions
```

Retrieves details of the property type `core.automobiles:Temperature` along with the description of the property type expanded

```
{  
  "d": {  
    "__metadata": {  
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/  
ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",  
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/  
ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",  
      "type": "com.sap.apptot.PropertyType"  
    },  
    "Name": "core.automobiles:Temperature",  
    "Description": null,  
    "Type": "String",  
    "PropertyLength": "128",  
    "QualityCode": "1",  
    "UnitOfMeasure": "C",  
    "Descriptions": {  
      "results": [  
        {  
          "LanguageCode": "en",  
          "Description": "Temperature"  
        }  
      ]  
    },  
    "Values": {  
      "__deferred": {  
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:  
443/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')/Values"  
      }  
    }  
  }  
}
```

Example 3

```
/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')?$expand=Values
```

Retrieves details of the property type `core.automobiles:Temperature` along with the values of the property type expanded

```
{  
  "d": {  
    "__metadata": {  
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/  
ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",  
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/  
ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",  
      "type": "com.sap.apptot.PropertyType"  
    },  
    "Name": "core.automobiles:Temperature",  
    "Description": "Temperature",  
    "Type": "String",  
    "PropertyLength": "128",  
    "QualityCode": "1",  
    "UnitOfMeasure": "C",  
    "Descriptions": {  
      "__deferred": {  
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:  
443/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')/Values"  
      }  
    }  
  }  
}
```

```

        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
      },
      "Values": {
        "results": [
          {
            "Value": "High",
            "Description": "High temperature"
          },
          {
            "Value": "Medium",
            "Description": "Medium temperature"
          },
          {
            "Value": "Low",
            "Description": "Low temperature"
          }
        ]
      }
    }
  }
}

```

Example 4

`/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')?$expand=Values`

Retrieves details of the property type `core.automobiles:Temperature` along with the values of the property type expanded. If there are no descriptions defined for the enumeration values, the method assigns the value *null* for the descriptions as shown in the below example:

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "type": "com.sap.apptot.PropertyType"
    },
    "Name": "core.automobiles:Temperature",
    "Description": "Temperature",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "C",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
      }
    },
    "Values": {
      "results": [
        {
          "Value": "High",
          "Description": null
        },
        {
          "Value": "Medium",
          "Description": null
        },
        {
          "Value": "Low",
          "Description": null
        }
      ]
    }
  }
}

```

```

    }
  }
}

```

Example 5

```

/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')?
$expand=Values/Descriptions

```

Retrieves details of the property type `core.automobiles:Temperature` along with the descriptions of the enumeration values expanded

```

{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
      "type": "com.sap.apptot.PropertyType"
    },
    "Name": "core.automobiles:Temperature",
    "Description": "Temperature",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "C",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
      }
    },
    "Values": {
      "results": [
        {
          "__metadata": {
            "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Values('High')",
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Values('High')",
            "type": "com.sap.apptot.Value"
          },
          "Value": "High",
          "Description": null,
          "Descriptions": {
            "results": [
              {
                "LanguageCode": "en",
                "Description": "High temperature"
              },
              {
                "LanguageCode": "de",
                "Description": "hohe Temperatur"
              },
              {
                "LanguageCode": "fr",
                "Description": "haute température"
              },
              {
                "LanguageCode": "ch",
                "Description": "高温"
              }
            ]
          }
        }
      ]
    }
  }
}

```


Related Information

[Property Type \[page 484\]](#)

8.2.6.3 Read all Property Types

With this method, you can retrieve all property types.

This method retrieves all property types to which the user has access authorization. It includes property types from all packages from the same tenant.

In addition, you can retrieve a subset of all property types, according to the filter criteria provided. For a collective request for a set of property types, you have these options:

- You can restrict the set of property types to be retrieved by filter criteria based on the property type name, description, type, property length, quality code, and unit of measure.
- You can define that the set of matching property types shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/PropertyTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Parameters

None

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Type	Description
\$inlinecount	No	String	Total number of property types available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of thing types available. • If you use this with <code>\$filter</code> parameter, the result contains the total count of thing types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are name, description, type, property length, quality code, and unit of measure. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Type	Description
\$filter	No	String	Filter condition to be applied; the valid fields are name, description, type, property length, quality code, and unit of measure. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using <i>\$filter</i>.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are name, description, type, property length, quality code, and unit of measure.

Request Example

/ThingConfiguration/v1/PropertyTypes

Response

Response Status and Error Codes

Code	Description
200	Details of all property types retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
```

```

        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')",
        "type": "com.sap.apptot.PropertyType"
    },
    "Name": "core.automobiles:Temperature",
    "Description": "Temperature",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "C",
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
        }
    },
    "Values": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')/Values"
        }
    }
},
{
    "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')",
        "type": "com.sap.apptot.PropertyType"
    },
    "Name": "core.automobiles:Pressure",
    "Description": "Pressure",
    "Type": "String",
    "PropertyLength": "128",
    "QualityCode": "1",
    "UnitOfMeasure": "AA",
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')/Descriptions"
        }
    },
    "Values": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')/Values"
        }
    }
}
]
}
}

```

Related Information

[Property Type \[page 484\]](#)

8.2.6.4 Read all Property Types of a Package

With this method, you can retrieve all property types for the specified package.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingConfiguration/v1/Packages('package name')/PropertyTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Parameters

Parameter	Required	Data Type	Description
<code>package name</code>	Yes	String	Unique name of the package

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are name, description, type, property length, quality code, and unit of measure. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are name, description, type, property length, quality code, and unit of measure.
\$inlinecount	No	String	Total number of property types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <i>\$top</i> and <i>\$skip</i> parameters, the result contains the total count of property types available. • If you use this with <i>\$filter</i> parameter, the result contains the total count of property types based on the defined filter condition.

Parameter	Required	Type	Description
\$filter	No	String	Filter condition to be applied; valid fields are name, description, type, property length, quality code, and unit of measure. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or. You can use the string functions such as substringof, startswith, and endswith to search data using \$filter. Only valid field is name.

Request Example

```
/ThingConfiguration/v1/Packages('core.automobiles')/PropertyTypes
```

Response

Response Status and Error Codes

Code	Description
200	Details of property type of a specific package are retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/PropertyTypes('core.automobiles%3ATemperature')",
          "type": "com.sap.apptot.PropertyType"
        },

```

```

        "Name": "core.automobiles:Temperature",
        "Description": "Temperature",
        "Type": "String",
        "PropertyLength": "",
        "QualityCode": "1",
        "UnitOfMeasure": "C",
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')/Descriptions"
            }
        },
        "Values": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3ATemperature')/Values"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')",
            "type": "com.sap.apptot.PropertyType"
        },
        "Name": "core.automobiles:Pressure",
        "Description": "Pressure",
        "Type": "String",
        "PropertyLength": "",
        "QualityCode": "1",
        "UnitOfMeasure": "C",
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')/Descriptions"
            }
        },
        "Values": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3APressure')/Values"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AColor')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AColor')",
            "type": "com.sap.apptot.PropertyType"
        },
        "Name": "core.automobiles:Color",
        "Description": "Color",
        "Type": "String",
        "PropertyLength": "128",
        "QualityCode": "1",
        "UnitOfMeasure": "C",

```

```

        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AColor')/Descriptions"
            }
        },
        "Values": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AColor')/Values"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AFinish')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AFinish')",
            "type": "com.sap.apptot.PropertyType"
        },
        "Name": "core.automobiles:Finish",
        "Description": "Color",
        "Type": "String",
        "PropertyLength": "128",
        "QualityCode": "1",
        "UnitOfMeasure": "C",
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AFinish')/Descriptions"
            }
        },
        "Values": {
            "__deferred": {
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
PropertyTypes('core.automobiles%3AFinish')/Values"
            }
        }
    }
]
}
}

```

Related Information

[Property Type \[page 484\]](#)

8.2.6.5 Update a Property Type

With this method, you can update a property type.

The `ETag` value is mandatory to update a property type. You must retrieve the `ETag` value of the thing type using the `GET (/ThingConfiguration/v1/PropertyTypes('<property type name>'))` service. The

ETag value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the ETag value in the request header or if the ETag value is not correct, the server displays an error message.

- You can add, edit, or delete the following for a property type:
 - Data type
 - Length
 - Descriptions
 - Enumeration values
 - Description of enumeration values
 - Unit of measure
 - Quality code
- You cannot change the name of the property type using `PATCH` request.

Note

- You cannot update a property type if it is already reused in a property set type.
- After updating a property type, the system generates a new ETag value for the thing type and replaces the old value with the new value.

Request

URI: `/ThingConfiguration/v1/PropertyTypes('<property type name>')`

Operation Type: CRUD

HTTP Method: `PATCH`

Permissions: `<thingconf>.u`

Request Header Parameters

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific property type that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
property type name	Yes	String	Unique name of the property type.

Request Example

```
/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')
```

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

The following request payload is used to add new enumeration values `High` and `Medium` along with their descriptions for the property type `core.automobiles:Temperature`

```
{
  "Name": "core.automobiles:Temperature",
  "Type": "String",
  "Values": [{
    "Value": "High",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "High temperature"
    }]
  }, {
    "Value": "Medium",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Medium temperature"
    }]
  }],
  "UnitOfMeasure": "C",
  "QualityCode": "1"
}
```

Response

Response Headers

Name	Description
Etag	Identifies the updated thing type

Response Status and Error Codes

Code	Description
204	Property type updated successfully

Related Information

[Property Type \[page 484\]](#)

8.2.6.6 Delete a Property Type

With this method, you can delete the specified property type.

The ETag value is mandatory to delete a property type. You must retrieve the ETag value of the property type using the `GET (/ThingConfiguration/v1/PropertyTypes('<property type name>'))` service. The ETag value is assigned to the request header parameter `If-Match` in the `DELETE` request. If you do not include the ETag value in the request header or if the ETag value is not correct, the server displays an error message.

Note

You cannot delete a property type if it is already reused in a property set type.

Request

URI: `/ThingConfiguration/v1/PropertyTypes('<property type name>')`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<thingconf>.d`

Request Header Parameters

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific property type that is updated using the <code>DELETE</code> request.

Request Parameters

Parameter	Required	Data Type	Description
property type name	Yes	String	Unique name of the property type

Request Example

`/ThingConfiguration/v1/PropertyTypes('core.automobiles:Temperature')`

Response

Response Status and Error Codes

Code	Description
204	Property type deleted successfully

Related Information

[Property Type \[page 484\]](#)

8.2.7 Annotation

Annotation is an array of attributes used to qualify properties of a property set type. You can define annotations in a package and assign it only to property set types that belong to the same package. In addition to the annotations you defined, you can also assign the predefined annotations offered by SAP.

The following is the only supported predefined annotation for a property type:

- `com.sap.appiot.analytics:dimension`
 - You can assign this annotation only to the property types of the following predefined value data types:
 - String
 - ThingID
 - BPID
 - However, if you have assigned quality code to the property type of the predefined value data types listed above, you cannot assign the predefined annotation `com.sap.appiot.analytics:dimension`.

The following are the supported predefined annotations for a property set type:

- `com.sap.appiot.security:pii`
 - You can assign this annotation to a property set type that contains data to identify a person or subject. Data such as nick name, birthdate, and email address are few examples that can be categorized as data that identifies a person.
- `com.sap.appiot.security:spi`
 - You can assign this annotation to a property set type that contains critical data of a person. Data such as identification number, ethnic origin, and biometric data are few examples that can be categorized as critical data of a person.

i Note

- You cannot assign the predefined annotations for property set types of data category **ReferencePropertyData**. If the referred property set type is considered as personal information or sensitive personal information by assigning the predefined annotations (`com.sap.appiot.security:pii` and `com.sap.appiot.security:spi`), the reference property

data such as threshold values, unit of measure, and target values are also treated as personal information or sensitive personal information.

- You can assign multiple unique annotations for a property. However, you cannot assign the same annotation more than once for a property.

Resource Path: `http://<server address>[:<port number>][/path]/ThingConfiguration`

Example for a base URI in a cloud foundry environment: `https://config-thing-sap.cfapps.eu10.hana.ondemand.com/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
<i>POST</i>	Create Annotation [page 512]	<code>/v1/Packages('<package name>')/Annotations</code>	<code><thingconf>.c</code>
<i>GET</i>	Read Details of an Annotation [page 514]	<code>/v1/Annotations('<annotation name>')</code>	<code><thingconf>.r</code>
<i>GET</i>	Read all Annotations of a Package [page 516]	<code>/v1/Package('<package name>')/Annotations</code>	<code><thingconf>.r</code>
<i>PATCH</i>	Update an Annotation [page 519]	<code>/v1/Annotations('<annotation name>')</code>	<code><thingconf>.u</code>
<i>DELETE</i>	Delete an Annotation [page 521]	<code>/v1/Annotations('<annotation name>')</code>	<code><thingconf>.d</code>

Annotation Object Properties

Property	Data Type	Mandatory	Description
Name	String	Yes	Name of the annotation
Descriptions	Array	No	Description of the annotation for each language with the corresponding ISO language code

Description Object Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request

payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Data Protection and Privacy \[page 327\]](#)

8.2.7.1 Create Annotation

With this method, you can create annotation in the specified package.

i Note

In the configuration, you can define any number of annotations. However, you can create only one annotation per `POST` request. You can create more number of annotations for a package through multiple `POST` requests.

→ Recommendation

You can define up to 10 annotations for a package.

Naming convention

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Request

URI: `/ThingConfiguration/v1/Packages('<package name>')/Annotations`

Operation Type: CRUD

HTTP Method: *POST*

Permissions: `<thingconf>.c`

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Request Example

Format: *JSON*

`/ThingConfiguration/v1/Packages('core.automobiles')/Annotations`

```
{
  "Name": "core.automobiles:Pressure108",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Description of annotation in en"
    },
    {
      "LanguageCode": "de",
      "Description": "Description of annotation in de"
    }
  ]
}
```

```
}
```

Response

Response Status and Error Codes

Code	Description
201	Annotations created successfully.

Response Payload

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles%3APressure108')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles%3APressure108')",
      "type": "com.sap.apptot.Annotation"
    },
    "Name": "core.automobiles:Pressure108",
    "PackageName": "core.automobiles",
    "Description": "Description of annotation in en",
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles%3APressure108')/Descriptions"
      }
    }
  }
}
```

8.2.7.2 Read Details of an Annotation

With this method, you can retrieve details of the specified annotation.

Request

URI: /ThingConfiguration/v1/Annotations('<annotation name>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thingconf>.r

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the annotation

Request Example

```
/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')
```

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created annotation instance. The system generates a new value and replaces the old value every time the annotation is updated.

Response Status and Error Codes

Code	Description
200	Annotation retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples:

Request without the query parameter \$expand (/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')) returns the following response:

```
{
  "d": {
    "_metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')",
      "type": "com.sap.apptot.Annotation"
    },
    "Name": "core.automobiles:Pressure108",
    "PackageName": "core.automobiles",
    "Description": " Describes annotation in en ",
    "Descriptions": {
      "__deferred": {
```

```

      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')/Descriptions"
    }
  }
}

```

Request without the query parameter `$expand(/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')?&$expand=Descriptions)` returns the following response:

```

{
  "d": {
    "_metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')",
      "type": "com.sap.apptot.Annotation"
    },
    "Name": "core.automobiles:Pressure108",
    "PackageName": "core.automobiles",
    "Description": " Describes annotation in en ",
    "Descriptions": {
      "results": [
        {
          "_metadata": {
            "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Descriptions('en')",
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Descriptions('en')",
            "type": "com.sap.apptot.Description"
          },
          "LanguageCode": "en",
          "Description": " Describes annotation in en "
        },
        {
          "_metadata": {
            "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Descriptions('de')",
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
ThingConfiguration/v1/Descriptions('de')",
            "type": "com.sap.apptot.Description"
          },
          "LanguageCode": "de",
          "Description": "Describes annotation in de"
        }
      ]
    }
  }
}

```

8.2.7.3 Read all Annotations of a Package

With this method, you can retrieve all annotations of the specified package.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: /ThingConfiguration/v1/Package('<package name>')/Annotations

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thingconf>.r

Request Parameters

Parameter	Required	Data Type	Description
PackageName	Yes	String	Name of the package

Query Request Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$inlinecount	No	String	Total number of annotations available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of annotations available. • If you use this with \$filter parameter, the result contains the total count of annotations based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are name and description. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Type	Description
\$filter	No	String	Filter condition to be applied; valid fields are name and description. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Only valid field is annotation name.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are name, description, and package name.

Request Example

```
/ThingConfiguration/v1/Packages('core.automobiles')/Annotations
```

Response

Response Status and Error Codes

Code	Description
200	Annotations of the specified package retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles%3APressure108')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/Annotations('core.automobiles%3APressure108')",
        "type": "com.sap.apptot.Annotation"
      },
      "Name": "core.automobiles:Pressure108",
      "PackageName": "core.automobiles",
      "Description": " Describes annotation in en ",
      "Descriptions": {
        "__deferred": {
```

```

        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('core.automobiles%3APressure108')/Descriptions"
    }
},
{
    "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('core.automobiles%3APressure109')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('core.automobiles%3APressure109')",
        "type": "com.sap.apptot.Annotation"
    },
    "Name": "core.automobiles:Pressure109",
    "PackageName": "core.automobiles",
    "Description": " Describes annotation in en ",
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('core.automobiles%3APressure109')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('com.sap.apptot.analytics%3Adimension')",
        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('com.sap.apptot.analytics%3Adimension')",
        "type": "com.sap.apptot.Annotation"
    },
    "Name": "com.sap.apptot.analytics:dimension",
    "PackageName": "com.sap.apptot.analytics",
    "Description": null,
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v1/
Annotations('com.sap.apptot.analytics%3Adimension')/Descriptions"
        }
    }
}
]
}
}

```

8.2.7.4 Update an Annotation

With this method, you can update a specific annotation.

The **ETag** value is mandatory to update annotation. You must retrieve the **ETag** value of the annotation using the `GET(/ThingConfiguration/v1/Annotations('<annotation name>'))` service. The **ETag** value is assigned to the request header parameter **If-Match** in the **PATCH** request. If you do not include the **ETag** value in the request header or if the **ETag** value is not correct, the server displays an error message.

After updating annotation, the system generates a new ETag value for the annotation and replaces the old value with the new value.

Note

You cannot change the name of the annotation using `PATCH` request.

Request

URI: `/ThingConfiguration/v1/ Annotations('<annotation name>')`

Operation Type: CRUD

HTTP Method: `PATCH`

Permissions: `<thingconf>.u`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific annotation that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the annotation

Request Example

`/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')`

Payload

```
{
  "Name": "core.automobiles:Pressure108",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Describes annotation in en"
    },
    {
      "LanguageCode": "de",
      "Description": "Describes annotation in de"
    }
  ]
}
```

Note

You cannot update the annotation name using the `PATCH` request. The annotation name specified in the request payload is ignored for update.

Response

Response Status and Error Codes

Code	Description
204	Annotations updated successfully

8.2.7.5 Delete an Annotation

With this method, you can delete the specified annotation.

The `ETag` value is mandatory to delete annotation. You must retrieve the `ETag` value of the annotation using the `GET (/ThingConfiguration/v1/Annotations('<annotation name>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `ETag` value in the request header or if the `ETag` value is not correct, the server displays an error message.

Request

URI: `/ThingConfiguration/v1/Annotations('<annotation name>')`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<thingconf>.d`

Request Headers

Header	Required	Values
<code>If-Match</code>	Yes	Latest <code>ETag</code> value of a annotation that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
<code>Name</code>	Yes	String	Unique name of the annotation

Request Example

```
/ThingConfiguration/v1/Annotations('core.automobiles:Pressure108')
```

Response

Response Status and Error Codes

Code	Description
204	Annotation deleted successfully

8.3 Event Configuration

Overview

With the event configuration service, you can create user-defined event types. The service provides a framework to design the user-defined event types containing all required information for IoT scenario. The event configuration service uses the package to define the metadata objects such as event type, event property set type, status, severity, and code. These objects are used to store event data. You can create event property set type with properties and also assign a event property set type as property set to an event type.

You can use the event configuration service to perform the following:

- Configure user-defined event types along with their attributes
- Create events based on the predefined and user-defined event types
- Retrieve event details for a specific event type

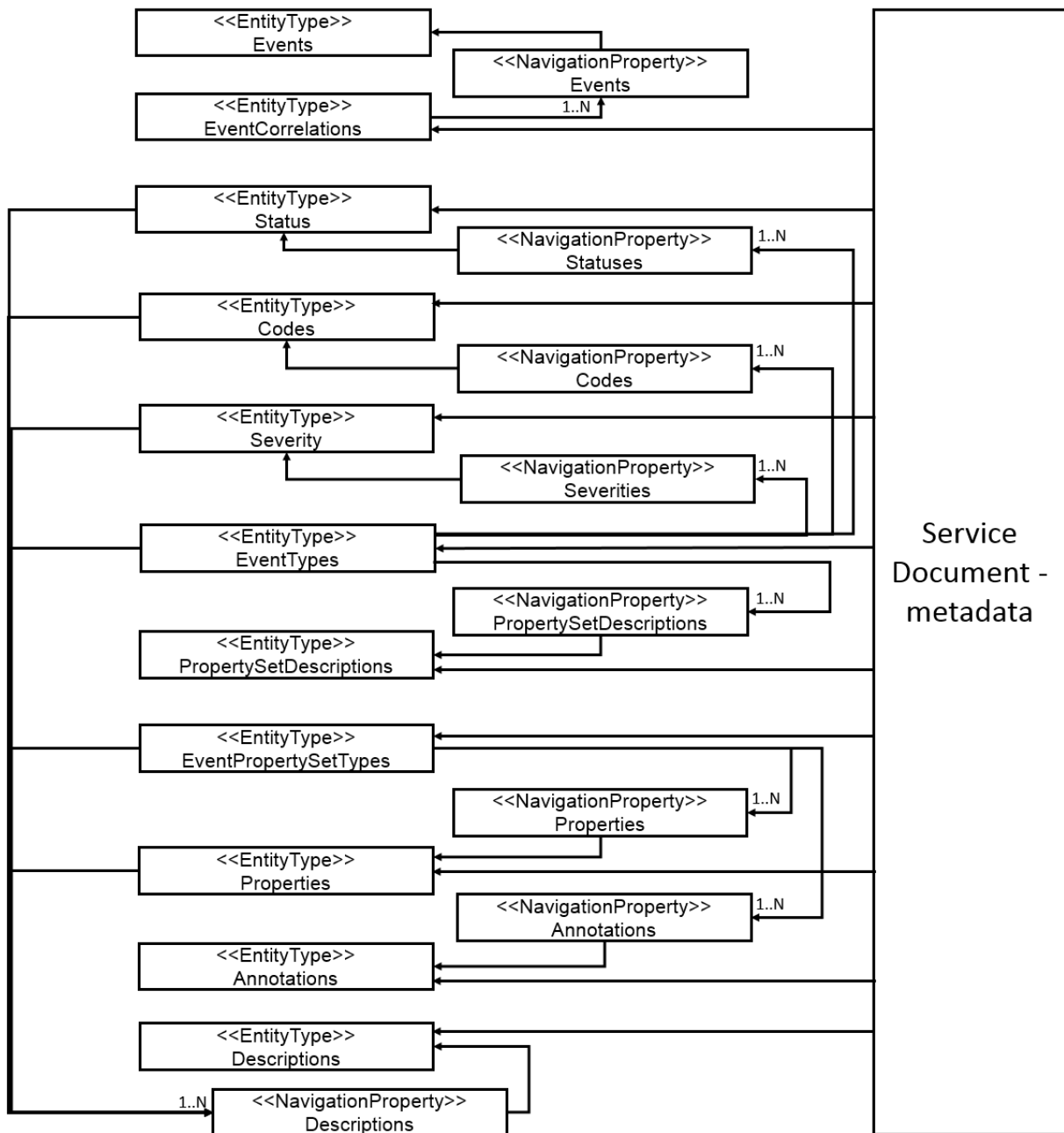
You can create event types with one of the following states:

- **Mutable:** You can delete events that are created based on an event type with `EventTypeState=Mutable`.
- **Immutable:** You cannot delete events that are created based on an event type with `EventTypeState=Immutable`.

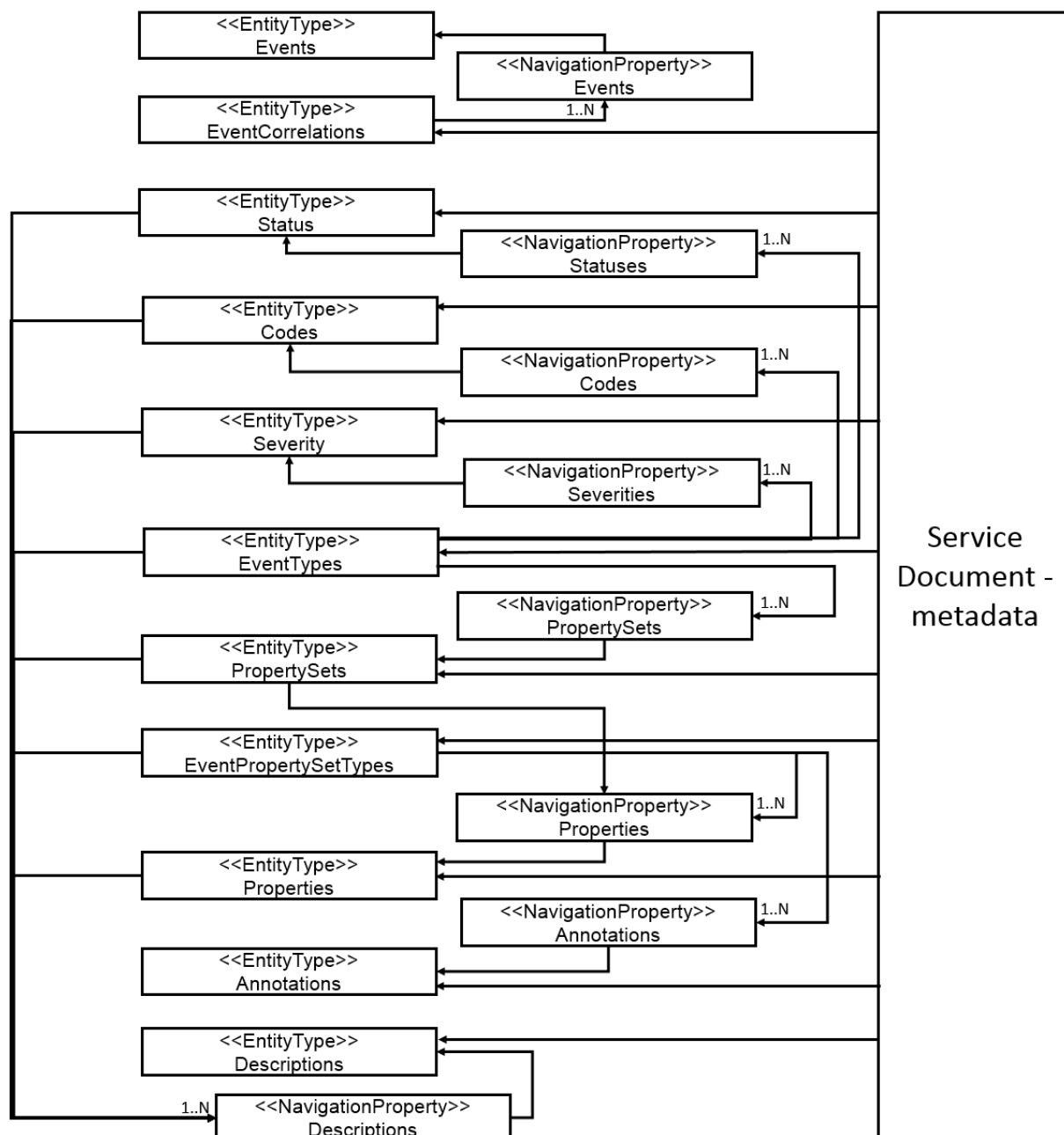
There are two different versions of this service. Using version /v1, you can create event type with only one property set. Using version /v2, you can create event type with multiple property sets.

Entity Data Model

The following diagram shows the EDM of the Event Configuration service (/v1 version):



The following diagram shows the EDM of the Event Configuration service (/v2 version):



Service Metadata URI:

- Event type with single event property set [http://<server address>\[:<port number>\]/ES/v1/\\$metadata](http://<server address>[:<port number>]/ES/v1/$metadata)
- Event type with multiple event property sets: [http://<server address>\[:<port number>\]/ES/v2/\\$metadata](http://<server address>[:<port number>]/ES/v2/$metadata)

Resources

Resource	Description	Path
Event Type with Single Event Property Set [page 525]	Event Type	/v1/EventTypes
Event Type with Multiple Event Property Sets [page 570]	Event Type	/v2/EventTypes
Event Property Set Type [page 615]	Event Property Set Type	/v1/EventPropertySetTypes
User-defined Events (/v1 version) [page 1211]	Events	/ES/EventType/<event type name>/v1/Events
User-defined Events (/v2 version) [page 1249]	Events	/ES/EventType/<event type name>/v2/Events

8.3.1 Event Type with Single Event Property Set

In this section, you will see the methods using which you can create, read, update, or delete an event type with only one event property set.

Resource Path: `http://<server address>[:<port number>][/path]/ES/v1`

Example for a base URI in a cloud foundry environment: `https://events-sap.cfapps.eu10.hana.ondemand.com/ES`

Note

`com.sap.apptot.eventtypes.StandardEventType` is a predefined event type delivered by SAP. The values for the property such as `EventStatus` and `EventSeverity` are already defined and you cannot assign different values for these properties. You cannot retrieve the configuration details of the predefined event type using the methods described in this chapter. For example, you cannot retrieve the statuses, severities, or codes of the predefined event type. Similarly, you cannot update or delete the predefined event type.

Only the following values are supported for `EventStatus` of a predefined event type:

- *Open*
- *InProcess*
- *Completed*

Only values *1*, *2*, and *3* are supported for `EventSeverity` of a predefined event type. The values correspond to the descriptions **High**, **Medium**, and **Low**, respectively.

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create Event Type [page 535]	/ES/v1/EventTypes	<tde>.c
GET	Read Details of an Event Type [page 540]	/ES/v1/EventTypes ('<event type name>')	<tde>.r
GET	Read Statuses of an Event Type [page 542]	/ES/v1/EventTypes ('<event type name>')/Statuses	<tde>.r
GET	Read Severities of an Event Type [page 546]	/ES/v1/EventTypes ('<event type name>')/Severities	<tde>.r
GET	Read Codes of an Event Type [page 549]	/ES/v1/EventTypes ('<event type name>')/Codes	<tde>.r
GET	Read all Event Types [page 551]	/ES/v1/EventTypes	<tde>.r
GET	Read Statuses of all Event Types [page 555]	/ES/v1/EventTypes?\$expand=Statuses	<tde>.r
GET	Read Severities of all Event Types [page 559]	/ES/v1/EventTypes?\$expand=Severities	<tde>.r
GET	Read Codes of all Event Types [page 562]	/ES/v1/EventTypes?\$expand=Codes	<tde>.r
PATCH	Update an Event Type [page 566]	/ES/v1/EventTypes ('<event type name>')	<tde>.u
DELETE	Delete an Event Type [page 569]	/ES/v1/EventTypes ('<event type name>')	<tde>.d

Event Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes		Name of the event type
Descriptions	Array of description objects	No	-	Description of the event type
PackageName	String	Yes	50	Name of the package for which the event types are configured
PropertySetID	String	Yes	30	Name of the property set
PropertySetType	String	Yes	81	Name of the property set type
PropertySetDescriptions	Array of description objects	No	-	Description of the property set for each language with the corresponding ISO language code

Property	Type	Mandatory	Maximum Length	Description
EventTypeState	String	No	Fixed	State of the event. The possible values are <i>Mutable</i> and <i>Immutable</i> . Default value is <i>Immutable</i> .
Statuses	Array of event status objects	Yes	-	Status of the event
Severities	Array of event severity objects	Yes	-	Severity of the event
Codes	Array of event code objects	Yes	-	Code of the event

Statuses Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventStatus	String	No	50	Status of the event
Descriptions	Array of description objects	No	-	Description of the event status

Severities Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventSeverity	Integer	No	-	Severity of the event
Descriptions	Array of description objects	No	-	Description of the event severity

Codes Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventCode	String	No	50	Code of the event
Descriptions	Array of description objects	No	-	Description of the event code

PropertySetDescriptions and Descriptions Object Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Event Property Set Type \[page 615\]](#)

[User-defined Events \(/v1 version\) \[page 1211\]](#)

8.3.1.1 Read Metadata of Event Configuration

With this method, you can retrieve the metadata of event configuration.

Request

URI: /ES/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Request Example

`/ES/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Event configuration metadata retrieved successfully.

Payload

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.appiot.es" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="Status">
        <Key>
          <PropertyRef Name="EventStatus"></PropertyRef>
        </Key>
        <Property Name="EventStatus" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.Status_Description" FromRole="Statuses"
ToRole="Descriptions"></NavigationProperty>
      </EntityType>
      <EntityType Name="Annotations">
        <Key>
          <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <LongDescription>Name of Annotation</LongDescription>
          </Documentation>
        </Property>
        <Property Name="PackageName" Type="Edm.String" Nullable="true"
MaxLength="50" sap:creatable="false" sap:updatable="false">
          <Documentation>
            <LongDescription>Package Name</LongDescription>
          </Documentation>
        </Property>
      </EntityType>
    </Schema>
  </DataServices>
</edmx:Edmx>
```

```

        </Property>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="Properties">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
            <PropertyRef Name="PropertySetType"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="Type" Type="Edm.String"></Property>
        <Property Name="PropertyLength" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Property_Description" FromRole="Properties"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="PropertySetId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <Property Name="EventTypeState" Type="Edm.String"></Property>
        <NavigationProperty Name="PropertySetDescriptions"
Relationship="com.sap.apptot.es.EventType_PropertySetDescription"
FromRole="EventTypes" ToRole="PropertySetDescriptions"></NavigationProperty>
        <NavigationProperty Name="Statuses"
Relationship="com.sap.apptot.es.EventType_Status" FromRole="EventTypes"
ToRole="Statuses"></NavigationProperty>
        <NavigationProperty Name="Severities"
Relationship="com.sap.apptot.es.EventType_Severity" FromRole="EventTypes"
ToRole="Severities"></NavigationProperty>
        <NavigationProperty Name="Codes"
Relationship="com.sap.apptot.es.EventType_Code" FromRole="EventTypes"
ToRole="Codes"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.EventType_Description" FromRole="EventTypes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventCorrelations">
        <Key>
            <PropertyRef Name="CorrelationId"></PropertyRef>
        </Key>
        <Property Name="CorrelationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Event Correlation ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
        <NavigationProperty Name="Events"
Relationship="com.sap.apptot.es.EventCorrelation_Event"
FromRole="EventCorrelations" ToRole="Events"></NavigationProperty>
    </EntityType>
    <EntityType Name="PropertySetDescriptions">
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>

```



```

        <Property Name="LanguageCode" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Language Code</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String">
            <Documentation>
                <LongDescription>Description</LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <EntityType Name="EventPropertySetTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="DataCategory" Type="Edm.String"></Property>
        <Property Name="Language" Type="Edm.String"></Property>
        <Property Name="PropertySetTypeDescription" Type="Edm.String"></
Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.apptot.es.EventPropertySetType_Property"
FromRole="EventPropertySetTypes" ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.EventPropertySetType_Description"
FromRole="EventPropertySetTypes" ToRole="Descriptions"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="Descriptions">
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String">
            <Documentation>
                <LongDescription>Language Code</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String">
            <Documentation>
                <LongDescription>Description</LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <EntityType Name="Severity">
        <Key>
            <PropertyRef Name="EventSeverity"></PropertyRef>
        </Key>
        <Property Name="EventSeverity" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Severity_Description" FromRole="Severities"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Events">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Event unique ID</LongDescription>
            </Documentation>
        </Property>

```

```

        <Property Name="CorrelationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Event Correlation ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
        <Property Name="Type" Type="Edm.String"></Property>
        <Property Name="EventType" Type="Edm.String"></Property>
        <Property Name="EventStatus" Type="Edm.String"></Property>
        <Property Name="EventSeverity" Type="Edm.Int64"></Property>
        <Property Name="EventCode" Type="Edm.String"></Property>
        <Property Name="EventSource" Type="Edm.String"></Property>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="ThingProperty" Type="Edm.String"></Property>
        <Property Name="ExternalId" Type="Edm.String"></Property>
        <Property Name="EventInfo" Type="Edm.String"></Property>
    </EntityType>
    <EntityType Name="Codes">
        <Key>
            <PropertyRef Name="EventCode"></PropertyRef>
        </Key>
        <Property Name="EventCode" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.Code_Description" FromRole="Codes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <Association Name="EventPropertySetType_Annotation">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Annotations" Multiplicity="*"
Role="Annotations"></End>
    </Association>
    <Association Name="Property_Description">
        <End Type="com.sap.appiot.es.Property" Multiplicity="1"
Role="Properties"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Severity_Description">
        <End Type="com.sap.appiot.es.Severity" Multiplicity="1"
Role="Severities"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_Code">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Code" Multiplicity="*"
Role="Codes"></End>
    </Association>
    <Association Name="EventPropertySetType_Property">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventType_Status">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Status" Multiplicity="*"
Role="Statuses"></End>
    </Association>
    <Association Name="EventCorrelation_Event">
        <End Type="com.sap.appiot.es.EventCorrelation" Multiplicity="1"
Role="EventCorrelations"></End>

```

```

        <End Type="com.sap.appiot.es.Event" Multiplicity="*"
Role="Events"></End>
    </Association>
    <Association Name="EventType_Description">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_Severity">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Severity" Multiplicity="*"
Role="Severities"></End>
    </Association>
    <Association Name="Status_Description">
        <End Type="com.sap.appiot.es.Status" Multiplicity="1"
Role="Statuses"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Code_Description">
        <End Type="com.sap.appiot.es.Code" Multiplicity="1"
Role="Codes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventPropertySetType_Description">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_PropertySetDescription">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.PropertySetDescription"
Multiplicity="*" Role="PropertySetDescriptions"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Statuses"
EntityType="com.sap.appiot.es.Status"></EntitySet>
        <EntitySet Name="Annotations"
EntityType="com.sap.appiot.es.Annotations"></EntitySet>
        <EntitySet Name="Properties"
EntityType="com.sap.appiot.es.Property"></EntitySet>
        <EntitySet Name="EventTypes"
EntityType="com.sap.appiot.es.EventType"></EntitySet>
        <EntitySet Name="EventCorrelations"
EntityType="com.sap.appiot.es.EventCorrelation"></EntitySet>
        <EntitySet Name="PropertySetDescriptions"
EntityType="com.sap.appiot.es.PropertySetDescription"></EntitySet>
        <EntitySet Name="EventPropertySetTypes"
EntityType="com.sap.appiot.es.EventPropertySetType"></EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.es.Description"></EntitySet>
        <EntitySet Name="Severities"
EntityType="com.sap.appiot.es.Severity"></EntitySet>
        <EntitySet Name="Events" EntityType="com.sap.appiot.es.Event"></
EntitySet>
        <EntitySet Name="Codes" EntityType="com.sap.appiot.es.Code"></
EntitySet>
        <AssociationSet Name="EventPropertySetType_Annotation"
Association="com.sap.appiot.es.EventPropertySetType_Annotation">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Annotations" Role="Annotations"></End>

```

```

        </AssociationSet>
        <AssociationSet Name="Property_Description"
Association="com.sap.apptot.es.Property_Description">
            <End EntitySet="Properties" Role="Properties"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Severity_Description"
Association="com.sap.apptot.es.Severity_Description">
            <End EntitySet="Severities" Role="Severities"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Code"
Association="com.sap.apptot.es.EventType_Code">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Codes" Role="Codes"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Property"
Association="com.sap.apptot.es.EventPropertySetType_Property">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Properties" Role="Properties"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Status"
Association="com.sap.apptot.es.EventType_Status">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Statuses" Role="Statuses"></End>
        </AssociationSet>
        <AssociationSet Name="EventCorrelation_Event"
Association="com.sap.apptot.es.EventCorrelation_Event">
            <End EntitySet="EventCorrelations"
Role="EventCorrelations"></End>
            <End EntitySet="Events" Role="Events"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Description"
Association="com.sap.apptot.es.EventType_Description">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Severity"
Association="com.sap.apptot.es.EventType_Severity">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Severities" Role="Severities"></End>
        </AssociationSet>
        <AssociationSet Name="Status_Description"
Association="com.sap.apptot.es.Status_Description">
            <End EntitySet="Statuses" Role="Statuses"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Code_Description"
Association="com.sap.apptot.es.Code_Description">
            <End EntitySet="Codes" Role="Codes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Description"
Association="com.sap.apptot.es.EventPropertySetType_Description">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_PropertySetDescription"
Association="com.sap.apptot.es.EventType_PropertySetDescription">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="PropertySetDescriptions"
Role="PropertySetDescriptions"></End>
        </AssociationSet>
    </EntityContainer>
</Schema>
</edmx:DataServices>

```

```
</edmx:Edmx>
```

Related Information

[Event Configuration \[page 522\]](#)

8.3.1.2 Create Event Type

Configure user-defined event types

The event type configuration definition must contain at least one event type and event property set. You must associate only one event property set type as property set for an event type. An event type cannot have multiple property sets. The fields *EventStatus*, *EventSeverity*, and *EventCode* are optional. However, if you define enumeration values for these fields while creating an event type, you must assign only one of these defined enumeration values for these fields while creating an event. If you assign different values, the system displays an error message.

Note

To indicate that the fields *EventStatus*, *EventSeverity*, and *EventCode* are optional, you must include them with an empty array in the request payload.

Naming convention for event type

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Naming convention for property set

- Only the following characters are supported:
 - Uppercase and lowercase alphabets *a* through *z* and *A* through *Z*
 - Numeric digits *0* through *9*
 - Punctuation marks underscore (*_*), hyphen (*-*), colon (*:*), and full-stop (*.*)
- Maximum length is 30 characters.

Request

URI: /ES/v1/EventTypes

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <td>.c

Request Parameters

None

Request Example

/ES/v1/EventTypes

Payload

Format: *JSON*

Example 1

The following request payload is used to create an event type. As the property `EventTypeState` is not specified in this payload, all events created using this event type are immutable.

```
{
  "Name": "core.automobiles:ExceededTemperature",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Event type for exceeded temperature"
  },
  {
    "LanguageCode": "de",
    "Description": "Ereignistyp für überschrittene Temperatur"
  }
],
  "PackageName": "core.automobiles",
  "PropertySetId": "EngineTemp",
  "PropertySetType": "core.automobiles:Engine",
  "PropertySetDescriptions": [{
    "LanguageCode": "en",
    "Description": "Engine property set type"
  }],
  "Statuses": [{
    "EventStatus": "Open",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Open Status"
    }]
  },
  {
    "EventStatus": "InProgress",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "In process Status"
    }]
  }
],
}
```

```

    {
      "EventStatus": "Completed",
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Completed Status"
      }]
    }
  ],
  "Severities": [{
    "EventSeverity": 1,
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "High"
    }]
  },
  {
    "EventSeverity": 2,
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Medium"
    }]
  },
  {
    "EventSeverity": 3,
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Low"
    }]
  }
],
"Codes": [{
  "EventCode": "EQ12",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Event Code 12"
  }]
}]
}]
}

```

Example 2

The following request payload is to create an event type. As the property `EventTypeState="Mutable"` is specified in this payload, all events created using this event type are mutable.

```

{
  "Name": "core.automobiles:ExceededPressure",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Event type for exceeded pressure"
  }]
},
"PackageName": "core.automobiles",
"EventTypeState": "Mutable",
"PropertySetId": "WheelPressure",
"PropertySetType": "core.automobiles:Wheel",
"PropertySetDescriptions": [{
  "LanguageCode": "en",
  "Description": "Wheel property set type"
}],
"Statuses": [{
  "EventStatus": "Open",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Open Status"
  }]
}],
}

```

```

        "EventStatus": "InProgress",
        "Descriptions": [{
            "LanguageCode": "en",
            "Description": "In process Status"
        }]
    },
    {
        "EventStatus": "Completed",
        "Descriptions": [{
            "LanguageCode": "en",
            "Description": "Completed Status"
        }]
    }
],
"Severities": [{
    "EventSeverity": 1,
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "High"
    }]
},
{
    "EventSeverity": 2,
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Medium"
    }]
},
{
    "EventSeverity": 3,
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Low"
    }]
}
],
"Codes": [{
    "EventCode": "EQ12",
    "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Event Code 12"
    }]
}]
}]
}

```

Response

Response Status and Error Codes

Code	Description
201	Event type created successfully

Payload

Format: *JSON*

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

The following is the response payload after creating an event type

`core.automobiles:ExceededTemperature`.

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
      "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemperature",
    "PackageName": "core.bbautomobiles",
    "EventTypeState": "",
    "PropertySetId": "EngineTemp",
    "PropertySetType": "core.automobiles:Engine",
    "LanguageCode": "",
    "Description": "",
    "PropertySetDescriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/PropertySetDescriptions"
      }
    },
    "Statuses": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Statuses"
      }
    },
    "Severities": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Severities"
      }
    },
    "Codes": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Codes"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Descriptions"
      }
    }
  }
}
```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.3 Read Details of an Event Type

With this method, you can retrieve the details of the specified event type.

Request

URI: `/ES/v1/EventTypes('<event type name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the event type

Request Example

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')
```

Retrieves details of the event type `core.automobiles:ExceededTemperature`

Response

Response Status and Error Codes

Code	Description
200	Details of the event type are retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples.

Example 1

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')
```

```
{
  "d": {
    "__metadata": {
```

```

      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventTypes('core.automobiles%3AExceededTemperature')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventTypes('core.automobiles%3AExceededTemperature')",
      "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemperature",
    "PackageName": "core.automobiles",
    "EventTypeState": "",
    "PropertySetId": "EngineTemp",
    "PropertySetType": "core.automobiles:Temperature",
    "LanguageCode": "",
    "Description": "",
    "PropertySetDescriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/
PropertySetDescriptions"
      }
    },
    "Statuses": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Statuses"
      }
    },
    "Severities": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Severities"
      }
    },
    "Codes": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Codes"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')/Descriptions"
      }
    }
  }
}

```

Example 2

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Descriptions

Retrieves descriptions of the specified event type

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Descriptions('en')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Descriptions('en')",
          "type": "com.sap.apptot.es.Descriptions"
        },
        "LanguageCode": "en",
        "Description": "Event type for exceeded temperature"
      }
    ]
  }
}

```

```

    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('de')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('de')",
        "type": "com.sap.apptot.es.Descriptions"
      },
      "LanguageCode": "de",
      "Description": "Ereignistyp für überschrittene Temperatur"
    }
  ]
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.4 Read Statuses of an Event Type

With this method, you can retrieve statuses of the specified event type.

Request

URI: /ES/v1/EventTypes('<event type name>')/Statuses

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <td>.r

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the event type

Request Example

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Statuses

Response

Response Status and Error Codes

Code	Description
200	Statuses of the specified event type retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples.

Example 1

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Statuses

Retrieves statuses of the specified event type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Open')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Open')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "Open",
        "LanguageCode": "en",
        "Description": "Open Status",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Open')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('InProgress')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('InProgress')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "InProgress",
        "LanguageCode": "en",
        "Description": "In process Status",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('InProgress')/Descriptions"
          }
        }
      }
    ]
  }
}
```

```

        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Completed')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Completed')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "Completed",
        "LanguageCode": "en",
        "Description": "Completed Status",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Completed')/Descriptions"
          }
        }
      }
    ]
  }
}

```

Example 2

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Statuses?
\$expand=Descriptions

Retrieves statuses along with the expanded list of descriptions for the specified event type

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Open')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('Open')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "Open",
        "LanguageCode": null,
        "Description": null,
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
                "type": "com.sap.apptot.es.Descriptions"
              },
              "LanguageCode": "en",
              "Description": "Open Status"
            }
          ]
        }
      }
    ],
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('InProgress')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Statuses('InProgress')",
        "type": "com.sap.apptot.es.Status"
      },
      "EventStatus": "InProgress",

```

```

    "LanguageCode": null,
    "Description": null,
    "Descriptions": {
      "results": [
        {
          "__metadata": {
            "id": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
            "type": "com.sap.apptot.es.Descriptions"
          },
          "LanguageCode": "en",
          "Description": "In process Status"
        }
      ]
    }
  },
  {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Statuses('Completed')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Statuses('Completed')",
      "type": "com.sap.apptot.es.Status"
    },
    "EventStatus": "Completed",
    "LanguageCode": null,
    "Description": null,
    "Descriptions": {
      "results": [
        {
          "__metadata": {
            "id": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
            "type": "com.sap.apptot.es.Descriptions"
          },
          "LanguageCode": "en",
          "Description": "Completed Status"
        }
      ]
    }
  }
]
}

```

Related Information

Event Type with Single Event Property Set [page 525]

8.3.1.5 Read Severities of an Event Type

With this method, you can retrieve severities of the specified event type.

Request

URI: `/ES/v1/EventTypes('<event type name>')/Severities`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<tde>.r`

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Request Example

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Severities
```

Response

Response Status and Error Codes

Code	Description
200	Severities of the specified event type retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

Example 1

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Severities
```

Retrieves severities of the specified event type

```
{
  "d": {
    "results": [
      {
```



```

      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')",
        "type": "com.sap.apptot.es.Severity"
      },
      "EventSeverity": "1",
      "LanguageCode": "en",
      "Description": "High",
      "Descriptions": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')/Descriptions"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')",
        "type": "com.sap.apptot.es.Severity"
      },
      "EventSeverity": "2",
      "LanguageCode": "en",
      "Description": "Medium",
      "Descriptions": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')/Descriptions"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')",
        "type": "com.sap.apptot.es.Severity"
      },
      "EventSeverity": "3",
      "LanguageCode": "en",
      "Description": "Low",
      "Descriptions": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')/Descriptions"
        }
      }
    }
  ]
}

```

Example 2

```

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Severities?
$expand=Descriptions

```

Retrieves severities along with the expanded list of descriptions for the specified event type

```

{
  "d": {
    "results": [

```

```

{
  "__metadata": {
    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')",
    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')",
    "type": "com.sap.apptot.es.Severity"
  },
  "EventSeverity": "1",
  "LanguageCode": "en",
  "Description": "High",
  "Descriptions": {
    "__deferred": {
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('1')/Descriptions"
    }
  }
},
{
  "__metadata": {
    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')",
    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')",
    "type": "com.sap.apptot.es.Severity"
  },
  "EventSeverity": "2",
  "LanguageCode": "en",
  "Description": "Medium",
  "Descriptions": {
    "__deferred": {
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('2')/Descriptions"
    }
  }
},
{
  "__metadata": {
    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')",
    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')",
    "type": "com.sap.apptot.es.Severity"
  },
  "EventSeverity": "3",
  "LanguageCode": "en",
  "Description": "Low",
  "Descriptions": {
    "__deferred": {
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Severities('3')/Descriptions"
    }
  }
}
]
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.6 Read Codes of an Event Type

With this method, you can retrieve codes of the specified event type.

Request

URI: `/ES/v1/EventTypes('<event type name>')/Codes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Request Example

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Codes
```

Response

Response Status and Error Codes

Code	Description
200	Codes of the specified event type retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

Example 1

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Codes
```

Retrieves codes of the specified event type

```
{
  "d": {
    "results": [
      {
```

```

        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Codes('EQ12')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Codes('EQ12')",
          "type": "com.sap.apptot.es.Codes"
        },
        "EventCode": "EQ12",
        "LanguageCode": "en",
        "Description": "Event Code 12",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Codes('EQ12')/Descriptions"
          }
        }
      }
    ]
  }
}

```

Example 2

/ES/v1/EventTypes('core.automobiles:ExceededTemperature')/Codes?
\$expand=Descriptions

Retrieves codes along with its expanded list of descriptions for the specified event type.

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Codes('EQ12')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Codes('EQ12')",
          "type": "com.sap.apptot.es.Codes"
        },
        "EventCode": "EQ12",
        "LanguageCode": null,
        "Description": null,
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
                "type": "com.sap.apptot.es.Descriptions"
              },
              "LanguageCode": "en",
              "Description": "Event Code 12"
            }
          ]
        }
      }
    ]
  }
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.7 Read all Event Types

Retrieves a list of event types from the database

With this method, you send a request to the server to retrieve a subset of all event types, according to the filter criteria provided. You can restrict the set of event types to be retrieved by filter criteria based on the event type name, package name, property type name, and property set type name.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$inlinecount	String	No	Total number of event types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of event types available. • If you use this with \$filter parameter, the result contains the total count of event types based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>.
\$filter	String	No	Filter condition to be applied; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>.

Request Example

/ES/v1/EventTypes

Retrieves all event types to which the user has access authorization

Response

Response Status and Error Codes

Code	Description
200	Retrieved all event types successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

Example 1

/ES/v1/EventTypes

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "type": "com.sap.apptot.es.EventTypes"
      },
      "Name": "core.automobiles:ExceededPressure",
      "PackageName": "core.automobiles",
      "EventTypeState": "Mutable",
      "PropertySetId": "WheelPressure",
      "PropertySetType": "core.automobiles:Wheel",
      "LanguageCode": "en",
      "Description": "Event type for exceeded pressure",
      "PropertySetDescriptions": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/PropertySetDescriptions"
        }
      },
      "Statuses": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/Statuses"
        }
      },
      "Severities": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/Severities"
        }
      },
      "Codes": {
        "__deferred": {
```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Codes"
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Descriptions"
        }
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
            "type": "com.sap.apptot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededTemperature",
        "PackageName": "core.automobiles",
        "EventTypeState": "",
        "PropertySetId": "EngineTemp",
        "PropertySetType": "core.automobiles:Engine",
        "LanguageCode": "en",
        "Description": "Event type for exceeded temperature",
        "PropertySetDescriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/PropertySetDescriptions"
            }
        },
        "Statuses": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Statuses"
            }
        },
        "Severities": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Severities"
            }
        },
        "Codes": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Codes"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Descriptions"
            }
        }
    }
}
]
}
}

```


Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.8 Read Statuses of all Event Types

With this method, you can retrieve statuses of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventTypes?$expand=Statuses`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Request Example

`/ES/v1/EventTypes?$expand=Statuses`

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus .

Response

Response Status and Error Codes

Code	Description
200	Statuses of all event types retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededPressure",
    "PackageName": "core.automobiles",
    "PropertySetId": "WheelPressure",
    "PropertySetType": "core.automobiles:Wheel",
    "LanguageCode": "en",
    "Description": "Event type for exceeded pressure",
    "PropertySetDescriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/PropertySetDescriptions"
        }
    },
    "Statuses": {
        "results": [{
            "EventStatus": "Open",
            "LanguageCode": "en",
            "Description": "Open Status"
        },
        {
            "EventStatus": "InProgress",
            "LanguageCode": "en",
            "Description": "In process Status"
        },
        {
            "EventStatus": "Completed",
            "LanguageCode": "en",
            "Description": "Completed Status"
        }
    ]
    },
    "Severities": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Severities"
        }
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemperature",
    "PackageName": "core.automobiles",
    "PropertySetId": "EngineTemp",

```

```

        "PropertySetType": "core.automobiles:Engine",
        "LanguageCode": "en",
        "Description": "Event type for exceeded temperature",
        "PropertySetDescriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/PropertySetDescriptions"
            }
        },
        "Statuses": {
            "results": [{
                "EventStatus": "InProgress",
                "LanguageCode": "en",
                "Description": "In process Status"
            },
            {
                "EventStatus": "Completed",
                "LanguageCode": "en",
                "Description": "Completed Status"
            },
            {
                "EventStatus": "Open",
                "LanguageCode": "en",
                "Description": "Open Status"
            }
        ]
    },
    "Severities": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Severities"
        }
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Descriptions"
        }
    }
}
]
}
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.9 Read Severities of all Event Types

With this method, you can retrieve severities of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventTypes?$expand=Severities`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.
<code>\$orderby</code>	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity . To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Type	Required	Description
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity .

Request Example

```
/ES/v1/EventTypes?$expand=Severities
```

Response

Response Status and Error Codes

Code	Description
200	Severities of all event types are retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "type": "com.sap.apptot.es.EventTypes"
      },
      "Name": "core.automobiles:ExceededPressure",
      "PackageName": "core.automobiles",
      "PropertySetId": "WheelPressure",
      "PropertySetType": "core.automobiles:Wheel",
      "LanguageCode": "en",
      "Description": "Event type for exceeded pressure",
      "PropertySetDescriptions": {
        "__deferred": {
```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/PropertySetDescriptions"
    },
    "Statuses": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Statuses"
        }
    },
    "Severities": {
        "results": [{
            "EventSeverity": "1",
            "LanguageCode": "en",
            "Description": "High"
        },
        {
            "EventSeverity": "2",
            "LanguageCode": "en",
            "Description": "Medium"
        },
        {
            "EventSeverity": "3",
            "LanguageCode": "en",
            "Description": "Low"
        }
    ]
},
"Codes": {
    "__deferred": {
        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Codes"
    }
},
"Descriptions": {
    "__deferred": {
        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Descriptions"
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemperature",
    "PackageName": "core.automobiles",
    "PropertySetId": "EngineTemp",
    "PropertySetType": "core.automobiles:Engine",
    "LanguageCode": "en",
    "Description": "Event type for exceeded temperature",
    "PropertySetDescriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/PropertySetDescriptions"
        }
    },
    "Statuses": {
        "__deferred": {

```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Statuses"
    },
    "Severities": {
        "results": [{
            "EventSeverity": "1",
            "LanguageCode": "en",
            "Description": "High"
        },
        {
            "EventSeverity": "2",
            "LanguageCode": "en",
            "Description": "Medium"
        },
        {
            "EventSeverity": "3",
            "LanguageCode": "en",
            "Description": "Low"
        }
    ]
},
"Codes": {
    "__deferred": {
        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Codes"
    }
},
"Descriptions": {
    "__deferred": {
        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Descriptions"
    }
}
}
]
}
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.10 Read Codes of all Event Types

With this method, you can retrieve codes of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `ES/v1/EventTypes?$expand=Codes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set.
\$skip	Integer	No	Number of records to exclude from the result set.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode .

Request Example

`ES/v1/EventTypes?$expand=Codes`

Response

Response Status and Error Codes

Code	Description
200	Codes of all event types retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')",
        "type": "com.sap.apptot.es.EventTypes"
      },
      "Name": "core.automobiles:ExceededPressure",
      "PackageName": "core.bbautomobiles",
      "PropertySetId": "WheelPressure",
      "PropertySetType": "core.automobiles:Wheel",
      "LanguageCode": "en",
      "Description": "Event type for exceeded pressure",
      "PropertySetDescriptions": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/PropertySetDescriptions"
        }
      },
      "Statuses": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/Statuses"
        }
      },
      "Severities": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles%3AExceededPressure')/Severities"
        }
      },
      "Codes": {
        "results": [{
          "EventCode": "EQ12",
          "LanguageCode": "en",
          "Description": "Event Code 12"
        }]
      },
      "Descriptions": {
        "__deferred": {
```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededPressure')/Descriptions"
    }
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventTypes('core.automobiles%3AExceededTemperature')",
            "type": "com.sap.apptot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededTemperature",
        "PackageName": "core.automobiles",
        "PropertySetId": "EngineTemp",
        "PropertySetType": "core.automobiles:Engine",
        "LanguageCode": "en",
        "Description": "Event type for exceeded temperature",
        "PropertySetDescriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/PropertySetDescriptions"
            }
        },
        "Statuses": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Statuses"
            }
        },
        "Severities": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Severities"
            }
        },
        "Codes": {
            "results": [{
                "EventCode": "EQ12",
                "LanguageCode": "en",
                "Description": "Event Code 12"
            },
            {
                "EventCode": "EQ14",
                "LanguageCode": "en",
                "Description": "Event Code 14"
            }
        ]
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventTypes('core.automobiles
%3AExceededTemperature')/Descriptions"
        }
    }
}
]
}
}

```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.11 Update an Event Type

With this method, you can update a specific event type.

The *ETag* value is mandatory to update an event type. You must retrieve the *ETag* value of the event type using the GET (/ES/v1/EventTypes('<event type name>')) service. The *ETag* value is assigned to the request header parameter If-Match in the PATCH request. If you do not include the *ETag* value in the request header or if the *ETag* value is not correct, the server displays an error message.

Note

- You can only update the already existing description of statuses, severities, and codes.
- You can add enumeration values for the fields *EventStatus*, *EventSeverity*, and *EventCode* only if the following conditions are met:
 - The event type was created with an empty array for the fields *EventStatus*, *EventSeverity*, and *EventCode*
 - There are no events created for the event type.
- You can indicate the fields *EventStatus*, *EventSeverity*, and *EventCode* as optional by using an empty array, irrespective of events created or not created for the event type.
- You can delete the already defined enumeration values for the fields *EventStatus*, *EventSeverity*, and *EventCode* of an event type, if there are no events created for that event type.
- You can add descriptions for an event type in different languages. If you want to remove the description in a specific language, assign null value for the **Description** field.
- If an event is already created for an event type, the fields *EventStatus*, *EventSeverity*, and *EventCode* can be updated as explained in the following table:

EventStatus	EventSeverity	EventCode	What can be updated?
No enumeration values defined in event type configuration			Cannot update these fields by adding new enumeration values
Enumeration values defined in event type configuration	No enumeration values defined in event type in event type configuration	No enumeration values defined in event type in event type configuration	You can add new enumeration values only for the field <i>EventStatus</i>
No enumeration values defined in event type in event type configuration	Enumeration values defined in event type configuration	No enumeration values defined in event type in event type configuration	You can add new enumeration values only for the field <i>EventSeverity</i>
No enumeration values defined in event type in event type configuration	No enumeration values defined in event type in event type configuration	Enumeration values defined in event type configuration	You can add new enumeration values only for the field <i>EventCode</i>

EventStatus	EventSeverity	EventCode	What can be updated?
Enumeration values defined in event type configuration	Enumeration values defined in event type configuration	Enumeration values defined in event type configuration	You can add new enumeration values only for the fields EventStatus , EventSeverity , EventCode
- You can add, edit, or delete the following for an event type if there are no events already created for the event type. - EventTypeState - PropertySetID - PropertySetType - The valid operations are <code>ADD</code>, <code>DELETE</code>, and <code>UPDATE</code> - You cannot change the name of the event type using <code>PATCH</code> request. After updating the event type, the system generates a new ETag value for the event type and replaces the old value with the new value.			

Request

URI: `/ES/v1/EventTypes('<event type name>')`

Operation Type: `CRUD`

HTTP Method: [PATCH](#)

Permissions: `<td>.u`

Request Header Parameters

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific event type that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the event type

Request Example

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')
```

Response

Response Status and Error Codes

Code	Description
200	Event type updated successfully.

Payload

Format: *JSON*

Example 1

The following request payload updates the event type `core.automobiles:ExceededTemperature` by adding a new event code `EQ14`:

```
{
  "Name": "core.automobiles:ExceededTemperature",
  "PackageName": "core.automobiles",
  "Codes": [
    {
      "EventCode": "EQ14",
      "Operation": "ADD",
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Event Code 14"
      }]
    }
  ]
}
```

Example 2

The following request payload updates the event type `core.automobiles:ExceededTemperature` with the following:

- New event code `EQ14` added.
- Empty arrays for *Statuses* and *Severities* indicate the fields *EventStatus* and *EventSeverity* accept free text or optional fields.

by adding a new event code and indicating the fields *EventStatuses* and *EventSeverities* :

```
{
  "Name": "core.automobiles:ExceededTemperature",
  "PackageName": "core.automobiles",
  "Statuses": [],
  "Severities": [],
  "Codes": [
    {
      "EventCode": "EQ14",
      "Operation": "ADD",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Event Code 14"
        }
      ]
    }
  ]
}
```

```
]
}
```

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.1.12 Delete an Event Type

With this method, you can delete an event type with a specific name.

The *ETag* value is mandatory to delete an event type. You must retrieve the *ETag* value of the event type using the GET (`/ES/v1/EventTypes('<event type name>')`) service. The *ETag* value is assigned to the request header parameter `If-Match` in the PATCH request. If you do not include the *ETag* value in the request header or if the *ETag* value is not correct, the server displays an error message.

Note

- You cannot delete an event type if you have already created events for the event type.
- If you delete an event type, the system deletes the associated status, severity, and code of the event type.

Request

URI: `/ES/v1/EventTypes('<event type name>')`

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: `<tde>.d`

Request Headers

Header	Required	Values
<code>If-Match</code>	Yes	Latest <i>ETag</i> value of a specific event type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
<code>event type name</code>	Yes	String	Name of the event type

Request Example

```
/ES/v1/EventTypes('core.automobiles:ExceededTemperature')
```

Response

Response Status and Error Codes

Code	Description
204	Specified event type deleted successfully.

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

8.3.2 Event Type with Multiple Event Property Sets

The /v2 version of the event configuration service is an enhanced version of /v1 event configuration service. In this version, you can create an event type with multiple event property sets.

Resource Path: `http://<server address>[:<port number>][/path]/ES/v2`

Example for a base URI in a cloud foundry environment: `https://events-sap.cfapps.eu10.hana.ondemand.com/ES/v2`

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Metadata of Event Configuration with Multiple Event Property Set Types [page 573]	/ES/v2/\$metadata
POST	Create Event Type with Multiple Event Property Sets [page 581]	/ES/v2/EventTypes
GET	Read Details of an Event Type [page 584]	/ES/v2/EventTypes('<event type name>')
GET	Read Statuses of an Event Type [page 589]	/ES/v2/EventTypes('<event type name>')/Statuses

HTTP Method	Operation	URI
GET	Read Severities of an Event Type [page 593]	/ES/v2/EventTypes('<event type name>')/Severities
GET	Read Codes of an Event Type [page 596]	/ES/v2/EventTypes('<event type name>')/Codes
GET	Read all Event Types [page 598]	/ES/v2/EventTypes
GET	Read Statuses of all Event Types [page 602]	/ES/v2/EventTypes?\$expand=Statuses
GET	Read Severities of all Event Types [page 606]	/ES/v2/EventTypes?\$expand=Severities
GET	Read Codes of all Event Types [page 609]	/ES/v2/EventTypes?\$expand=Codes
PATCH	Update an Event type [page 613]	/ES/v2/EventTypes
DELETE	Delete an Event type [page 614]	/ES/v2/EventTypes('<event type name>')

Event Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes		Name of the event type
Descriptions	Array of description objects	No	-	Description of the event type
PackageName	String	Yes	50	Name of the package for which the event types are configured
PropertySets	Array of property set objects	No	-	Array of property sets that belong to the event type
EventTypeState	String	No	Fixed	State of the event. The possible values are <i>Mutable</i> and <i>Immutable</i> . Default value is <i>Immutable</i> .
Statuses	Array of event status objects	Yes	-	Status of the event
Severities	Array of event severity objects	Yes	-	Severity of the event
Codes	Array of event code objects	Yes	-	Code of the event

Property Set Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	50	Unique identifier of the property set (that belongs to the property-SetType) defined in a event type
PropertySetType	String	Yes	81	Name of the property set type referred
Descriptions	Array	No	-	Description of the property set for each language with the corresponding ISO language code

Statuses Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventStatus	String	No	50	Status of the event
Descriptions	Array of description objects	No	-	Description of the event status

Severities Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventSeverity	Integer	No	-	Severity of the event
Descriptions	Array of description objects	No	-	Description of the event severity

Codes Object Properties

Property	Type	Mandatory	Maximum Length	Description
EventCode	String	No	50	Code of the event
Descriptions	Array of description objects	No	-	Description of the event code

PropertySetDescriptions and Descriptions Object Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request

payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

8.3.2.1 Read Metadata of Event Configuration with Multiple Event Property Set Types

With this method, you can retrieve the metadata of event configuration.

Request

URI: /ES/v2/\$metadata

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <td>.r

Request Headers

None

Request Parameters

None

Request Example

/ES/v2/\$metadata

Response

Response Headers

None

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Response Payload Example

```
<EntityType Name="Severity">
  <Key>
    <PropertyRef Name="EventSeverity"></PropertyRef>
  </Key>
  <Property Name="EventSeverity" Type="Edm.String"></Property>
  <Property Name="LanguageCode" Type="Edm.String"></Property>
  <Property Name="Description" Type="Edm.String"></Property>
  <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Severity_Description" FromRole="Severities"
ToRole="Descriptions"></NavigationProperty>
</EntityType>
<EntityType Name="EventCorrelations">
  <Key>
    <PropertyRef Name="CorrelationId"></PropertyRef>
  </Key>
  <Property Name="CorrelationId" Type="Edm.String">
    <Documentation>
      <LongDescription>Event Correlation ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="EventId" Type="Edm.String"></Property>
  <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
  <NavigationProperty Name="Events"
Relationship="com.sap.apptot.es.EventCorrelation_Event"
FromRole="EventCorrelations" ToRole="Events"></NavigationProperty>
</EntityType>
<EntityType Name="EventPropertySetTypes">
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
  <Property Name="DataCategory" Type="Edm.String"></Property>
```

```

        <Property Name="Language" Type="Edm.String"></Property>
        <Property Name="PropertySetTypeDescription" Type="Edm.String"></
Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.appiot.es.EventPropertySetType_Property"
FromRole="EventPropertySetTypes" ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.EventPropertySetType_Description"
FromRole="EventPropertySetTypes" ToRole="Descriptions"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.appiot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="Description" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="EventTypeState" Type="Edm.String"></Property>
        <Property Name="IsBatch" Type="Edm.Boolean"></Property>
        <NavigationProperty Name="PropertySets"
Relationship="com.sap.appiot.es.EventType_PropertySet" FromRole="EventTypes"
ToRole="PropertySets"></NavigationProperty>
        <NavigationProperty Name="Statuses"
Relationship="com.sap.appiot.es.EventType_Status" FromRole="EventTypes"
ToRole="Statuses"></NavigationProperty>
        <NavigationProperty Name="Severities"
Relationship="com.sap.appiot.es.EventType_Severity" FromRole="EventTypes"
ToRole="Severities"></NavigationProperty>
        <NavigationProperty Name="Codes"
Relationship="com.sap.appiot.es.EventType_Code" FromRole="EventTypes"
ToRole="Codes"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.EventType_Description" FromRole="EventTypes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Events">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Event unique ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="CorrelationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Event Correlation ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
        <Property Name="Type" Type="Edm.String"></Property>
        <Property Name="EventType" Type="Edm.String"></Property>
        <Property Name="EventStatus" Type="Edm.String"></Property>
        <Property Name="EventSeverity" Type="Edm.Int64"></Property>
        <Property Name="EventCode" Type="Edm.String"></Property>
        <Property Name="EventSource" Type="Edm.String"></Property>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="ThingProperty" Type="Edm.String"></Property>
        <Property Name="ExternalId" Type="Edm.String"></Property>
        <Property Name="EventInfo" Type="Edm.String"></Property>
    </EntityType>

```

```

        <EntityType Name="Properties">
            <Key>
                <PropertyRef Name="Name"></PropertyRef>
                <PropertyRef Name="PropertySetType"></PropertyRef>
            </Key>
            <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
                <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
                <Property Name="Type" Type="Edm.String"></Property>
                <Property Name="PropertyLength" Type="Edm.String"></Property>
                <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Property_Description" FromRole="Properties"
ToRole="Descriptions"></NavigationProperty>
            </EntityType>
            <EntityType Name="Status">
                <Key>
                    <PropertyRef Name="EventStatus"></PropertyRef>
                </Key>
                <Property Name="EventStatus" Type="Edm.String"></Property>
                <Property Name="LanguageCode" Type="Edm.String"></Property>
                <Property Name="Description" Type="Edm.String"></Property>
                <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Status_Description" FromRole="Statuses"
ToRole="Descriptions"></NavigationProperty>
            </EntityType>
            <EntityType Name="Annotations">
                <Key>
                    <PropertyRef Name="Name"></PropertyRef>
                </Key>
                <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
                    <Documentation>
                        <LongDescription>Name of Annotation</LongDescription>
                    </Documentation>
                </Property>
                <Property Name="PackageName" Type="Edm.String" Nullable="true"
MaxLength="50" sap:creatable="false" sap:updatable="false">
                    <Documentation>
                        <LongDescription>Package Name</LongDescription>
                    </Documentation>
                </Property>
                <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
            </EntityType>
            <EntityType Name="Descriptions">
                <Key>
                    <PropertyRef Name="LanguageCode"></PropertyRef>
                </Key>
                <Property Name="LanguageCode" Type="Edm.String">
                    <Documentation>
                        <LongDescription>Language Code</LongDescription>
                    </Documentation>
                </Property>
                <Property Name="Description" Type="Edm.String">
                    <Documentation>
                        <LongDescription>Description</LongDescription>
                    </Documentation>
                </Property>
            </EntityType>
            <EntityType Name="PropertySets">
                <Key>
                    <PropertyRef Name="Name"></PropertyRef>
                </Key>
                <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>

```

```

        <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="DataCategory" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <Property Name="Operation" Type="Edm.String"></Property>
        <Property Name="EventType" Type="Edm.String"></Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.appiot.es.PropertySets_Property" FromRole="PropertySets"
ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.PropertySets_Description"
FromRole="PropertySets" ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Codes">
        <Key>
            <PropertyRef Name="EventCode"></PropertyRef>
        </Key>
        <Property Name="EventCode" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.Code_Description" FromRole="Codes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <Association Name="PropertySets_PropertySetType">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
    </Association>
    <Association Name="PropertySets_EventType">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="*"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
    </Association>
    <Association Name="EventType_Description">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventCorrelation_Event">
        <End Type="com.sap.appiot.es.EventCorrelation" Multiplicity="1"
Role="EventCorrelations"></End>
        <End Type="com.sap.appiot.es.Event" Multiplicity="*"
Role="Events"></End>
    </Association>
    <Association Name="EventPropertySetType_Annotation">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Annotations" Multiplicity="*"
Role="Annotations"></End>
    </Association>
    <Association Name="Severity_Description">
        <End Type="com.sap.appiot.es.Severity" Multiplicity="1"
Role="Severities"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_PropertySet">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="*"
Role="PropertySets"></End>
    </Association>
    <Association Name="EventPropertySetType_Property">

```

```

        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventType_Status">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Status" Multiplicity="*"
Role="Statuses"></End>
    </Association>
    <Association Name="Property_Description">
        <End Type="com.sap.appiot.es.Property" Multiplicity="1"
Role="Properties"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Status_Description">
        <End Type="com.sap.appiot.es.Status" Multiplicity="1"
Role="Statuses"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventPropertySetType_Description">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Code_Description">
        <End Type="com.sap.appiot.es.Code" Multiplicity="1"
Role="Codes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_Code">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Code" Multiplicity="*"
Role="Codes"></End>
    </Association>
    <Association Name="PropertySets_Property">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventType_Severity">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Severity" Multiplicity="*"
Role="Severities"></End>
    </Association>
    <Association Name="PropertySets_Description">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Severities"
EntityType="com.sap.appiot.es.Severity"></EntitySet>
        <EntitySet Name="EventCorrelations"
EntityType="com.sap.appiot.es.EventCorrelation"></EntitySet>
        <EntitySet Name="EventPropertySetTypes"
EntityType="com.sap.appiot.es.EventPropertySetType"></EntitySet>

```



```

        <EntitySet Name="EventTypes"
EntityType="com.sap.appiot.es.EventType"></EntitySet>
        <EntitySet Name="Events" EntityType="com.sap.appiot.es.Event"></
EntitySet>
        <EntitySet Name="Properties"
EntityType="com.sap.appiot.es.Property"></EntitySet>
        <EntitySet Name="Statuses"
EntityType="com.sap.appiot.es.Status"></EntitySet>
        <EntitySet Name="Annotations"
EntityType="com.sap.appiot.es.Annotations"></EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.es.Description"></EntitySet>
        <EntitySet Name="PropertySets"
EntityType="com.sap.appiot.es.PropertySet"></EntitySet>
        <EntitySet Name="Codes" EntityType="com.sap.appiot.es.Code"></
EntitySet>
        <AssociationSet Name="PropertySets_PropertySetType"
Association="com.sap.appiot.es.PropertySets_PropertySetType">
            <End EntitySet="PropertySets" Role="PropertySets"></End>
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySets_EventType"
Association="com.sap.appiot.es.PropertySets_EventType">
            <End EntitySet="PropertySets" Role="PropertySets"></End>
            <End EntitySet="EventTypes" Role="EventTypes"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Description"
Association="com.sap.appiot.es.EventType_Description">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventCorrelation_Event"
Association="com.sap.appiot.es.EventCorrelation_Event">
            <End EntitySet="EventCorrelations"
Role="EventCorrelations"></End>
            <End EntitySet="Events" Role="Events"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Annotation"
Association="com.sap.appiot.es.EventPropertySetType_Annotation">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Annotations" Role="Annotations"></End>
        </AssociationSet>
        <AssociationSet Name="Severity_Description"
Association="com.sap.appiot.es.Severity_Description">
            <End EntitySet="Severities" Role="Severities"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_PropertySet"
Association="com.sap.appiot.es.EventType_PropertySet">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="PropertySets" Role="PropertySets"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Property"
Association="com.sap.appiot.es.EventPropertySetType_Property">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Properties" Role="Properties"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Status"
Association="com.sap.appiot.es.EventType_Status">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Statuses" Role="Statuses"></End>
        </AssociationSet>
        <AssociationSet Name="Property_Description"
Association="com.sap.appiot.es.Property_Description">
            <End EntitySet="Properties" Role="Properties"></End>

```

```

        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="Status_Description"
Association="com.sap.appiot.es.Status_Description">
        <End EntitySet="Statuses" Role="Statuses"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="EventPropertySetType_Description"
Association="com.sap.appiot.es.EventPropertySetType_Description">
        <End EntitySet="EventPropertySetTypes"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="Code_Description"
Association="com.sap.appiot.es.Code_Description">
        <End EntitySet="Codes" Role="Codes"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="EventType_Code"
Association="com.sap.appiot.es.EventType_Code">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="Codes" Role="Codes"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySets_Property"
Association="com.sap.appiot.es.PropertySets_Property">
        <End EntitySet="PropertySets" Role="PropertySets"></End>
        <End EntitySet="Properties" Role="Properties"></End>
    </AssociationSet>
    <AssociationSet Name="EventType_Severity"
Association="com.sap.appiot.es.EventType_Severity">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="Severities" Role="Severities"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySets_Description"
Association="com.sap.appiot.es.PropertySets_Description">
        <End EntitySet="PropertySets" Role="PropertySets"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <FunctionImport Name="MigrateEvents" ReturnType="Edm.String"
m:HttpMethod="POST">
        <Parameter Name="EventType" Type="Edm.String"></Parameter>
        <Parameter Name="EventPropertySetType" Type="Edm.String"></
Parameter>
    </FunctionImport>
    <FunctionImport Name="DeleteEvents" ReturnType="Edm.String"
m:HttpMethod="DELETE">
        <Parameter Name="ToTime" Type="Edm.DateTimeOffset"></
Parameter>
        <Parameter Name="EventType" Type="Edm.String"></Parameter>
        <Parameter Name="ThingId" Type="Edm.String"></Parameter>
        <Parameter Name="FromTime" Type="Edm.DateTimeOffset"></
Parameter>
    </FunctionImport>
</EntityContainer>
</Schema>

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.2 Create Event Type with Multiple Event Property Sets

With this method, you can create an event type with multiple property sets associated with one or more event property set types. However, you cannot assign more than five property sets for an event type. The fields [EventStatus](#), [EventSeverity](#), and [EventCode](#) are optional. However, if you define enumeration values for these fields while creating an event type, you must assign only one of these defined enumeration values for these fields while creating an event. If you assign different values, the system displays an error message.

Note

To indicate that the fields [EventStatus](#), [EventSeverity](#), and [EventCode](#) are optional, you must include them with an empty array in the request payload.

Naming convention for event type

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: `<package>:<name>`. For example: `core.automobiles:FlyWheel`
- Name must be unique within a package.

Naming convention for property set

- Only the following characters are supported:
 - Uppercase and lowercase alphabets [a](#) through [z](#) and [A](#) through [Z](#)
 - Numeric digits [0](#) through [9](#)
 - Punctuation marks underscore (`_`), hyphen (`-`), colon (`:`), and full-stop (`.`)
- Maximum length is 30 characters.
- You can create multiple property sets with unique names for an event type using the same event property set type or different event property set types. Property set names must be unique for an event type.

Request

URI: `/ES/v2/EventTypes`

Operation Type: CRUD

HTTP Method: [POST](#)

Permissions: <td>.c

Request Headers

None

Request Parameters

None

Request Example

Request URL: /ES/v2/EventTypes

```
{
  "Name": "core.automobiles:ExceededSpeed",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Event type for exceeded speed"
    },
    {
      "LanguageCode": "de",
      "Description": "Ereignistyp für überschrittene Geschwindigkeit"
    }
  ],
  "PackageName": " core.automobiles ",
  "PropertySets": [
    {
      "Name": "WheelSpeed",
      "PropertySetType": "core.automobiles:Wheel",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Wheel properties"
        },
        {
          "LanguageCode": "de",
          "Description": "Radeigenschaften"
        }
      ]
    },
    {
      "Name": "enginemap",
      "PropertySetType": "core.automobiles:engine",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Engine properties"
        },
        {
          "LanguageCode": "de",
          "Description": "Motoreigenschaften"
        }
      ]
    }
  ],
  "Statuses": [],
  "Severities": [],
  "Codes": []
}
```

Response

Response Headers

None

Response Status and Error Codes

Code	Description
201	Event type created successfully

Response Payload Example

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExdSpeed')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExdSpeed')",
      "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExdSpeed",
    "PackageName": "core.automobiles ",
    "Description": "",
    "LanguageCode": "",
    "EventTypeState": "Immutable",
    "IsBatch": null,
    "PropertySets": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/PropertySets"
      }
    },
    "Statuses": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceeddeSpeed')/Statuses"
      }
    },
    "Severities": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed1')/Severities"
      }
    },
    "Codes": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Codes"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Descriptions"
      }
    }
  }
}
```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.3 Read Details of an Event Type

With this method, you can retrieve the details of an event type along with the property set details.

Request

URI: `/ES/v2/EventTypes('<event type name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Event type name	Yes	String	Name of the event type	Path

Request Example

`/ES/v2/EventTypes('core.automobiles:ExdSpeed')`

Response

Response Headers

Header	Description
ETag	Entity tag of the newly event type instance. The system generates a new value and replaces the old value every time an event type is updated.

Response Status and Error Codes

Code	Description
201	Event type details retrieved successfully

Response Payload Example

Example 1: /ES/v2/EventTypes('core.automobiles:ExceededSpeed')

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
      "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededSpeed",
    "PackageName": "core.automobiles",
    "Description": "Event type for exceeded temperature and speed",
    "LanguageCode": "en",
    "EventTypeState": "Immutable",
    "IsBatch": false,
    "PropertySets": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/PropertySets"
      }
    },
    "Statuses": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Statuses"
      }
    },
    "Severities": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Severities"
      }
    },
    "Codes": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Codes"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Descriptions"
      }
    }
  }
}
```

Example 2: /ES/v2/EventTypes('core.automobiles:ExceededSpeed')?\$expand=PropertySets

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes('core.automobiles%3AExceededSpeed')",
        "type": "com.sap.apiot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededSpeed",
    "PackageName": "core.automobiles",
    "Description": "Event type for exceeded temperature and speed",
    "LanguageCode": "en",
    "EventTypeState": "Immutable",
    "IsBatch": false,
    "PropertySets": {
        "results": [
            {
                "Name": "WheelSpeed",
                "PropertySetType": "core.automobiles:Wheel",
                "DataCategory": "EventData",
                "Description": "Wheel properties",
                "Operation": null,
                "EventType": "core.automobiles:ExceededSpeed"
            },
            {
                "Name": "enginetemp",
                "PropertySetType": " core.automobiles:engine ",
                "DataCategory": "EventData",
                "Description": "engine properties",
                "Operation": null,
                "EventType": "core.automobiles:ExceededSpeed"
            }
        ]
    },
    "Statuses": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Statuses"
        }
    },
    "Severities": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Severities"
        }
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Descriptions"
        }
    }
}

```

Example 3: /ES/v2/EventTypes('core.automobiles:ExceededSpeed')?\$expand=PropertySets/Properties

```

{
    "d": {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes('core.automobiles%3AExceededSpeed')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes('core.automobiles%3AExceededSpeed')",

```



```

        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededSpeed",
    "PackageName": "core.automobiles",
    "Description": "Event type for exceeded temperature and speed",
    "LanguageCode": "en",
    "EventTypeState": "Immutable",
    "IsBatch": false,
    "PropertySets": {
        "results": [
            {
                "__metadata": {
                    "id": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')",
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')",
                    "type": "com.sap.apptot.es.PropertySets"
                },
                "Name": "WheelSpeed",
                "PropertySetType": "core.automobiles:Wheel",
                "DataCategory": "EventData",
                "Description": "Wheel property set",
                "Operation": null,
                "EventType": "core.automobiles:ExceededSpeed",
                "Properties": {
                    "results": [
                        {
                            "Name": "whspeed",
                            "PropertySetType": "core.automobiles:Wheel",
                            "Type": "Numeric",
                            "PropertyLength": null
                        }
                    ]
                },
                "Descriptions": {
                    "__deferred": {
                        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')/
Descriptions"
                    }
                }
            }
        ],
        {
            "__metadata": {
                "id": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('enginemp')",
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('enginemp')",
                "type": "com.sap.apptot.es.PropertySets"
            },
            "Name": "enginemp",
            "PropertySetType": "core.automobiles:engine",
            "DataCategory": "EventData",
            "Description": "Engine",
            "Operation": null,
            "EventType": "core.automobiles:ExceededSpeed",
            "Properties": {
                "results": [
                    {
                        "Name": "entemp",
                        "PropertySetType": "core.automobiles:engine",
                        "Type": "Numeric",
                        "PropertyLength": null
                    }
                ]
            },
            "Descriptions": {
                "__deferred": {

```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('enginemp')/
Descriptions"
    }
}
    ],
    "Statuses": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Statuses"
        }
    },
    "Severities": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Severities"
        }
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Descriptions"
        }
    }
}
}
}

```

Example 4: /ES/v2/EventTypes('core.automobiles:ExdSpeed')/PropertySets

```

{
    "d": {
        "results": [{
            "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/PropertySets('enginemp')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/PropertySets('enginemp')",
                "type": "com.sap.apptot.es.PropertySets"
            },
            "Name": "enginemp",
            "PropertySetType": "core.automobiles:engine",
            "DataCategory": null,
            "Description": null,
            "Operation": null,
            "EventType": "core.automobiles:ExceededSpeed",
            "Properties": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('enginemp')/Properties"
                }
            },
            "Descriptions": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('enginemp')/
Descriptions"
                }
            }
        ]
    }
}

```

```

{
  "__metadata": {
    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')",
    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')",
    "type": "com.sap.apptot.es.PropertySets"
  },
  "Name": "WheelSpeed",
  "PropertySetType": "core.automobiles:Wheel",
  "DataCategory": null,
  "Description": null,
  "Operation": null,
  "EventType": "core.automobiles:ExceededSpeed",
  "Properties": {
    "__deferred": {
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')/Properties"
    }
  },
  "Descriptions": {
    "__deferred": {
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/PropertySets('WheelSpeed')/Descriptions"
    }
  }
}
]
}
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.4 Read Statuses of an Event Type

With this method, you can retrieve statuses of the specified event type.

Request

URI: /ES/v2/EventTypes('<event type name>')/Statuses

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <tde>.r

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the event type

Request Example

```
/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Statuses
```

Response

Response Status and Error Codes

Code	Description
200	Statuses of the specified event type retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples.

Example 1

```
/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Statuses
```

Retrieves statuses of the specified event type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Open')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Open')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "Open",
        "LanguageCode": "en",
        "Description": "Open Status",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Open')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('InProgress')",
```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('InProgress')",
        "type": "com.sap.apptot.es.Status"
    },
    "EventStatus": "InProgress",
    "LanguageCode": "en",
    "Description": "In process Status",
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('InProgress')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Completed')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Completed')",
        "type": "com.sap.apptot.es.Status"
    },
    "EventStatus": "Completed",
    "LanguageCode": "en",
    "Description": "Completed Status",
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Completed')/Descriptions"
        }
    }
}
]
}
}

```

Example 2

```

/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Statuses?
$expand=Descriptions

```

Retrieves statuses along with the expanded list of descriptions for the specified event type

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Open')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Open')",
          "type": "com.sap.apptot.es.Status"
        },
        "EventStatus": "Open",
        "LanguageCode": null,
        "Description": null,
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                "type": "com.sap.apptot.es.Descriptions"
              },

```

```

        "LanguageCode": "en",
        "Description": "Open Status"
    }
    ]
}
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('InProgress')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('InProgress')",
        "type": "com.sap.apptot.es.Status"
    },
    "EventStatus": "InProgress",
    "LanguageCode": null,
    "Description": null,
    "Descriptions": {
        "results": [
            {
                "__metadata": {
                    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                    "type": "com.sap.apptot.es.Descriptions"
                },
                "LanguageCode": "en",
                "Description": "In process Status"
            }
        ]
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Completed')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Statuses('Completed')",
        "type": "com.sap.apptot.es.Status"
    },
    "EventStatus": "Completed",
    "LanguageCode": null,
    "Description": null,
    "Descriptions": {
        "results": [
            {
                "__metadata": {
                    "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                    "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                    "type": "com.sap.apptot.es.Descriptions"
                },
                "LanguageCode": "en",
                "Description": "Completed Status"
            }
        ]
    }
}
]
}
}
}
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.5 Read Severities of an Event Type

With this method, you can retrieve severities of the specified event type.

Request

URI: `/ES/v2/EventTypes('<event type name>')/Severities`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Request Example

`/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Severities`

Response

Response Status and Error Codes

Code	Description
200	Severities of the specified event type retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples.

Example 1

/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Severities

Retrieves severities of the specified event type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "1",
        "LanguageCode": "en",
        "Description": "High",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "2",
        "LanguageCode": "en",
        "Description": "Medium",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "3",
        "LanguageCode": "en",
        "Description": "Low",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')/Descriptions"
          }
        }
      }
    ]
  }
}
```

Example 2

/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Severities?
\$expand=Descriptions

Retrieves severities along with the expanded list of descriptions for the specified event type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "1",
        "LanguageCode": "en",
        "Description": "High",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('1')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "2",
        "LanguageCode": "en",
        "Description": "Medium",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('2')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')",
          "type": "com.sap.apptot.es.Severity"
        },
        "EventSeverity": "3",
        "LanguageCode": "en",
        "Description": "Low",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Severities('3')/Descriptions"
          }
        }
      }
    ]
  }
}
```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.6 Read Codes of an Event Type

With this method, you can retrieve codes of the specified event type.

Request

URI: `/ES/v2/EventTypes('<event type name>')/Codes`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Request Example

`/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Codes`

Response

Response Status and Error Codes

Code	Description
200	Codes of the specified event type retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples.

Example 1

/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Codes

Retrieves codes of the specified event type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Codes('EQ12')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Codes('EQ12')",
          "type": "com.sap.apptot.es.Codes"
        },
        "EventCode": "EQ12",
        "LanguageCode": "en",
        "Description": "Event Code 12",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Codes('EQ12')/Descriptions"
          }
        }
      }
    ]
  }
}
```

Example 2

/ES/v2/EventTypes('core.automobiles:ExceededTemperature')/Codes?

\$expand=Descriptions

Retrieves codes along with its expanded list of descriptions for the specified event type.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Codes('EQ12')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Codes('EQ12')",
          "type": "com.sap.apptot.es.Codes"
        },
        "EventCode": "EQ12",
        "LanguageCode": null,
        "Description": null,
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Descriptions('en')",
                "type": "com.sap.apptot.es.Descriptions"
              },
              "LanguageCode": "en",
              "Description": "Event Code 12"
            }
          ]
        }
      }
    ]
  }
}
```

```
}  
  }  
]
```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.7 Read all Event Types

Retrieves a list of event types from the database

With this method, you send a request to the server to retrieve a subset of all event types, according to the filter criteria provided. You can restrict the set of event types to be retrieved by filter criteria based on the event type name, package name, property type name, and property set type name.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/EventTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$inlinecount	String	No	Total number of event types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of event types available. • If you use this with \$filter parameter, the result contains the total count of event types based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>.
\$filter	String	No	Filter condition to be applied; valid fields are <i>Name</i>, <i>PackageName</i>, <i>PropertySetId</i>, and <i>PropertySetType</i>.

Request Example

/ES/v2/EventTypes

Retrieves all event types to which the user has access authorization

Response

Response Status and Error Codes

Code	Description
200	Retrieved all event types successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples.

Example 1

/ES/v2/EventTypes

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
          "type": "com.sap.appiot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededTemp",
        "PackageName": "core.automobiles",
        "Description": "Event type for exceeded temperature",
        "LanguageCode": "en",
        "EventTypeState": "Immutable",
        "IsBatch": null,
        "PropertySets": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')/PropertySets"
          }
        },
        "Statuses": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')/Statuses"
          }
        },
        "Severities": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')/Severities"
          }
        },
        "Codes": {
          "__deferred": {
```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Codes"
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Descriptions"
        }
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
            "type": "com.sap.apptot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededSpeed",
        "PackageName": "core.automobiles",
        "Description": "Event type for exceeded temperature",
        "LanguageCode": "en",
        "EventTypeState": "Immutable",
        "IsBatch": null,
        "PropertySets": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/PropertySets"
            }
        },
        "Statuses": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Statuses"
            }
        },
        "Severities": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Severities"
            }
        },
        "Codes": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Codes"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Descriptions"
            }
        }
    },
    {
        "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes?$skiptoken=500"
    }
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.8 Read Statuses of all Event Types

With this method, you can retrieve statuses of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/EventTypes?$expand=Statuses`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Request Example

`/ES/v2/EventTypes?$expand=Statuses`

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventStatus .

Response

Response Status and Error Codes

Code	Description
200	Statuses of all event types retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",

```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededSpeed",
    "PackageName": "core.automobiles",
    "Description": "Demo Event Type",
    "LanguageCode": "en",
    "EventTypeState": "Mutable",
    "IsBatch": null,
    "PropertySets": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/PropertySets"
        }
    },
    "Statuses": {
        "results": [
            {
                "EventStatus": "Open",
                "LanguageCode": "en",
                "Description": "Open Status"
            },
            {
                "EventStatus": "InProgress",
                "LanguageCode": "en",
                "Description": "In process Status"
            },
            {
                "EventStatus": "Completed",
                "LanguageCode": "en",
                "Description": "Completed Status"
            }
        ]
    },
    "Severities": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Severities"
        }
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemp",
    "PackageName": "core.automobiles",

```

```

        "Description": "Demo Event Type",
        "LanguageCode": "en",
        "EventTypeState": "Mutable",
        "IsBatch": null,
        "PropertySets": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/PropertySets"
            }
        },
        "Statuses": {
            "results": [
                {
                    "EventStatus": "Open",
                    "LanguageCode": "en",
                    "Description": "Open Status"
                },
                {
                    "EventStatus": "InProgress",
                    "LanguageCode": "en",
                    "Description": "In process Status"
                },
                {
                    "EventStatus": "Completed",
                    "LanguageCode": "en",
                    "Description": "Completed Status"
                }
            ]
        },
        "Severities": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Severities"
            }
        },
        "Codes": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Codes"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Descriptions"
            }
        }
    },
    "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes?$skiptoken=500&$expand=Statuses"
}
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.9 Read Severities of all Event Types

With this method, you can retrieve severities of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/EventTypes?$expand=Severities`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.
<code>\$orderby</code>	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity . To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Type	Required	Description
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventSeverity .

Request Example

/ES/v2/EventTypes?\$expand=Severities

Response

Response Status and Error Codes

Code	Description
200	Severities of all event types are retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
          "type": "com.sap.apptot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededSpeed",
        "PackageName": "core.automobiles",
        "Description": "Demo Event Type",
        "LanguageCode": "en",
        "EventTypeState": "Mutable",
        "IsBatch": null,
        "PropertySets": {
          "__deferred": {
```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/PropertySets"
    },
    "Statuses": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Statuses"
        }
    },
    "Severities": {
        "results": [
            {
                "EventSeverity": "2",
                "LanguageCode": "en",
                "Description": "Medium"
            },
            {
                "EventSeverity": "3",
                "LanguageCode": "en",
                "Description": "Low"
            },
            {
                "EventSeverity": "1",
                "LanguageCode": "en",
                "Description": "High"
            }
        ]
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
        "type": "com.sap.apptot.es.EventTypes"
    },
    "Name": "core.automobiles:ExceededTemp",
    "PackageName": "core.automobiles",
    "Description": "Demo Event Type",
    "LanguageCode": "en",
    "EventTypeState": "Mutable",
    "IsBatch": null,
    "PropertySets": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/PropertySets"
        }
    },
    "Statuses": {

```

```

        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Statuses"
        }
    },
    "Severities": {
        "results": [
            {
                "EventSeverity": "2",
                "LanguageCode": "en",
                "Description": "Medium"
            },
            {
                "EventSeverity": "1",
                "LanguageCode": "en",
                "Description": "High"
            },
            {
                "EventSeverity": "3",
                "LanguageCode": "en",
                "Description": "Low"
            }
        ]
    },
    "Codes": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Codes"
        }
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Descriptions"
        }
    }
},
    "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes?$skiptoken=500&$expand=Severities"
}
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.10 Read Codes of all Event Types

With this method, you can retrieve codes of all event types.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: /ES/v2/EventTypes?\$expand=Codes

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set.
\$skip	Integer	No	Number of records to exclude from the result set.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode .
\$filter	String	No	Filter condition to be applied; valid fields are Name , PackageName , PropertySetId , PropertySetType and EventCode .

Request Example

ES/v2/EventTypes?\$expand=Codes

Response

Response Status and Error Codes

Code	Description
200	Codes of all event types retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')",
          "type": "com.sap.apptot.es.EventTypes"
        },
        "Name": "core.automobiles:ExceededSpeed",
        "PackageName": "core.automobiles",
        "Description": "Demo Event Type",
        "LanguageCode": "en",
        "EventTypeState": "Mutable",
        "IsBatch": null,
        "PropertySets": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/PropertySets"
          }
        },
        "Statuses": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Statuses"
          }
        },
        "Severities": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles%3AExceededSpeed')/Severities"
          }
        },
        "Codes": {
          "results": [
            {
              "EventCode": "EQ12",
              "LanguageCode": "en",
              "Description": "Event Code 12"
            }
          ]
        }
      }
    ]
  }
}
```

```

        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededSpeed')/Descriptions"
            }
        },
        {
            "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventTypes('core.automobiles%3AExceededTemp')",
                "type": "com.sap.apptot.es.EventTypes"
            },
            "Name": "core.automobiles:ExceededTemp",
            "PackageName": "core.automobiles",
            "Description": "Demo Event Type",
            "LanguageCode": "en",
            "EventTypeState": "Mutable",
            "IsBatch": null,
            "PropertySets": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/PropertySets"
                }
            },
            "Statuses": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Statuses"
                }
            },
            "Severities": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Severities"
                }
            },
            "Codes": {
                "results": [
                    {
                        "EventCode": "EQ12",
                        "LanguageCode": "en",
                        "Description": "Event Code 12"
                    }
                ]
            },
            "Descriptions": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventTypes('core.automobiles
%3AExceededTemp')/Descriptions"
                }
            }
        },
        {
            "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventTypes?$skiptoken=500&$expand=Codes"
        }
    ]
}

```

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.11 Update an Event type

With this method, you can add, delete, or modify the event type.

- Only allowed operations are ADD, DELETE, and PATCH.
- You can assign new event property sets using the ADD operation.
- You can remove the already assigned event property sets using the DELETE operation.
- Using the PATCH operation, you cannot assign a different property set type name for a property set. Instead, you must delete the property set and reassign the property set with a different property set type name.
- Using the PATCH operation, you can only change the description of the property set.

Request

URI: `/ES/v2/EventTypes('<event type name>')`

Operation Type: CRUD

HTTP Method: *PATCH*

Permissions: `<td>.u`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific event type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Name of the event type	Path

Request Example

Request URL: `/ES/v2/EventTypes('core.automobiles:ExceededSpeed')`

Example 1: The following request payload updates the event type `core.automobiles:ExceededSpeed` by assigning a new event property set type.

```
{
  "PackageName": "core.automobiles",
  "PropertySets": [
    {
```

```

        "Name": "motorps",
        "PropertySetType": "core.automobiles:motorPST",
        "Operation": "ADD",
        "Descriptions": [{
            "LanguageCode": "en",
            "Description": "motor property set"
        }]
    }
]
}

```

Example 2: The following request payload updates the event type `core.automobiles:ExceededSpeed` by removing the already assigned event property set type.

```

{
  "PackageName": "core.automobiles",
  "PropertySets": [
    {
      "Name": "motorps",
      "PropertySetType": "core.automobiles:motorPST",
      "Operation": "DELETE",
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "motor property set updated"
      }]
    }
  ]
}

```

Response

Response Headers

None

Response Status and Error Codes

Code	Description
204	Event type updated successfully

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.2.12 Delete an Event type

With this method, you can delete an event type with specific name.

Request

URI: `/ES/v2/EventTypes('<event type name>')`

Operation Type: CRUD

HTTP Method: [DELETE](#)

Permissions: `<td>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific event type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Name of the event type	Path

Request Example

`/ES/v2/EventTypes('core.automobiles:ExceededSpeed')`

Response

Response Headers

None

Response Status and Error Codes

Code	Description
204	Event type deleted successfully

Related Information

[Event Type with Multiple Event Property Sets \[page 570\]](#)

8.3.3 Event Property Set Type

Event property set type is a group of attributes that are used to describe events

You can define event property set types to be assigned to an event. These event property set types belong to the data category [EventData](#) and are assigned to event types to describe an event. For example, **Exceeded**

Temperature is a valid event property set type defined for an event type. **Temperature** of the engine and the message displayed when the temperature exceeds are some of the properties that you can define for the corresponding event property set type.

SAP IoT delivers predefined annotations to support compliance with regard to relevant legal requirements, including data protection. The following are the supported predefined annotations for an event property set type:

- `com.sap.appiot.security:pii`
You can assign this annotation to an event property set type that contains data to identify a person or subject. Data such as nick name, birthdate, and email address are few examples that can be categorized as data that identifies a person.
- `com.sap.appiot.security:spi`
You can assign this annotation to an event property set type that contains critical data of a person. Data such as identification number, ethnic origin, and biometric data are a few examples that can be categorized as critical data of a person.

Resource Path: `/ES/v1/EventPropertySetTypes`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
<i>POST</i>	Create Event Property Set Type [page 618]	<code>/ES/v1/EventPropertySetTypes</code>	<code><tde>.c</code>
<i>GET</i>	Read Details of an Event Property Set Type [page 622]	<code>/ES/v1/EventPropertySetTypes ('<event property set type name>')</code>	<code><tde>.r</code>
<i>GET</i>	Read all Event Property Set Types [page 628]	<code>/ES/v1/EventPropertySetTypes</code>	<code><tde>.r</code>
<i>PATCH</i>	Update an Event Property Set Type [page 634]	<code>/ES/v1/EventPropertySetTypes ('<event property set type name>')</code>	<code><tde>.u</code>
<i>DELETE</i>	Delete an Event Property Set Type [page 636]	<code>/ES/v1/EventPropertySetTypes ('<event property set type name>')</code>	<code><tde>.d</code>

Event Property Set Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Name of the event type property set type

Property	Type	Mandatory	Maximum Length	Description
Descriptions	Array	No	-	Description of the event property set type
PackageName	String	Yes	50	Name of the package for which the event types are configured
DataCategory	Enum	Yes	-	Data category of the property set type
				i Note Only allowed value is <i>EventData</i> .
Properties	Array of properties	No	-	Array of properties of data category EventData
Annotations	Array of annotation objects	No	-	Array of annotation used to qualify property set type

Event Properties Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	30	Name of the property
Descriptions	Array	No	-	Description of the property
PropertySetType	String	Yes	81	Name of the property set type
Type	enum	Yes	30	Type used by the property
PropertyLength	Integer	Yes	30	Storage length for the property type specified as an integer value

Annotations Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	-	Name of the annotation The following are the supported predefined annotations for an event property set type: • <code>com.sap.appt.ot.security:pii</code> • <code>com.sap.appt.ot.security:spi</code>

Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Related Information

[Event Type with Single Event Property Set \[page 525\]](#)

[Data Protection and Privacy \[page 327\]](#)

8.3.3.1 Create Event Property Set Type

With this method, you can create an event property set type in a specific package.

Naming convention for property set type

- Always prefixed with the package name.
- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.

- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: <package>:<name>. For example: core.automobiles:FlyWheel
- Name must be unique within a package.

Naming convention for properties

- Only the following characters are supported:
 - Uppercase and lowercase alphabets a through z and A through Z
 - Numeric digits 0 through 9
 - Punctuation marks underscore (_), hyphen (-), colon (:), and full-stop (.)
- Maximum length is 30 characters.
- Property names have to be unique for a given set of property set types.

Request

URI: /ES/v1/EventPropertySetTypes

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <td>.c

Request Headers

Header	Required	Values
Accept	Yes	application/json

Request Parameters

None

Request Example

```
/ES/v1/EventPropertySetTypes
```

Payload

Example 1

The following request payload creates event property set type `core.automobiles:Engine` in the package `core.automobiles`.

```
{
  "Name": "core.automobiles:Engine",
  "PackageName": "core.automobiles",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Engine"
  },
  {
    "LanguageCode": "de",
    "Description": "Motor"
  }
  ],
  "DataCategory": "EventData",
  "Properties": [{
    "Name": "Temperature",
    "Type": "String",
    "PropertyLength": "127",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Engine Temperature"
    },
    {
      "LanguageCode": "de",
      "Description": "Motortemperatur"
    }
  ]
  }]
}
```

Example 2

The following request payload creates event property set type `core.automobiles:Engine` in the package `core.automobiles`. A predefined annotation `com.sap.apptot.security:spi` is assigned for the property set type.

```
{
  "Name": "core.automobiles:TemperatureEventPST",
  "DataCategory": "EventData",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Properties in core.automobiles:TemperatureEventPST"
  }],
  "Annotations": [{
    "Name": "com.sap.apptot.security:spi"
  }],
  "Properties": [{
    "Name": "Temperature",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Temperature of the Engine"
    }],
    "Type": "Numeric",
    "PropertyLength": "",
    "QualityCode": "1",
    "UnitOfMeasure": "AA"
  },
  {
    "Name": "Pressure",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Pressure of the Engine"
    }],
  }
]
```

```

        "Type": "Numeric",
        "PropertyLength": "",
        "QualityCode": "0",
        "UnitOfMeasure": "BA"
    }
]
}

```

Response

Response Status and Error Codes

Code	Description
200	Event property set type created successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

Response Payload Example

The following is the response payload after creating the event property set type `core.automobiles:Engine`.

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "type": "com.sap.apptot.es.EventPropertySetTypes"
        },
        "Name": "core.automobiles:Engine",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": null,
        "PropertySetTypeDescription": null,
        "Properties": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Properties"
          }
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Descriptions"
          }
        }
      }
    ]
  }
}

```

```
}
  }
]
}
```

Related Information

[Event Property Set Type \[page 615\]](#)

8.3.3.2 Read Details of an Event Property Set Type

Retrieves details of an event property set type with the specified name from the database

With this method, you send a request to the server to retrieve a particular event property set type specified by its name.

Request

URI: `/ES/v1/EventPropertySetTypes('<event property set type name>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Headers

Header	Required	Values
Accept	Yes	application/json

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Unique name of the event property set type

Request Example

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')
```

Response

Response Status and Error Codes

Code	Description
200	Details of a specific event property set type retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

Example 1

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')
```

Retrieves details of the specified event property set type

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
      "type": "com.sap.apiot.es.EventPropertySetTypes"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "EventData",
    "Language": "en",
    "PropertySetTypeDescription": "Engine",
    "Properties": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Properties"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Descriptions"
      }
    }
  }
}
```

Example 2

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')?$expand=Properties
```

Retrieves details of the specified event property set type along with the detailed list of properties

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventPropertySetTypes('core.automobiles%3AEngine')",
        "type": "com.sap.apptot.es.EventPropertySetTypes"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "EventData",
    "Language": "",
    "PropertySetTypeDescription": "",
    "Properties": {
        "results": [
            {
                "Name": "Speed",
                "PropertySetType": "core.automobiles:Engine",
                "Type": "Numeric",
                "PropertyLength": null
            },
            {
                "Name": "Temperature",
                "PropertySetType": "core.automobiles:Engine",
                "Type": "String",
                "PropertyLength": "128"
            }
        ]
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Descriptions"
        }
    }
}

```

Example 3

/ES/v1/EventPropertySetTypes('core.automobiles:Engine')?\$expand=Descriptions

Retrieves details of the specified event property set type along with the detailed list of descriptions of event property set types

```

{
    "d": {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventPropertySetTypes('core.automobiles%3AEngine')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventPropertySetTypes('core.automobiles%3AEngine')",
            "type": "com.sap.apptot.es.EventPropertySetTypes"
        },
        "Name": "core.automobiles:Engine",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": "",
        "PropertySetTypeDescription": "",
        "Properties": {
            "__deferred": {
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Properties"
            }
        },
        "Descriptions": {
            "results": [
                {
                    "LanguageCode": "en",
                    "Description": "Engine"
                }
            ]
        }
    }
}

```

```

        {
            "LanguageCode": "de",
            "Description": "Motor"
        }
    ]
}
}
}

```

Example 4

`/ES/v1/EventPropertySetTypes('core.automobiles:Engine')/Properties`

Retrieves the list of properties for the specified event property set type

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Speed',PropertySetType='core.automobiles%3AEngine')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Speed',PropertySetType='core.bbautomobiles%3AEngine')",
          "type": "com.sap.apptot.es.Properties"
        },
        "Name": "Speed",
        "PropertySetType": "core.automobiles:Engine",
        "Type": "Numeric",
        "PropertyLength": "",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Speed',PropertySetType='core.automobiles%3AEngine')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Temperature',PropertySetType='core.automobiles%3AEngine')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Temperature',PropertySetType='core.automobiles%3AEngine')",
          "type": "com.sap.apptot.es.Properties"
        },
        "Name": "Temperature",
        "PropertySetType": "core.automobiles:Engine",
        "Type": "String",
        "PropertyLength": "128",
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Temperature',PropertySetType='core.automobiles%3AEngine')/Descriptions"
          }
        }
      }
    ]
  }
}

```

```
}
```

Example 5

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')/Descriptions
```

Retrieves the list of descriptions for the specified event property set type

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('en')",
          "type": "com.sap.apptot.es.Descriptions"
        },
        "LanguageCode": "en",
        "Description": "Engine"
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('de')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Descriptions('de')",
          "type": "com.sap.apptot.es.Descriptions"
        },
        "LanguageCode": "de",
        "Description": "Motor"
      }
    ]
  }
}
```

Example 6

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')?$expand=Properties/
Descriptions
```

Retrieves details of the specified event property set type along with the expanded list of properties and descriptions of the event property set type

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
      "type": "com.sap.apptot.es.EventPropertySetTypes"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "EventData",
    "Language": "",
    "PropertySetTypeDescription": "",
    "Properties": {
      "results": [{
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Properties(PropertyName='Speed',PropertySetType='core.automobiles%3AEngine')",

```



```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
Properties(PropertyName='Speed',PropertySetType='core.automobiles%3AEngine')",
        "type": "com.sap.apptot.es.Properties"
    },
    "Name": "Speed",
    "PropertySetType": "core.automobiles:Engine",
    "Type": "Numeric",
    "PropertyLength": null,
    "Descriptions": {
        "results": [{
            "LanguageCode": "de",
            "Description": "Motor"
        },
        {
            "LanguageCode": "en",
            "Description": "Engine Speed"
        }
    ]
    },
    {
        "__metadata": {
            "id": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
Properties(PropertyName='Temperature',PropertySetType='core.automobiles
%3AEngine')",
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
Properties(PropertyName='Temperature',PropertySetType='core.automobiles
%3AEngine')",
            "type": "com.sap.apptot.es.Properties"
        },
        "Name": "Temperature",
        "PropertySetType": "core.automobiles:Engine",
        "Type": "String",
        "PropertyLength": "128",
        "Descriptions": {
            "results": [{
                "LanguageCode": "en",
                "Description": "Engine Temperature"
            },
            {
                "LanguageCode": "de",
                "Description": "Motortemperatur"
            }
        ]
    }
    },
    {
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Descriptions"
            }
        }
    }
}

```

Related Information

[Event Property Set Type \[page 615\]](#)

8.3.3.3 Read all Event Property Set Types

Retrieves a list of event property set types from the database

With this method, you send a request to the server to retrieve all event property set types or a subset of event property set types according to the filter criteria provided. For a collective request for a set of event property set types, you have these options:

- You can restrict the set of event property set types to be retrieved by filter criteria based on name, version, package, and data category.
- You can define that the set of matching event property set types shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventPropertySetTypes`

Operation Type: CRUD

HTTP Method: `GET`

Permissions: `<td>.r`

Request Headers

Header	Required	Values
Accept	Yes	application/json

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$inlinecount	String	No	Total number of event property set types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <i>\$top</i> and <i>\$skip</i> parameters, the result contains the total count of event property set types available. • If you use this with <i>\$filter</i> parameter, the result contains the total count of event property set types based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are <i>Name</i>, <i>PackageName</i>, and <i>DataCategory</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are <i>Name</i>, <i>PackageName</i>, and <i>DataCategory</i>.
\$filter	String	No	Filter condition to be applied; valid fields are <i>Name</i>, <i>PackageName</i>, and <i>DataCategory</i>.

Request Example

```
/ES/v1/EventPropertySetTypes
```

Response

Response Status and Error Codes

Code	Description
200	Event property set types retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

/ES/v1/EventPropertySetTypes

Retrieves all event property set types

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "type": "com.sap.apptot.es.EventPropertySetTypes"
        },
        "Name": "core.automobiles:Engine",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": "en",
        "PropertySetTypeDescription": "Engine",
        "Properties": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Properties"
          }
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
          "type": "com.sap.apptot.es.EventPropertySetTypes"
        }
      }
    ]
  }
}
```

```

        "Name": "core.automobiles:Wheel",
        "PackageName": "core.bbautomobiles",
        "DataCategory": "EventData",
        "Language": "en",
        "PropertySetTypeDescription": "Wheel",
        "Properties": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Properties"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Descriptions"
            }
        }
    }
]
}
}

```

Example 2

/ES/v1/EventPropertySetTypes?\$expand=Properties

Retrieves all event property set types with the expanded list of their properties

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
          "type": "com.sap.apptot.es.EventPropertySetTypes"
        },
        "Name": "core.automobiles:Engine",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": "en",
        "PropertySetTypeDescription": "Engine Speed",
        "Properties": {
          "results": [
            {
              "Name": "Speed",
              "PropertySetType": "core.automobiles:Engine",
              "Type": "Numeric",
              "PropertyLength": null
            }
          ]
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AEngine')/Descriptions"
          }
        }
      },
      {
        "__metadata": {

```

```

        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
        "type": "com.sap.apptot.es.EventPropertySetTypes"
    },
    "Name": "core.automobiles:Engine",
    "PackageName": "core.automobiles",
    "DataCategory": "EventData",
    "Language": "en",
    "PropertySetTypeDescription": "Engine Temperature",
    "Properties": {
        "results": [
            {
                "Name": "Temperature",
                "PropertySetType": "core.automobiles:Engine",
                "Type": "String",
                "PropertyLength": "128"
            }
        ]
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AEngine')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
        "type": "com.sap.apptot.es.EventPropertySetTypes"
    },
    "Name": "core.automobiles:Wheel",
    "PackageName": "core.automobiles",
    "DataCategory": "EventData",
    "Language": "en",
    "PropertySetTypeDescription": "Wheel Temperature",
    "Properties": {
        "results": [
            {
                "Name": "Temperature",
                "PropertySetType": "core.automobiles:Wheel",
                "Type": "String",
                "PropertyLength": "128"
            }
        ]
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Descriptions"
        }
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
        "type": "com.sap.apptot.es.EventPropertySetTypes"
    },

```

```

        "Name": "core.automobiles:Wheel",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": "en",
        "PropertySetTypeDescription": "Wheel Pressure",
        "Properties": {
            "results": [
                {
                    "Name": "Pressure",
                    "PropertySetType": "core.automobiles:Wheel",
                    "Type": "String",
                    "PropertyLength": "127"
                }
            ]
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Descriptions"
            }
        }
    }
}

```

Example 3

/ES/v1/EventPropertySetTypes?\$expand=Descriptions

Retrieves all event property set types with the expanded list of their descriptions

```

{
    "d": {
        "results": [{
            "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AEngine')",
                "type": "com.sap.apptot.es.EventPropertySetTypes"
            },
            "Name": "core.automobiles:Engine",
            "PackageName": "core.automobiles",
            "DataCategory": "EventData",
            "Language": "",
            "PropertySetTypeDescription": "",
            "Properties": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AEngine')/Properties"
                }
            },
            "Descriptions": {
                "results": [{
                    "LanguageCode": "de",
                    "Description": "Motor"
                },
                {
                    "LanguageCode": "en",
                    "Description": "Engine"
                }
            ]
        },
        "Annotations": {

```

```

        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AEngine')/Annotations"
        }
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/EventPropertySetTypes('core.automobiles%3AWheel')",
            "type": "com.sap.apptot.es.EventPropertySetTypes"
        },
        "Name": "core.automobiles%3AWheel",
        "PackageName": "core.automobiles",
        "DataCategory": "EventData",
        "Language": "",
        "PropertySetTypeDescription": "",
        "Properties": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Properties"
            }
        },
        "Descriptions": {
            "results": [{
                "LanguageCode": "en",
                "Description": "Wheel"
            }]
        },
        "Annotations": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventPropertySetTypes('core.automobiles
%3AWheel')/Annotations"
            }
        }
    }
]
}

```

Related Information

[Event Property Set Type \[page 615\]](#)

8.3.3.4 Update an Event Property Set Type

With this method, you can to update the specified event property set type.

The [ETag](#) value is mandatory to update an event property set type. You must retrieve the [ETag](#) value of the event property set type using the GET (/ES/v1/EventPropertySetTypes('event property set type name')) service. The [ETag](#) value is assigned to the request header parameter If-Match in the PATCH request.

If you do not include the [ETag](#) value in the request header or if the [ETag](#) value is not correct, the server displays an error message.

Note

- You must specify the package name (to which the event property set type belongs) in the request payload.
- You cannot change the name of the event property set type using PATCH request.
- The valid operations for the properties are ADD, DELETE, and UPDATE.
 - You can add new properties, edit attributes of existing properties, or delete existing properties. You can edit and delete properties only if the event data does not exist.
- The valid operations for the annotations are ADD, DELETE, and UPDATE.
 - You can add annotation for an event property set type if nothing is already assigned and even though the data exists for the properties
 - You cannot add multiple annotations for the event property set type
 - You cannot add, delete, or change the annotation for an event property set type if it is referred in another event property set type
 - You cannot delete or change the already assigned annotation, if event data exists for the properties of the event property set type

After updating the event property set type, the system generates a new [ETag](#) value for the event property set type and replaces the old value with the new value.

Request

URI: `/ES/v1/EventPropertySetTypes('<event property set type name>')`

Operation Type: CRUD

HTTP Method: [PATCH](#)

Permissions: `<td>.u`

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific event property set type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Description
Name	Yes	Unique name of the event property set type

Request Example

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')
```

The following request payload adds a new property "Speed" for the property set type

core.automobiles:Engine:

```
{
  "PackageName": "core.automobiles",
  "Properties": [{
    "Name": "Speed",
    "Operation": "ADD",
    "Type": "Numeric",
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Engine Speed"
    },
    {
      "LanguageCode": "de",
      "Description": "Motordrehzahl"
    }
  ]
}]
}
```

Response

Response Status and Error Codes

Code	Description
204	Event property set type updated successfully.

Related Information

[Event Property Set Type \[page 615\]](#)

8.3.3.5 Delete an Event Property Set Type

With this method, you can delete an event property set type with a specific name.

The [ETag](#) value is mandatory to delete an event property set type. You must retrieve the [ETag](#) value of the event property set type using the GET (/ES/v1/EventPropertySetTypes('<event property set type name>')) service. The [ETag](#) value is assigned to the request header parameter If-Match in the PATCH request. If you do not include the [ETag](#) value in the request header or if the [ETag](#) value is not correct, the server displays an error message.

Request

URI: /ES/v1/EventPropertySetTypes('<event property set type name>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <tded>.r

Request Parameters

None

Request Example

```
/ES/v1/EventPropertySetTypes('core.automobiles:Engine')
```

Response

Response Status and Error Codes

Code	Description
204	Data deleted successfully.

Related Information

[Event Property Set Type \[page 615\]](#)

8.4 Thing Type and Sensor Type Mapping

Service for managing the mapping of a thing type to a sensor type

Pre-requisites

Configure the IoT service credentials using Thing Modeler data mapping credentials API:

<https://tm-data-mapping.cfapps.sap.hana.ondemand.com/v1/credentials>

See [Create Credentials \[page 822\]](#).

Functional Overview

Configuration OData service supports auto creation of Capabilities, Sensor Types, Property Set Types, Property Sets, Thing Type and Mappings in a single API. This is possible by using the following enhancements of the Thing Type OData service.

See [Thing Type \[page 374\]](#).

- New entities such as Capability, Sensor Type and Sensor Type to Thing Type Mapping
- An association between Thing Type Entity and Sensor Types
- An association between Thing Type and Sensor Type Mapping
- The above enhancement facilitates to auto create all the required artifacts in a single API call as per the OData specifications.
- This API will internally perform the following actions to create the artifacts:
 - REST APIs of IoT Services will be used to create Capabilities, Sensor Types and obtain the respective object IDs.
 - Thing Type is created in SAP IoT.
 - Sensor Type to Thing Type Mapping is created in SAP IoT.
- These enhancements are fully backward compatible and do not impact the existing usage of these APIs.
- If the additional data structures are found in the payload, then these API's will take care of auto creation.

Resource Path: `v2/Packages('<package name>')/ThingTypes`

Example for a base URI in a cloud foundry environment: `https://sap-iotaeexplore.iot-sap.cfapps.eu10.hana.ondemand.com/config-thing-sap/ThingConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
POST	Create a Thing Type and Sensor Type Mapping [page 642]	<code>/ThingConfiguration/v2/ Packages('<package name>')/ ThingTypes</code>	<code><thingconf >.c</code>
GET	Read a Thing Type with its Sensor Type Mappings [page 646]	<code>/ThingConfiguration/v2/ ThingTypes('<thing type name>')? \$expand=SensorTypeMappings/ MeasureMappings,SensorTypeMappings /TargetMappings</code>	<code><thingconf >.r</code>
GET	Read all Sensor Types associated with a Thing Type [page 649]	<code>ThingConfiguration/v2/ ThingTypes('<thing type name>')? \$expand=SensorTypes/ SensorTypeCapabilities/ Capabilities/Properties</code>	<code><thingconf >.r</code>
PATCH	Update Sensor Type Mappings or Sensor Types in the Thing Type [page 653]	<code>/ThingConfiguration/v2/ ThingTypes(<Thing Type Name>)</code>	<code><thingconf >.r</code>
DELETE	Delete a Thing Type with its Sensor Type Mappings [page 656]	<code>/ThingConfiguration/v2/ ThingTypes(<Thing Type Name>)</code>	<code><thingconf >.d</code>

i Note

- `<thingconf>` refers to the thing configuration application name.
- `<version>` refers to the version of the method, /v2

Thing Type Object Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Unique name of the thing type
Description	String	No	60	Description of the thing type for each language with the corresponding ISO language code
i Note If you include <code>Descriptions</code> along with the <code>CopySource</code> field, the method assigns these descriptions for the newly created thing type. If you do not include <code>Descriptions</code> along with the <code>CopySource</code> field, the method copies descriptions defined in the source thing type to the newly created thing type.				
PropertySets	Array of property set objects	No	-	Array of property sets that belong to the thing type
ThingTypeCategory	String	No	Fixed	Category of thing type Only the following values are supported: • <code>ASSET</code> – Indicates the root thing • <code>COMPONENT</code> – Indicates the sub-items of the <code>ASSET</code>
i Note You can define this only using /v2 version of the create method.				

Property	Type	Mandatory	Maximum Length	Description
CopySource	String	No	81	Name of the thing type You can use this field to specify the already existing thing type name, structure of which is copied to the new thing type to be created. Note - You can use this field only in the /v1 version of the create method. - You cannot specify any value other than the thing type name in this field. - You cannot create copy of a thing type that belongs to a package with scope=private. - In a request payload to copy an existing thing type, you can only specify the name of the new thing type, CopySource field, and Descriptions field.

SensorTypeMappings Properties

Property	Type	Mandatory	Maximum Length	Description
MappingId	String	No	81	ID of the mapping
Name	String	Yes	81	Name of the mapping
Description	String	No	60	Description of the mapping
MeasureMappings	Array	No	-	Array of MeasureMappings
TargetMappings	Array	No	-	Array of TargetMappings

MeasureMappings Properties

Property	Type	Mandatory	Maximum Length	Description
MappingId	String	No	81	ID of its parent mapping
SensorTypeName	String	Yes	81	Name of sensor type
SensorTypeId	String	No	81	ID of sensor type
CapabilityName	String	Yes	60	Name of capability
CapabilityId	String	No	60	ID of capability

Property	Type	Mandatory	Maximum Length	Description
CapabilityPropertyId	String	Yes	81	Name of Capability Property
ThingTypeName	String	Yes	81	Name of thing type
PropertySetTypeId	String	Yes	81	ID of Property Set Type
NamedPropertySetTypeId	String	Yes	81	ID of Named Property Set Type
NamedPropertySetTypePropertyId	String	Yes	81	ID of Property Set Type Property

TargetMappings Properties

Property	Type	Mandatory	Maximum Length	Description
MappingId	String	No	81	ID of its parent mapping
SensorTypeName	String	Yes	81	Name of sensor type
SensorTypeId	String	No	81	ID of sensor type
CapabilityName	String	Yes	60	Name of capability
CapabilityId	String	No	60	ID of capability
CapabilityPropertyId	String	Yes	81	Name of Capability Property
ThingTypeName	String	Yes	81	Name of thing type
PropertySetTypeId	String	Yes	81	ID of Reference Property Set Type
NamedPropertySetTypeId	String	Yes	81	ID of Named Property Set Type
NamedPropertySetTypeReferencePropertyId	String	Yes	81	ID of Reference Property Set Type Property of attribute type either <code>com.sap.iot.core.TargetValue</code> or <code>com.sap.iot.core.Command</code>

SensorTypes Properties

Property	Type	Mandatory	Maximum Length	Description
id	String	No	81	ID of Sensor Type
Name	String	Yes	81	Name of Sensor Type
SensorTypeCapabilities	Array	Yes	-	Array of SensorTypeCapabilities

SensorTypeCapabilities Properties

Property	Type	Mandatory	Maximum Length	Description
Capabilities	Object	Yes	-	Capability Object

Property	Type	Mandatory	Maximum Length	Description
Type	String	Yes	81	Type of capability. It can be either measure or command.

Capabilities Properties

Property	Type	Mandatory	Maximum Length	Description
id	String	No	81	ID of Capability
Name	String	Yes	81	Name of Capability
Properties	Array	-	-	Array of Properties

Properties

Property	Type	Mandatory	Maximum Length	Description
Name	String	Yes	81	Name of Capability Property
DataType	String	Yes	81	Data Type of Capability Property
UnitOfMeasure	String	No	50	Unit of Measure of Capability Property

Thing Type Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Note

This part of the documentation is only relevant to you if you do not have a new SAP IoT license under which the Device Connectivity feature is an integral part of SAP IoT.

You can find out which type of license you're using by going to your SAP BTP subaccount in the SAP BTP Cockpit and looking under Subscriptions.

- If you're subscribed to SAP IoT (new license: oneproduct application plan), this documentation is not relevant to you.
- If you're subscribed to SAP Leonardo IoT (older license: standard application plan), this documentation is relevant to you.

8.4.1 Create a Thing Type and Sensor Type Mapping

With this method, you create thing types and sensor type mappings in a specific package.

Naming convention for thing type

- Always prefixed with the package name.

- Can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.
- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object name. The syntax is: <package>:<name>. For example: core.automobiles:FlyWheel
- Name must be unique within a package.

Request

URI: /ThingConfiguration/v2/Packages ('<package name>') /ThingTypes

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <thingconf>.c

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is EN.

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	string	Unique name of the package

Request Example

```
/ThingConfiguration/v2/Packages ('core.automobiles:BMWCarX2') /ThingTypes
```

Creates the thing type core.automobiles:BMWCarX2 in the packagecore.automobiles. This also creates sensor types and capabilities in the IoT services, and sensor type mappings in the SAP IoT.

Note

Sensor type, capability and property names in sensor types JSON fragment should match with sensor type, capability and property names in Sensor Type Mapping JSON fragment.

Payload

Format: *JSON*

```
{
  "Name": "core.automobiles:BMWCarX2",
  "PackageName": "core.automobiles",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "name of the thing type"
  }],
  "PropertySets": [
    {
      "Name": "BMWCarWheel",
      "PropertySetType": "core.automobiles:VehicleWheel",
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "BMW Car wheel info"
      }]
    },
    {
      "Name": "BMWCarEngine",
      "PropertySetType": "core.automobiles:VehicleEngine",
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "BMW Car engine info"
      }]
    }
  ],
  "SensorTypeMappings": [{
    "Descriptions": [{
      "LanguageCode": "en",
      "Description": "Car Sensor Type Mappings"
    }],
    "Name": "CarSensorTypeMappings",
    "MeasureMappings": [
      {
        "CapabilityPropertyId": "pressurecapability",
        "NamedPropertySetTypePropertyId": "pressure",
        "SensorTypeName": "smartwheel",
        "CapabilityName": "wheelcapability",
        "PropertySetTypeId": "core.automobiles:VehicleWheel",
        "NamedPropertySetTypeId": "BMWCarWheel"
      },
      {
        "CapabilityPropertyId": "speedcapability",
        "NamedPropertySetTypePropertyId": "speed",
        "SensorTypeName": "smartwheel",
        "CapabilityName": "wheelcapability",
        "PropertySetTypeId": "core.automobiles:VehicleWheel",
        "NamedPropertySetTypeId": "BMWCarWheel"
      },
      {
        "CapabilityPropertyId": "tempcapability",
        "NamedPropertySetTypePropertyId": "temperature",
        "SensorTypeName": "smartengine",
        "CapabilityName": "enginecapability",
        "PropertySetTypeId": "core.automobiles:VehicleEngine",
        "NamedPropertySetTypeId": "BMWCarEngine"
      }
    ]
  },
  "TargetMappings": [
    {
      "CapabilityPropertyId": "rtempcapability",
      "SensorTypeName": "rsmartengine",
      "CapabilityName": "renginecapability",
      "PropertySetTypeId": "core.automobiles:VehicleEngineRef",
    }
  ]
}
```

```

        "NamedPropertySetTypeId": "BMWCarEngine",
        "NamedPropertySetTypeReferencePropertyId": "temperatureTV"
    }
  ],
  "SensorTypes": [{
    "Name": "smartwheel",
    "SensorTypeCapabilities": [{
      "Capability": {
        "Name": "wheelcapability",
        "Properties":
          [
            {
              "Name": "pressurecapability",
              "DataType": "Integer"
            }
          ],
      },
      {
        "Name": "speedcapability",
        "DataType": "Integer"
      }
    ]
  },
  {
    "Type": "measure"
  }
  ]
}, {
  "Name": "smartengine",
  "SensorTypeCapabilities": [{
    "Capability": {
      "Name": "enginecapability",
      "Properties":
        [
          {
            "Name": "tempcapability",
            "DataType": "Integer"
          }
        ]
    },
    {
      "Type": "measure"
    }
  ]
},
{
  "Name": "rsmartengine",
  "SensorTypeCapabilities": [{
    "Capability": {
      "Name": "reenginecapability",
      "Properties":
        [
          {
            "Name": "rtempcapability",
            "DataType": "Integer"
          }
        ]
    },
    {
      "Type": "command"
    }
  ]
}
}]
}

```

Response

Response Status and Error Codes

Code	Description
201	Thing type and sensor type mapping created successfully

8.4.2 Read a Thing Type with its Sensor Type Mappings

With this method, you can retrieve the details of a thing type with its sensor type mappings.

Request

URI: `/ThingConfiguration/v2/ThingTypes('<thing type name>')?$expand=SensorTypeMappings/MeasureMappings,SensorTypeMappings/TargetMappings`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	string	Name of the thing type

Request Example

`ThingConfiguration/v2/ThingTypes('core.automobiles:BMWCarX2')?$expand=SensorTypeMappings/MeasureMappings,SensorTypeMappings/TargetMappings`

```
{
  "d": {
    "__metadata": {
      "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')",
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')",
      "type": "com.sap.apptot.ThingType"
    },
    "Name": "core.automobiles:BMWCarX2",
    "PackageName": "core.automobiles",
    "Description": "name of the thing type",
  }
}
```

```

    "ExtendedThingType": null,
    "ThingTypeCategory": null,
    "PropertySets": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/PropertySets"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/Descriptions"
      }
    },
    "ThingTemplates": {
      "__deferred": {
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/ThingTemplates"
      }
    },
    "SensorTypeMappings": {
      "results": [
        {
          "__metadata": {
            "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeMappings('957f52c2-498d-4f99-a92a-bfbf9064d047')",
            "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeMappings('957f52c2-498d-4f99-a92a-bfbf9064d047')",
            "type": "com.sap.apptot.SensorTypeMapping"
          },
          "MappingId": "957f52c2-498d-4f99-a92a-bfbf9064d047",
          "Name": "CarSensorTypeMappings",
          "Description": null,
          "ThingTypeName": "core.automobiles:BMWCarX2",
          "Descriptions": {
            "__deferred": {
              "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeMappings('957f52c2-498d-4f99-a92a-bfbf9064d047')/Descriptions"
            }
          },
          "ThingTypes": {
            "__deferred": {
              "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeMappings('957f52c2-498d-4f99-a92a-bfbf9064d047')/ThingTypes"
            }
          },
          "MeasureMappings": {
            "results": [
              {
                "MappingId": "957f52c2-498d-4f99-a92a-bfbf9064d047",
                "SensorTypeName": "smartwheel",
                "CapabilityName": "wheelcapability",
                "SensorTypeId": "614a04d5-ed4c-48e3-b34b-45ff3a05614c",
                "CapabilityId": "5522437a-717c-48cf-a444-a9fa97003b2a",
                "ThingTypeName": "core.automobiles:BMWCarX2",
                "CapabilityPropertyId": "pressurecapability",
                "PropertySetTypeId": "core.automobiles:VehicleWheel",
                "NamedPropertySetTypeId": "BMWCarWheel",
                "NamedPropertySetTypePropertyId": "pressure"
              }
            ]
          }
        }
      ]
    }
  }
}

```

```

    },
    {
      "MappingId": "957f52c2-498d-4f99-a92a-
bfbf9064d047",
      "SensorTypeName": "smartwheel",
      "CapabilityName": "wheelcapability",
      "SensorTypeId": "614a04d5-ed4c-48e3-
b34b-45ff3a05614c",
      "CapabilityId": "5522437a-717c-48cf-a444-
a9fa97003b2a",
      "ThingTypeName": "core.automobiles:BMWCarX2",
      "CapabilityPropertyId": "speedcapability",
      "PropertySetTypeId":
"core.automobiles:VehicleWheel",
      "NamedPropertySetTypeId": "BMWCarWheel",
      "NamedPropertySetTypePropertyId": "speed"
    },
    {
      "MappingId": "957f52c2-498d-4f99-a92a-
bfbf9064d047",
      "SensorTypeName": "smartengine",
      "CapabilityName": "enginecapability",
      "SensorTypeId": "e969e979-3f62-447f-aeb2-
dc0beb3a486b",
      "CapabilityId": "6e55194b-d364-4457-8942-
b58b9277205a",
      "ThingTypeName": "core.automobiles:BMWCarX2",
      "CapabilityPropertyId": "tempcapability",
      "PropertySetTypeId":
"core.automobiles:VehicleEngine",
      "NamedPropertySetTypeId": "BMWCarEngine",
      "NamedPropertySetTypePropertyId": "temperature"
    }
  ],
  "TargetMappings": {
    "results": [
      {
        "MappingId": "957f52c2-498d-4f99-a92a-
bfbf9064d047",
        "SensorTypeName": "rsmartengine",
        "CapabilityName": "renginecapability",
        "SensorTypeId": "7d1ca23d-0686-4f20-
ad88-873df4462e20",
        "CapabilityId": "942507ec-99bd-41b9-90e6-
cc994b6d0a9a",
        "ThingTypeName": "core.automobiles:BMWCarX2",
        "CapabilityPropertyId": "rtempcapability",
        "PropertySetTypeId":
"core.automobiles:VehicleEngineRef",
        "NamedPropertySetTypeId": "BMWCarEngine",
        "NamedPropertySetTypeReferencePropertyId":
"temperatureTV"
      }
    ]
  }
},
  "SensorTypes": {
    "__deferred": {
      "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/SensorTypes"
    }
  }
}
}

```

Response

Response Status and Error Codes

Code	Description
200	Details of a specific thing type with its sensor type mappings retrieved successfully

8.4.3 Read all Sensor Types associated with a Thing Type

With this method, you get the thing type and sensor types used in mappings.

Request

URI: `ThingConfiguration/v2/ThingTypes('<thing type name>')?$expand=SensorTypes/SensorTypeCapabilities/Capabilities/Properties`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thingconf>.r`

Request Headers

Header	Required	Values
<code>Accept-Language</code>	No	Language of the thing type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
<code>Name</code>	Yes	string	Name of the thing type

Request Example

```
ThingConfiguration/v2/ThingTypes('core.automobiles:BMWCarX2')?$expand=SensorTypes/SensorTypeCapabilities/Capabilities/Properties
```

Payload

Format: [JSON](#)

```
{
```

```

    "d": {
      "__metadata": {
        "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')",
        "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')",
        "type": "com.sap.apptot.ThingType"
      },
      "Name": "core.automobiles:BMWCarX2",
      "PackageName": "core.automobiles",
      "Description": "name of the thing type",
      "ExtendedThingType": null,
      "ThingTypeCategory": null,
      "PropertySets": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/PropertySets"
        }
      },
      "Descriptions": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/Descriptions"
        }
      },
      "ThingTemplates": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/ThingTemplates"
        }
      },
      "SensorTypeMappings": {
        "__deferred": {
          "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/ThingTypes('core.automobiles%3ABMWCarX2')/SensorTypeMappings"
        }
      },
      "SensorTypes": {
        "results": [
          {
            "__metadata": {
              "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypes('e969e979-3f62-447f-aeb2-dc0beb3a486b')",
              "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypes('e969e979-3f62-447f-aeb2-dc0beb3a486b')",
              "type": "com.sap.apptot.SensorType"
            },
            "id": "e969e979-3f62-447f-aeb2-dc0beb3a486b",
            "Name": "smartengine",
            "SensorTypeCapabilities": {
              "results": [
                {
                  "__metadata": {
                    "id": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeCapabilities(SensorTypeId='e969e979-3f62-447f-aeb2-dc0beb3a486b',CapabilityId='6e55194b-d364-4457-8942-b58b9277205a')",
                    "uri": "https://config-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypeCapabilities(SensorTypeId='e969e979-3f62-447f-aeb2-dc0beb3a486b',CapabilityId='6e55194b-d364-4457-8942-b58b9277205a')",
                    "type": "com.sap.apptot.SensorTypeCapability"
                  }
                ]
              }
            }
          ]
        }
      }
    }
  }

```



```

        "SensorTypeId": "e969e979-3f62-447f-aeb2-
dc0beb3a486b",
        "CapabilityId": "6e55194b-d364-4457-8942-
b58b9277205a",
        "Type": "measure",
        "Capabilities": {
            "_metadata": {
                "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/Capabilities('6e55194b-
d364-4457-8942-b58b9277205a')",
                "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/Capabilities('6e55194b-
d364-4457-8942-b58b9277205a')",
                "type": "com.sap.appiot.Capability"
            },
            "id": "6e55194b-d364-4457-8942-b58b9277205a",
            "Name": "enginecapability",
            "Properties": {
                "results": [
                    {
                        "Name": "tempcapability",
                        "CapabilityId": "6e55194b-
d364-4457-8942-b58b9277205a",
                        "UnitOfMeasure": "ff"
                    }
                ]
            }
        }
    },
    {
        "_metadata": {
            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypes('614a04d5-
ed4c-48e3-b34b-45ff3a05614c')",
            "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/SensorTypes('614a04d5-
ed4c-48e3-b34b-45ff3a05614c')",
            "type": "com.sap.appiot.SensorType"
        },
        "id": "614a04d5-ed4c-48e3-b34b-45ff3a05614c",
        "Name": "smartwheel",
        "SensorTypeCapabilities": {
            "results": [
                {
                    "_metadata": {
                        "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/
SensorTypeCapabilities(SensorTypeId='614a04d5-ed4c-48e3-
b34b-45ff3a05614c',CapabilityId='5522437a-717c-48cf-a444-a9fa97003b2a')",
                        "uri": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/
SensorTypeCapabilities(SensorTypeId='614a04d5-ed4c-48e3-
b34b-45ff3a05614c',CapabilityId='5522437a-717c-48cf-a444-a9fa97003b2a')",
                        "type": "com.sap.appiot.SensorTypeCapability"
                    },
                    "SensorTypeId": "614a04d5-ed4c-48e3-
b34b-45ff3a05614c",
                    "CapabilityId": "5522437a-717c-48cf-a444-
a9fa97003b2a",
                    "Type": "measure",
                    "Capabilities": {
                        "_metadata": {
                            "id": "https://config-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingConfiguration/v2/
Capabilities('5522437a-717c-48cf-a444-a9fa97003b2a')",

```



```

    },
    "id": "942507ec-99bd-41b9-90e6-cc994b6d0a9a",
    "Name": "enginecapability",
    "Properties": {
      "results": [
        {
          "Name": "rtempcapability",
          "CapabilityId":
            "942507ec-99bd-41b9-90e6-cc994b6d0a9a",
          "UnitOfMeasure": "ff"
        }
      ]
    }
  }
}

```

Response

Response Status and Error Codes

Code	Description
200	Details of a specific thing type with its sensor types used in mappings, retrieved successfully

8.4.4 Update Sensor Type Mappings or Sensor Types in the Thing Type

With this method, you can update the sensor type mappings in the thing type.

Sensor Type Mappings

The valid operations are `ADD`, `DELETE`, and `UPDATE`.

The operations are available for overall sensor type mapping, and also to measure mappings and target mappings in the mappings.

Overall Sensor Type Mappings

The valid operations are `ADD`, `DELETE`, and `UPDATE`.

`ADD`: Adds a new sensor type mapping to the existing list of sensor type mappings

`UPDATE`: Updates the name or descriptions of an existing sensor type mapping

`DELETE`: Deletes the mapping from the existing list of mappings

Measure Mapping Inside a Sensor Type Mapping

The valid operations are `ADD`, `DELETE`, and `UPDATE`.

`ADD`: Adds a new measure mapping to the existing list of measure mappings

`UPDATE`: Updates the existing measure mapping

`DELETE`: Deletes the existing measure mapping

Target Mapping Inside a Sensor Type Mapping

The valid operations are `ADD`, `DELETE`, and `UPDATE`.

`ADD`: Adds a new target mapping to the existing list of target mappings

`UPDATE`: Updates the existing target mapping

`DELETE`: Deletes the existing target mapping

Sensor Types

The valid operations are `ADD`, `DELETE`, and `UPDATE`.

The operations are available for overall sensor types, and also capability assignment within the sensor type.

Overall Sensor Type

`ADD`: Creates a sensor type in IoT services

`UPDATE`: Updates the sensor type name in IoT services

`DELETE`: Deletes the sensor type from IoT services

Capability Assignment within the Sensor Type

ADD: Creates a new capability, and assigns to sensor type in IoT services

UPDATE: Updates the capability type to **measure** or **command**

DELETE: Unassigns the capability from the sensor type

Request

URI: `/ThingConfiguration/v2/ThingTypes(<Thing Type Name>)`

Operation Type: CRUD

HTTP Method: *PUT*

Permissions: `<thingconf>.u`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is <i>en</i> .
If-Match	Yes	Latest ETag value of a specific thing type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
thing type name	Yes	String	Name of the thing type

Request Example

This request deletes sensor type mapping for the property "pressure" which is part of NamedPropertySet "BMWCarWheel" and PropertySet "core.automobiles:VehicleWheel".

```
/ThingConfiguration/v2/ThingTypes('core.automobiles:BMWCarX2')
```

Payload

Format: *JSON*

```
{
  "Name": "core.automobiles:BMWCarX2",
  "PackageName": "core.automobiles",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "name of the thing type"
  }],
}
```

```

    "SensorTypeMappings": [{
      "Descriptions": [{
        "LanguageCode": "en",
        "Description": "Car Sensor Type Mappings"
      }],
      "MappingId": "86d6c4d7-9524-40f3-b4c9-4a23b98be73b",
      "Name": "CarSensorTypeMappings",
      "Operation": "UPDATE",
      "MeasureMappings": [
        {
          "MappingId": "86d6c4d7-9524-40f3-b4c9-4a23b98be73b",
          "CapabilityPropertyId": "pressurecapability",
          "NamedPropertySetTypePropertyId": "pressure",
          "SensorTypeName": "smartwheel",
          "SensorTypeId": "425d218e-4ca3-4905-a635-deed261df7c1",
          "CapabilityId": "d874bb8a-a668-43ec-a17d-ad0afffc8f82",
          "CapabilityName": "wheelcapability",
          "PropertySetTypeId": "core.automobiles:VehicleWheel",
          "NamedPropertySetTypeId": "BMWCarWheel",
          "Operation": "DELETE"
        }
      ]
    }
  ]
}

```

Response

Response Status and Error Codes

Code	Description
204	The sensor type mappings in the thing type updated successfully

8.4.5 Delete a Thing Type with its Sensor Type Mappings

With this method, you can delete the thing type and all the mappings associated to it.

The **ETag** value is mandatory to delete a thing type. You must retrieve the **ETag** value of the thing type using the **GET (/ThingConfiguration/v2/ThingTypes('<thing type name>'))** service. The **ETag** value is assigned to the request header parameter **If-Match** in the **PATCH** request. If you do not include the **ETag** value in the request header, the server sends HTTP response code 428. If the **ETag** value is not correct, the server sends HTTP response code 412.

Note

- You cannot delete a thing type if one of the following reasons is true:
 - Extended to another thing type
 - Things are already created
- If you delete a thing type which has been mapped to one or more sensor types, the system automatically deletes all the mappings referring to that thing type.

Request

URI: /ThingConfiguration/v2/ThingTypes(<Thing Type Name>)

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <thingconf>.d

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific thing type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
thing type name	Yes	String	Unique name of the thing type

Request Example

```
/ThingConfiguration/v2/ThingTypes('core.automobiles:BMWCarX2')
```

Response

Response Status and Error Codes

Code	Description
204	Thing Type and its mappings deleted successfully

9 Custom Master Data

In intelligent enterprises, business benefit is derived by combining sensor data and business data. This is achieved by enriching sensor data by adding business context to it. Business context can come in different forms. It can be master data information (such as Material, Customer, Vendor, Employee, Business Partner, Product, and so on) or it can be information about business transactions (Sales Order, Goods Receipt, Service Request, Purchase Requisition, and so on). Supporting master data and business transactions is essential for customers to realize the true business value.

Things are often related to backend master data objects and business transaction objects as part of the end-to-end process in the intelligent enterprise. To enable generic things to be integrated into business processes, associations between thing instances and master data objects are requested.

i Note

Association-related operations are deprecated and will continue to be available on the AWS landscape for a limited period of time.

Pagination

Retrieving more number of objects than the recommended limits with only one collective GET request can lead to a high system load and a significant increase of response times. To avoid performance decline, we limit the number of objects to be retrieved in a single collective GET call, using the concept of paging. The default value of server size paging is set to 500 from next release, and this can still be modified using the paging options such as `$top` and `$skip`, but however the value will not exceed the server size page value.

`$top`: With the query option `$top`, the user can specify the maximum number of entries that should be returned, starting from the beginning. The default value of `$top`, if not explicitly mentioned, will be equal to the size of the server paging (in this case 500).

`$skip`: With the query option `$skip`, the user can specify the number of entries that should be ignored at the beginning of a collection. So if a user specifies `$skip=n`, then this returns the list of entries starting at position `n+1`. The default value of skip would be skip token, if passed, else the value of the server size paging is considered.

9.1 Object Types

Define a master data or transaction data object type.

A master data object type is defined with at least:

- the object type

- the language dependent object type description

In addition to the above, you can define up to 15 property types per object type, which support the standard data types (not large string, for example) as well as the enumerations with language dependent descriptions.

i Note

Deletion of a master data object type shall only be allowed if there is no instance existing.

Resource Path: `http://<server address>[:<port number>][<path>]/CustomDataConfiguration`

Example for a base URI in a cloud foundry environment: `https://sap-iotaeexplore.iot-sap.cfapps.eu10.hana.ondemand.com/config-customdata-sap/CustomDataConfiguration`

Operations

CRUD Operations

i Note

v1 API is for AWS landscape while v2 API supports all landscapes.

HTTP Method	Operation	URI (v1)	URI (v2)
GET	Read an Object Type [page 667]	<code>/CustomDataConfiguration/v1/ ObjectTypes ('<ObjectName>')</code>	<code>/CustomDataConfiguration/v2/ ObjectTypes ('<ObjectName>')</code>
GET	Read all Object Types of a Package [page 676]	<code>/CustomDataConfiguration/v1/ Packages ('<PackageID>') / ObjectTypes</code>	<code>/CustomDataConfiguration/v2/ Packages ('<PackageID>') / ObjectTypes</code>
GET	Read all Object Types [page 671]	<code>/CustomDataConfiguration/v1/ ObjectTypes</code>	<code>/CustomDataConfiguration/v2/ ObjectTypes</code>

HTTP Method	Operation	URI (v1)	URI (v2)
<i>POST</i>	Create an Object Type [page 660]	/CustomDataConfiguration/v1/ Packages ('<PackageID>') / ObjectTypes	/CustomData Configurat ion/v2/ Packages (' <PackageID >') / ObjectType s
<i>PATCH</i>	Update an Object Type [page 665]	/CustomDataConfiguration/v1/ ObjectTypes ('<ObjectTypeName>')	/CustomData Configurat ion/v2/ ObjectType s ('<Object TypeName>')
<i>DELETE</i>	Delete an Object Type [page 680]	/CustomDataConfiguration/v1/ ObjectTypes ('<ObjectTypeName>')	/CustomData Configurat ion/v2/ ObjectType s ('<Object TypeName>')

9.1.1 Create an Object Type

This operation helps to create a new object type with a maximum of 15 properties, along with translations in different languages. For example, Material is an object type having Density and Quantity as its properties.

i Note

- In the configuration, you can define any number of object types. However, you can create only one object type per `POST` request. You can create more number of object types for a package through multiple `POST` requests.

Naming convention for object types

- It is always prefixed with the package name.
- It can be a combination of alphanumeric characters and underscore.
- Each name must be fully qualified and contains a package name, colon as a separator and the object name. Maximum length of fully qualified name is 81 characters.
- Do not start the object name with a digit or an underscore.
- Length should be at least 3 characters.

- Camel case is generally allowed, however there is a uniqueness check carried out against textual case conflicts:
 - Two names with same characters of different textual case is not allowed. For example: A value "AbcDef" is not accepted when there is another value "abcDEF" that exists.
- Verify that a colon is used only to separate a package name and the object type name. The syntax is: <package>:<name>. For example: core.rawmaterial:material
- Name must be unique within a package.
- Only the following characters are supported:
 - Uppercase and lowercase alphabets *a* through *z* and *A* through *Z*
 - Numeric digits 0 through 9
 - Punctuation marks underscore (*_*), hyphen (*-*), colon (*:*), and full-stop (*.*)
- Maximum length is 50 characters.
- Property names have to be unique for a given set of object types.

Annotation

Annotation is an array of attributes that are used to qualify the properties of an Object Type. Annotations can be defined both for an Object Type and for its Property type.

Annotation for an Object Type

For an Object Type, annotation can be used to mark the Object Type as sensitive or personal.

Only one of the following annotations is supported for an Object Type:

- `com.sap.appiot.security:pii` (personal information)
You can assign this annotation to an Object Type that contains data to identify a person or subject. Data such as nick name, birth date, and email address are few examples that can be categorized as data that identifies a person.
- `com.sap.appiot.security:spi` (sensitive personal information)
You can assign this annotation to an Object Type that contains critical data of a person. Data such as identification number, ethnic origin, and biometric data are few examples that can be categorized as critical data of a person.
After you define the annotations, all properties of the object type are considered as personal data or sensitive data based on the annotations defined. You can remove or add the annotation for the object type, only if data does not exist for the properties of the object type. Whenever you create or modify data for properties that are identified as personal data or sensitive data, the system will generate audit logs.

Example to create Object Type with Annotation

API: /CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes

```
{
  "Name": "iotae.devtest1.cdemo:PartnerInfo",
  "PackageName": "iotae.devtest1.cdemo",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Person Data"
    }
  ],
  "Source": "ERP",
  "IsMultiLingual": false,
  "Annotations": [
    {
      "Name": "com.sap.appiot.security:pii"
    }
  ]
}
```

```

    }
  ],
  "Properties": [
    {
      "Name": "Partner_Name",
      "Type": "String",
      "PropertyLength": "130"
    }
  ]
}

```

Annotation for a Property of Object Type

You can define annotation in a package (refer the thing configuration API [Annotation \[page 510\]](#)) and assign it to the property of an object type that belongs to the same package of an Annotation.

Example to create an Object Type with Property Annotation (assuming `iotae.devtest1.cdemo:CustomAnnotation1` is already created using thing configuration API)

API: `/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes`

```

{
  "Name": "iotae.devtest1.cdemo:PartnerInfo",
  "PackageName": "iotae.devtest1.cdemo",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Person Data"
  }],
  "Source": "ERP",
  "IsMultiLingual": false,
  "Properties": [{
    "Name": "Partner_Name",
    "Type": "String",
    "PropertyLength": "130",
    "Annotations": [{
      "Name": " iotae.devtest1.cdemo:CustomAnnotation1"
    }]
  }]
}

```

Request

URI: `/CustomDataConfiguration/v2/Packages('<package name>')/ObjectTypes`

Operation Type: CRUD

HTTP Method: [POST](#)

Permissions: `<cdconf>.c`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the object type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Request Example

/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes

Payload

Format: JSON

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following example.

Example

/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes

```
{
  "Name": "iotae.devtest1.cdemo:Material",
  "PackageName": "iotae.devtest1.cdemo",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Material Data"
    }
  ],
  "Source": "Material Management",
  "IsMultiLingual": true,
  "Properties": [
    {
      "Name": "MATNR",
      "Type": "String",
      "PropertyLength": "120",
      "IsMultiLingual": false
    }, {
      "Name": "Material_Type",
      "Type": "String",
      "PropertyLength": "120",
      "IsMultiLingual": true
    }
  ]
}
```

Response

Response Headers

Header	Description
ETag	87FF06A3B6784A3B9F4A6EC3F9EA0675

Response Status and Error Codes

Code	Description
201	Object type created successfully for a specific package

Response Payload Example

```
{
  "d": {
    "__metadata": {
      "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "type": "com.sap.apptot.ObjectType"
    },
    "Name": "iotae.devtest1.cdemo:Material",
    "PackageName": "iotae.devtest1.cdemo",
    "Description": "",
    "IsMultiLingual": true,
    "NumberOfProperties": null,
    "Source": "Material Management",
    "Annotations": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
      }
    },
    "Properties": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
      }
    }
  }
}
```

With Annotation

Example

/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes

```
{
  "Name": "iotae.devtest1.cdemo:Material1",
  "PackageName": "iotae.devtest1.cdemo",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Material Data"
    }
  ],
  "Source": "Material Management",
  "IsMultiLingual": true,
}
```

```

"Annotations": [
  {
    "Name": "com.sap.appiot.security:pii"
  }
],
"Properties": [
  {
    "Name": "MATNR",
    "Type": "String",
    "PropertyLength": "120",
    "IsMultiLingual": false
  }, {
    "Name": "Material_Type",
    "Type": "String",
    "PropertyLength": "120",
    "IsMultiLingual": true
  }
]
}

```

9.1.2 Update an Object Type

With this method, you can update the details of the specified object type.

You can update the object type as follows:

- You can add annotation, delete or change annotation that is already assigned to the object type.
- You can add new properties, edit the existing properties, or delete the existing properties.
- You can add, change, or delete the annotation assigned to the property of an object type.
- You can add the field `IsMultiLingual=true` to support multiple languages for its string type properties, if the object type was not already supporting multiple languages. This is possible only if there is no data already existing for those properties.
- You can only increase the length of the property, if data already exists for the property and the data type is **String**. For any other data types, you cannot change the property.
- You can add new properties by reusing the property types, if the following conditions are true:
 - Property type and object type belongs to the same package.

The `Etag` value is mandatory to update an object type. You must retrieve the `Etag` value of the object type using the `GET (/CustomDataConfiguration/v1/ObjectTypes('<object type name>'))` service. The `Etag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `Etag` value in the request header, the server sends HTTP response code 428. If the `Etag` value is not correct, the server sends HTTP response code 412.

After updating an object type, the system generates a new `Etag` value for the object type and replaces the old value with the new value.

Note

- You cannot change the name of the object type.
- If you are not editing the already assigned annotation for a property, you must still specify the annotation details for the property in the request payload. If you do not specify the details, the service deletes the assignment and the annotation is no more assigned to that property.
- You cannot change the value of the `IsMultiLingual` field for an object type, if data already exists for its properties.

- The valid operations for the properties are ADD, DELETE, and UPDATE.
 - You cannot change the value of the field `IsMultiLingual`, if data already exists for that property.
 - You can add the field `IsMultiLingual=true` or `IsMultiLingual=false` for the string type property, if data does not exist and the object type supports multiple languages.
- The valid operations for the annotations of the object type are ADD, DELETE, and UPDATE.
 - You can add annotation for an object type if nothing is already assigned and even though the data exists for the properties.
 - You cannot add multiple annotations for the object type.
 - You cannot delete or change the already assigned annotation, if data exists for the properties of the object type.

Request

URI: `/CustomDataConfiguration/v2/ObjectTypes('<ObjectName>')`

Operation Type: CRUD

HTTP Method: [PATCH](#)

Permissions: `<cdconf>.u`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the object type description. The default language is en .
If-Match	Yes	Latest Etag value of a specific object type name that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
object type name	Yes	String	Name of the object type

Request Example

`/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')`

Payload

Format: JSON

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "Name": "iotae.devtest1.cdemo:Material1",
```



```

"PackageName": "iotae.devtest1.demo",
"Descriptions": [
  {
    "LanguageCode": "en",
    "Description": "Material Data"
  }
],
"Source": "Material Management",
"IsMultiLingual": true,
"Properties": [
  {
    "Operation": "ADD",
    "Name": "Material_Description",
    "Type": "String",
    "PropertyLength": "120",
    "IsMultiLingual": true
  },
  {
    "Operation": "DELETE",
    "Name": "Material_Type"
  }
]
}

```

Note

You cannot update the object type name using the `PATCH` request. The object type name specified in the request payload is ignored for update.

Response

Response Status and Error Codes

Code	Description
204	Details of the specified object type updated successfully

9.1.3 Read an Object Type

With this method, you can retrieve the details of a specific object type.

In order to read a given object type, we have to provide the object type name.

Request

URI: `/CustomDataConfiguration/v2/ObjectTypes('<ObjectName>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdconf>.r

Request Parameters

Parameter	Required	Data Type	Description
\$expand	No	String	Helps to get all the properties for the specified object type

Request Example

```
/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')
```

Response

Response Headers

Header	Value
Etag	DC68FB05A8AB46619F7F6E22F5F5241F

Response Status and Error Codes

Code	Description
200	Details of a specific object type retrieved successfully

Response Payload Example

```
/CustomDataConfiguration/v2/  
ObjectTypes('iotae.devtest1.aejob.automobilestes:testOT1308')/Properties
```

```
{  
  "d": {  
    "results": [  
      {  
        "__metadata": {  
          "id": "https://config-customdata-sap-  
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/  
Properties(Name='testProperty1',ObjectType='iotae.devtest1.aejob.automobilestes  
%3AtestOT1308')",  
          "uri": "https://config-customdata-sap-  
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/  
Properties(Name='testProperty1',ObjectType='iotae.devtest1.aejob.automobilestes  
%3AtestOT1308')",  
          "type": "com.sap.appiot.Property"  
        },  
        "Name": "testProperty1",  
        "ObjectType": "iotae.devtest1.aejob.automobilestes:testOT1308",  
        "Description": "Test Object Type 7",  
        "Type": "String",  
        "PropertyLength": "128"  
      },  
      {  
        "__metadata": {  
          "id": "https://config-customdata-sap-  
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/  
Properties(Name='testProperty2',ObjectType='iotae.devtest1.aejob.automobilestes  
%3AtestOT1308')",
```

```

        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
Properties(Name='testProperty2',ObjectType='iotae.devtest1.aejob.automobilestes
%3AtestOT1308')",
        "type": "com.sap.apptot.Property"
    },
    "Name": "testProperty2",
    "ObjectType": "iotae.devtest1.aejob.automobilestes:testOT1308",
    "Description": "Test Object Type 8",
    "Type": "String",
    "PropertyLength": "128"
}
]
}
}

```

/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')

```

{
  "d": {
    "__metadata": {
      "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "type": "com.sap.apptot.ObjectType"
    },
    "Name": "iotae.devtest1.cdemo:Material",
    "PackageName": "iotae.devtest1.cdemo",
    "Description": "Material Data",
    "IsMultilingual": true,
    "NumberOfProperties": null,
    "Source": "Material Management",
    "Annotations": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
      }
    },
    "Properties": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
      }
    }
  }
}

```

With \$expand=Properties

/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')?
\$format=json&\$expand=Properties

```

{
  "d": {

```

```

    "__metadata": {
      "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
      "type": "com.sap.apptot.ObjectType"
    },
    "Name": "iotae.devtest1.cdemo:Material",
    "PackageName": "iotae.devtest1.cdemo",
    "Description": "Material Data",
    "IsMultiLingual": true,
    "NumberOfProperties": null,
    "Source": "Material Management",
    "Annotations": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
      }
    },
    "Descriptions": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
      }
    },
    "Properties": {
      "results": [
        {
          "Name": "MATNR",
          "ObjectType": "iotae.devtest1.cdemo:Material",
          "Description": "",
          "Type": "String",
          "PropertyLength": "120",
          "UnitOfMeasure": "",
          "IsMultiLingual": false,
          "PropertyType": ""
        },
        {
          "Name": "Material Type",
          "ObjectType": "iotae.devtest1.cdemo:Material",
          "Description": "",
          "Type": "String",
          "PropertyLength": "120",
          "UnitOfMeasure": "",
          "IsMultiLingual": true,
          "PropertyType": ""
        }
      ]
    }
  }
}

```

With \$expand=Annotations

```

/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')?
$format=json&$expand=Annotations

```

```

{
  "d": {
    "__metadata": {
      "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",

```

```

        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
        "type": "com.sap.apptot.ObjectType"
    },
    "Name": "iotae.devtest1.cdemo:Material",
    "PackageName": "iotae.devtest1.cdemo",
    "Description": "Material Data",
    "IsMultiLingual": true,
    "NumberOfProperties": null,
    "Source": "Material Management",
    "Annotations": {
        "results": [
            {
                "Name": "com.sap.apptot.security:pii",
                "PackageName": "com.sap.apptot.security",
                "Description": null
            }
        ]
    },
    "Descriptions": {
        "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
        }
    },
    "Properties": {
        "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
        }
    }
}
}
}

```

9.1.4 Read all Object Types

With this method, you can read all the object types.

Request

URI: /CustomDataConfiguration/v2/ObjectTypes

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdconf>.r

Request Headers

Header	Required	Values
Accept-Language	No	Language of the object type description. The default language is en .
sap-iot-propertiescount	No	Include a new field <code>NumberOfProperties</code> in the response payload Only if you specify the value true for this parameter, the system includes the count of properties in a new field <code>NumberOfProperties</code> in the response payload. If you specify false or do not use this header parameter, the system does not return the count of properties in the response payload.

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set If \$orderby is not chosen, the results will be sorted by ObjectType in the ascending order.
\$skip	No	Integer	Number of the first n records to be excluded from the result set If \$orderby is not chosen, the results will be sorted by ObjectType in the ascending order.
\$inlinecount	No	String	Total number of object types available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of the object types available. • If you use this with \$filter parameter, the result contains the total count of the object types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; only valid fields are object type name, package name, and description. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are object type name, package name, and description.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are object type name, package name, and description.

Request Example

/CustomDataConfiguration/v2/ObjectTypes

Response

Response Status and Error Codes

Code	Description
200	Details of all object types retrieved successfully

Response Payload Example

Format: *JSON*

/CustomDataConfiguration/v2/ObjectTypes

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "type": "com.sap.apptot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "IsMultiLingual": true,
        "Source": "Material Management",
      }
    ]
  }
}
```

```

        "Annotations": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
            }
        },
        "Properties": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
            "type": "com.sap.apiot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material1",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "IsMultiLingual": true,
        "Source": "Material Management",
        "Annotations": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Annotations"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Descriptions"
            }
        },
        "Properties": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Properties"
            }
        }
    }
]
}

```

The following is an example payload with the count of properties included in the response payload:

```

{
  "d": {

```



```

    "results": [
      {
        "__metadata": {
          "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "type": "com.sap.apptot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "Source": "Material Management",
        "NumberOfProperties": 2,
        "IsMultiLingual": true,
        "Annotations": {
          "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
          }
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
          }
        },
        "Properties": {
          "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
          "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
          "type": "com.sap.apptot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material1",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "IsMultiLingual": true,
        "Source": "Material Management",
        "NumberOfProperties": 2,
        "Annotations": {
          "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Annotations"
          }
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Descriptions"
          }
        }
      }
    ]
  }

```

```

    },
    "Properties": {
      "__deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.demo%3AMaterial1')/Properties"
      }
    }
  }
]
}
}

```

9.1.5 Read all Object Types of a Package

With this method, you can read all object types of the specified package.

Request

URI: /CustomDataConfiguration/v2/Packages('<package name>')/ObjectTypes

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdconf>.r

Request Headers

Header	Required	Values
Accept-Language	No	Language of the property set type description. The default language is en .
sap-iot-propertiescount	No	Include a new field <code>NumberOfProperties</code> in the response payload. Only if you specify the value true for this parameter, the system includes the count of properties in a new field <code>NumberOfProperties</code> in the response payload. If you specify false or do not use this header parameter, the system does not return the count of properties in the response payload.

Request Parameters

Parameter	Required	Data Type	Description
package name	Yes	String	Unique name of the package

Query Request Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set If \$orderby is not chosen, the results will be sorted by ObjectType in the ascending order.
\$skip	No	Integer	Number of the first n records to be excluded from the result set
\$inlinecount	No	String	Total number of object types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of the object types available. • If you use this with \$filter parameter, the result contains the total count of object types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid fields are object type name and description. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are object type name and description.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are object type name, package name and description.

Request Example

```
/CustomDataConfiguration/v2/Packages('iotae.devtest1.aejob.automobilestes')/  
ObjectTypes
```

Response

Response Status and Error Codes

Code	Description
200	Details of all object types retrieved successfully

Response Payload Example

/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
          "type": "com.sap.apptot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "IsMultiLingual": true,
        "Source": "Material Management",
        "Annotations": {
          "__deferred": {
            "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
          }
        },
        "Descriptions": {
          "__deferred": {
            "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
          }
        },
        "Properties": {
          "__deferred": {
            "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Properties"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
          "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
          "type": "com.sap.apptot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material1",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",

```

```

        "IsMultiLingual": true,
        "Source": "Material Management",
        "Annotations": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Annotations"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Descriptions"
            }
        },
        "Properties": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Properties"
            }
        }
    }
}

```

The following is an example payload with the count of properties included in the response payload:

```

{
    "d": {
        "results": [
            {
                "__metadata": {
                    "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
                    "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')",
                    "type": "com.sap.apptot.ObjectType"
                },
                "Name": "iotae.devtest1.cdemo:Material",
                "PackageName": "iotae.devtest1.cdemo",
                "Description": "Material Data",
                "Source": "Material Management",
                "NumberOfProperties": 2,
                "IsMultiLingual": true,
                "Annotations": {
                    "__deferred": {
                        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Annotations"
                    }
                },
                "Descriptions": {
                    "__deferred": {
                        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial')/Descriptions"
                    }
                },
                "Properties": {
                    "__deferred": {

```

```

        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Properties"
    }
    },
    {
        "__metadata": {
            "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')",
            "type": "com.sap.apiot.ObjectType"
        },
        "Name": "iotae.devtest1.cdemo:Material1",
        "PackageName": "iotae.devtest1.cdemo",
        "Description": "Material Data",
        "IsMultiLingual": true,
        "Source": "Material Management",
        "NumberOfProperties": 2,
        "Annotations": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Annotations"
            }
        },
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Descriptions"
            }
        },
        "Properties": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v2/
ObjectTypes('iotae.devtest1.cdemo%3AMaterial1')/Properties"
            }
        }
    }
]
}
}

```

9.1.6 Delete an Object Type

With this method, you can delete the specified object type.

The [Etag](#) value is mandatory to delete an object type. You must retrieve the [Etag](#) value of the object type using the GET (/CustomDataConfiguration/v2/ObjectType('<object type name>')) service. The Etag value is assigned to the request header parameter If-Match in the [DELETE](#) request. If you do not include the Etag value in the request header, the server sends HTTP response code 428. If the Etag value is not correct, the server sends HTTP response code 412.

To delete an object type, you have to provide the name of the object type to be deleted. For security reasons, the latest Etag has to be sent as an If-Match header. For example, If-Match - 87FF06A3B6784A3B9F4A6EC3F9EA0675

Note

Once the object type is deleted successfully, you will get a 204 No Content Response.

Request

URI: /CustomDataConfiguration/v2/ObjectTypes('<ObjectName>')

Operation Type: CRUD

HTTP Method: [DELETE](#)

Permissions: <cdconf>.d

Request Headers

Header	Required	Values
If-Match	Yes	Latest Etag value of a specific object type that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
object_type_name	Yes	String	Unique name of the object type

Request Example

```
/CustomDataConfiguration/v2/ObjectTypes('iotae.devtest1.cdemo:Material')
```

Response

Response Status and Error Codes

Code	Description
204	Object type deleted successfully

9.1.7 Standard Object Types

There are two standard object types supported:

- **Business partner** - A business partner is an entity with a particular role as an actor in a business scenario. Business partners can be defined on different levels of abstraction, and they can refer to either human

beings or to a legal body. Business partner objects can be created using SAP IoT APIs. For more details, see the Business Partner section.

To use standard business partner object type in associations, the entity name should be specified as “com.sap.iotaestandardcontent:BusinessPartner”.

- **Location** - Contains the geographical position of a thing. Location objects can be created using Geo Location services or SAP IoT APIs. For more details, see the Location section.
To use standard location object type in associations, the entity name should be specified as “com.sap.iotaestandardcontent:LocationPoint”.

i Note

Use of Geo Location services is recommended.

9.2 Object Type Association

Define a master data association between entity types. Association-related operations are deprecated and will continue to be available on the AWS landscape for a limited period of time.

Overview

Association is a way of grouping objects, where every object is related to one or more objects in a unique way. You can create association between entity types, which in turn enables you to create association between object type instances and things. However, the scope of the association between entity types depends on the scope of the package to which the entity types belong.

Types of object type association

The following are the predefined object type association types:

- onetomany
- onetoone
- manytomany
- manytoone

i Note

These are the only values allowed and they are case sensitive.

Types of relationship

The following are the predefined relationship types:

- *IS A*
- *HAS A*
- *PART OF*

i Note

These are the only values allowed and they are case sensitive.

Types of entities

The following are the predefined entity types:

- [ObjectTypeToObjectType](#)
- [ObjectTypeToThingType](#)
- [ThingTypeToObjectType](#)

i Note

These are the only values allowed and they are case sensitive.

Resource Path: `//<server address>[:<port number>][<path>]/CustomDataConfiguration`

Example for a base URI in a cloud foundry environment: `https://sap-iotaeexplore.iot-sap.cfapps.eu10.hana.ondemand.com/config-customdata-sap/CustomDataConfiguration`

Operations

CRUD Operations

HTTP Method	Operation	URI
<i>GET</i>	Read all Object Type Associations [page 687]	<code>/CustomDataConfiguration/v1/ObjectTypeAssociations</code>
<i>POST</i>	Create Object Type Association [page 684]	<code>/CustomDataConfiguration/v1/ObjectTypeAssociations</code>
<i>DELETE</i>	Delete Object Type Association [page 690]	<code>/CustomDataConfiguration/v1/ObjectTypeAssociations(PrimaryEntity='<thing type or Object Type name>',AssociatedEntity='<thing type or object type name>',EntityTypes='Type of Entities associated',Relationship='<relationship name>')</code>

Entity Type Association Object Properties

Property	Type	Mandatory	Maximum Length	Description
PrimaryEntity	String	Yes	81	Primary entity type for which you want to create an association
AssociatedEntity	String	Yes	81	Entity type associated with the primary entity type
EntityTypes	String	Yes	NA	Association between different types of entities
AssociationType	String	Yes	-	Type of association between the primary entity type and the associated entity type
Relationship	String	Yes	-	Type of relationship between the primary entity type and the associated entity type
ExpiryTime	TimeStamp	No	-	Expiry time after which the association between the entity types becomes invalid. If you do not specify the expiry time, the association is valid indefinitely.

Entity Type Association Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	255	Description of the object

9.2.1 Create Object Type Association

With this service, you can create association between entity types, such as object type to object type, object type to thing type and thing type to object type, based on the predefined relationship and association types. The expiry time of the entity type association must be greater than the current time. The association is valid until the defined expiry time, after which, the association is invalid. To extend the validity of the association, you can delete the associated entity and recreate the association with a different expiry time. If you do not specify the expiry time, the association is valid indefinitely.

i Note

The primary entity type and the associated entity type must have unique association type and relationship. For example, the entity type **ACBXSeries** is associated with the primary entity type **Truck** with an expiry date **28-10-2018**. The relationship is **IS A** and the association type is **onetoone**. You cannot create another association between the entity types **Truck** and **ABCXSeries** with relationship **IS A** and association type **manytoone**.

i Note

It is possible to create more than one type of relationship between two entity types.

Request

URI: /CustomDataConfiguration/v1/ObjectTypeAssociations

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <cdconf>.c

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Unique name of the entity type which represents the primary entity type	Path

Request Example

/CustomDataConfiguration/v1/ObjectTypeAssociations

Payload

Format: JSON

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following examples:

Thing Type to Object Type Association

```
{
  "PrimaryEntity": "iotae.devtest1.cdemo:ConnectedSilo",
  "AssociatedEntity": "iotae.devtest1.cdemo:Material",
  "EntityTypes" : "ThingTypeToObjectType",
  "AssociationType": "onetoone",
  "Relationship": "HAS A",
  "ExpiryTime": "2019-10-16T08:26:56.229Z",
  "Descriptions": [
    {
```

```

        "LanguageCode": "en",
        "Description": "Connected Silo to Material Association"
    }
]
}

```

Object Type To Object Type Association

```

{
  "PrimaryEntity": "iotae.devtest1.cdemo.BP",
  "AssociatedEntity": "iotae.devtest1.cdemo:Material",
  "EntityTypes": "ObjectTypeToObjectType",
  "AssociationType": "onetoone",
  "Relationship": "IS A",
  "ExpiryTime": "2019-10-16T08:26:56.229Z",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "BP to Material Association"
  }]
}

```

Response

Response Headers

Header	Description
Etag	Generated Etag; Value: DC68FB05A8AB46619F7F6E22F5F5241F

Response Status and Error Codes

Code	Description
201	Object type association created successfully.

Response Payload Example

The following is the response payload for Thing Type to Object Type Association.

```

{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.cdemo%3AConnectedSilo',AssociatedEntity='iotae.devtest1.cdemo%3AMaterial',EntityTypes='ThingTypeToObjectType',Relationship='HAS%20A')",
          "uri": "https://config-customdata-sap-sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.cdemo%3AConnectedSilo',AssociatedEntity='iotae.devtest1.cdemo%3AMaterial',EntityTypes='ThingTypeToObjectType',Relationship='HAS%20A')",
          "type": "com.sap.apptot.ObjectTypeAssociation"
        },
        "EntityTypes": "ThingTypeToObjectType",
        "PrimaryEntity": "iotae.devtest1.cdemo:ConnectedSilo",
        "PrimaryTenant": "iotae-devtest1",
        "AssociatedEntity": "iotae.devtest1.cdemo:Material",

```

```

        "Relationship": "HAS A",
        "AssociationExpiryTime": "2019-10-16 08:26:56.229",
        "AssociationCreationTime": "2019-02-15T04:06:50.594Z",
        "AssociatedTenant": "iotae-devtest1",
        "Description": "Connected Silo to Material Association",
        "ETag": null,
        "Descriptions": {
            "__deferred": {
                "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(ParentEntity='iotae.devtest1.cdemo
%3AConnectedSilo',AssociatedEntity='iotae.devtest1.cdemo
%3AMaterial',EntityTypes='ThingTypeToObjectType',Relationship='HAS%20A')/"
            }
        }
    }
}
]
}
}

```

9.2.2 Read all Object Type Associations

With this service, you can retrieve all object type associations.

Request

URI: /CustomDataConfiguration/v1/ObjectTypeAssociations

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <cdconf>.r

Query Request Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set
			If \$orderby is not chosen, the results will be sorted by the Primary Entity in the ascending order.

Parameter	Required	Type	Description
\$inlinecount	No	String	Total number of object types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of the object types available. • If you use this with \$filter parameter, the result contains the total count of object types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid fields are PrimaryEntity, AssociatedEntity, Relationship, AssociationType, EntityTypes and ExpiryTime. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are PrimaryEntity, AssociatedEntity, Relationship, AssociationType, EntityTypes and ExpiryTime.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are PrimaryEntity, AssociatedEntity, Relationship, AssociationType, EntityTypes and ExpiryTime

Request Example

```
/CustomDataConfiguration/v1/ObjectTypeAssociations
```

Response

Response Status and Error Codes

Code	Description
200	OK

Response Payload Example

Format: JSON

```
{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3AtestOT25',AssociatedEntity='iotae.devtest1.cdatademo
%3AMaterial',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A')",
          "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3AtestOT25',AssociatedEntity='iotae.devtest1.cdatademo
%3AMaterial',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A')",
          "type": "com.sap.apptot.ObjectTypeAssociation"
        },
        "EntityTypes": "ObjectTypeToObjectType",
        "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:testOT25",
        "PrimaryTenant": "iotae-devtest1",
        "AssociatedEntity": "iotae.devtest1.cdatademo:Material",
        "Relationship": "HAS A",
        "AssociationExpiryTime": "2019-10-16T08:26:56Z",
        "AssociationCreationTime": "2019-01-21T12:37:30Z",
        "AssociatedTenant": "iotae-devtest1",
        "Description": "",
        "ETag": "B99EB97AACBB4B6BBEC57B5B638191F3",
        "Descriptions": {
          "_deferred": {
            "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3AtestOT25',AssociatedEntity='iotae.devtest1.cdatademo
%3AMaterial',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A') /
Descriptions"
          }
        }
      },
      {
        "_metadata": {
          "id": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3ABP1',AssociatedEntity='iotae.devtest1.aejob.automobilestes
%3AMaterial4',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A')",
          "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations(PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3ABP1',AssociatedEntity='iotae.devtest1.aejob.automobilestes
%3AMaterial4',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A')",
          "type": "com.sap.apptot.ObjectTypeAssociation"
        },
        "EntityTypes": "ObjectTypeToObjectType",
```

```

    "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:BP1",
    "PrimaryTenant": "iotae-devtest1",
    "AssociatedEntity": "iotae.devtest1.aejob.automobilestes:Material4",
    "Relationship": "HAS A",
    "AssociationExpiryTime": "2030-12-31T23:59:59Z",
    "AssociationCreationTime": "2019-01-18T15:51:57Z",
    "AssociatedTenant": "iotae-devtest1",
    "Description": "",
    "ETag": "67CB398ED2C34E7BABB7FE600B0A6200",
    "Descriptions": {
      "_deferred": {
        "uri": "https://config-customdata-sap-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataConfiguration/v1/
ObjectTypeAssociations (PrimaryEntity='iotae.devtest1.aejob.automobilestes
%3ABP1',AssociatedEntity='iotae.devtest1.aejob.automobilestes
%3AMaterial4',EntityTypes='ObjectTypeToObjectType',Relationship='HAS%20A') /
Descriptions"
      }
    }
  }
]
}
}

```

9.2.3 Delete Object Type Association

With this service, you can delete the association between the specified object types.

The `ETag` value is mandatory to delete association of an object type. The `ETag` value is assigned to the request header parameter `If-Match` in the `DELETE` request. If you do not include the `ETag` value in the request header, the server sends HTTP response code 428. If the `ETag` value is not correct, the server sends HTTP response code 412.

You can delete the association between the object types only if an association is not created between the object instances belonging to the associated object types.

Request

URI: `/CustomDataConfiguration/v1/ObjectTypeAssociations (PrimaryEntity='<ThingType or ObjectType name>',AssociatedEntity='<ThingType or ObjectType name>',EntityTypes='Type of Entities associated',Relationship='<relationship name>'`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<cdconf>.d`

Request Headers

Header	Required	Values
If-Match	Yes	Latest Etag value of a specific object type association

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Primary Entity Name	Yes	String	Unique name of the primary thing type/object type to which other thing types are associated	Path
Associated Entity Name	Yes	String	Unique name of the thing type/object type which represents the associated entity	Path
Entity Types	Yes	String	Identify the type of Primary entity and Associated entity. It may have one of the three values: - ObjectTypeToObjectType - ThingTypeToObjectType - ObjectTypeToThingType	Path
Relationship	Yes	String	Unique relationship between the associated thing types	Path

Request Example

/CustomDataConfiguration/v1/ObjectTypeAssociations

(PrimaryEntity='iotae.devtest1.cdemo:ConnectedSilo',AssociatedEntity='iotae.devtest1.cdemo:Material',EntityTypes='ThingTypeToObjectType',Relationship='HAS A')

Response

Response Status and Error Codes

Code	Description
204	No Content

9.3 Object Instances

Define and maintain object instances and maintain the data of an object type

i Note

- The Master Data Object ID should be validated to be unique per Master Data Object Type within a tenant.

Resource Path: `http://<server address>[:<port number>][/path]/ObjectType`

Example for a base URI in a cloud foundry environment: `https://sap-iotaeexplore.iot-sap.cfapps.eu10.hana.ondemand.com/customdata/ObjectType`

Operations

CRUD Operations

i Note

v1 API is for AWS landscape while v2 API supports all landscapes.

HTTP Method	Operation	URI (v1)	URI (v2)
GET	Read an Object Instance [page 698]	<code>/ObjectType/v1/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')</code>	<code>/ObjectType/v2/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')</code>
GET	Read all Object Instances [page 702]	<code>/ObjectType/v1/ <FullyQualifiedObjectTypeIDWithUnderscores></code>	<code>/ObjectType/v2/ <FullyQualifiedObjectTypeIDWithUnderscores></code>

HTTP Method	Operation	URI (v1)	URI (v2)
<i>POST</i>	Create an Object Instance [page 695]	/ObjectType/v1/ <FullyQualifiedObjectTypeIDWithUnderscores>	/ObjectType/v2/ <FullyQualifiedObjectTypeIDWithUnderscores>
<i>PATCH</i>	Update an Object Instance [page 697]	/ObjectType/v1/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')	/ObjectType/v2/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')
<i>DELETE</i>	Delete an Object Instance [page 706]	/ObjectType/v1/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')	/ObjectType/v2/ <FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')

Custom Operations

HTTP Method	Operation Type	Operation	URI (v1)	URI (v2)
<i>GET</i>	\$metadata	Metadata of Object Instances [page 694]	/ObjectType/v1/\$metadata	/ObjectType/v2/\$metadata
<i>POST</i>	\$batch	Metadata of Object Instances [page 694]	/ObjectType/v1/\$batch	/ObjectType/v2/\$batch

9.3.1 Metadata of Object Instances

With this method, you can retrieve the metadata of the specified object type.

Request

URI: /ObjectType/v2/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdinstance>.r

Request Headers

Header	Required	Values
sap-iot-ot	Yes	The Object Type ID for which metadata must be retrieved

Header example: sap-iot-ot:iotae.devtest1.aejob.automobilestes:BusinessPartner

Header example: iotae.devtest1.aejob.automobilestes:Material

Request Example

/ObjectType/v2/\$metadata

Response

Format: ATOM

Response Status and Error Codes

Code	Description
200	OK for Success

Response Payload Example

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.appiot" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="iotae_devtest1_aejob_automobilestes:Material">
        <Documentation>
          <Summary>Details of material desc entity type</Summary>
        </Documentation>
      </EntityType>
    </Schema>
  </DataServices>
</edmx:Edmx>
```

```

        <Key>
          <PropertyRef Name="ObjectID"></PropertyRef>
        </Key>
        <Property Name="ObjectID" Type="Edm.String" Nullable="false"
MaxLength="36" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Object ID of the entity</Summary>
          </Documentation>
        </Property>
        <Property Name="Language" Type="Edm.String" Nullable="false"
MaxLength="20" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Language of the entity</Summary>
          </Documentation>
        </Property>
        <Property Name="Density" Type="Edm.String" Nullable="true"
MaxLength="2147483647" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Density of entity</Summary>
          </Documentation>
        </Property>
        <Property Name="State" Type="Edm.String" Nullable="true"
MaxLength="2147483647" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>State of entity</Summary>
          </Documentation>
        </Property>
      </EntityType>
      <EntityContainer Name="ObjectTypeInstanceContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="iotae_devtest1_aejob_automobilestes:Material"
EntityType="com.sap.apiot.iotae_devtest1_aejob_automobilestes:Material">
          <Documentation>
            <Summary>Details of material desc entity set</Summary>
          </Documentation>
        </EntitySet>
      </EntityContainer>
    </Schema>
  </edmx:DataServices>
</edmx:Edmx>

```

9.3.2 Create an Object Instance

With this method, you can create an object instance for the object type.

i Note

- For all the CRUD operations, the fully qualified Object Type ID in the URL should not contain dots(.). All the dots should be replaced with underscores. Example: Object Type `iotae.devtest1.aejob:automobilestes:BusinessPartner` has to be passed as `iotae_devtest1_aejob_automobilestes:BusinessPartner`

Request

URI: /ObjectType/v2/<FullyQualifiedObjectTypeIDWithUnderscores>

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <cdinstance>.c

Request Headers

Header	Required	Values
Content-Type	Yes	The content type of the payload

Header example: Content-Type: application/json

Request Example

/ObjectType/v2/iotae_devtest1_aejob_automobilestes:Material

Payload

Format: JSON

i Note

Object ID: User can provide this ID or the system will generate a unique GUID.

```
{
  "ObjectID": "MAT-01",
  "Density": "{ \"en\": \"200\", \"fr\": \"200\" }",
  "State": "Solid"
}
```

Response

Format: ATOM or JSON

Response Status and Error Codes

Code	Description
201	Object instance created successfully

Response Payload Example

```
<?xml version="1.0" encoding="utf-8"?>
<entry xmlns="http://www.w3.org/2005/Atom" xmlns:m="http://
schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:d="http://
schemas.microsoft.com/ado/2007/08/dataservices" xml:base="http://localhost:9080/
customdata-services/ObjectType/v2/">
  <id>http://localhost:9080/customdata-services/ObjectType/v2/
iotae_devtest1_aejob_automobilestes%3AMaterial('MAT-01')</id>
```

```

<title type="text">iotae_devtest1_aejob_automobilestes:Material</title>
<updated>2019-01-07T12:16:04.417+05:30</updated>
<category term="com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
<link href="iotae_devtest1_aejob_automobilestes%3AMaterial('MAT-01') "
rel="edit" title="iotae_devtest1_aejob_automobilestes:Material"></link>
<content type="application/xml">
  <m:properties>
    <d:ObjectID>MAT-01</d:ObjectID>
    <d:State>Solid</d:State>
    <d:Density>{"en":"200","fr":"200"}</d:Density>
  </m:properties>
</content>
</entry>

```

9.3.3 Update an Object Instance

With this method, you can update an object instance for the object type.

i Note

- For all the CRUD operations, the fully qualified Object Type ID in the URL should not contain dots(.). All the dots should be replaced with underscores. Example: Object Type `iotae_devtest1_aejob:automobilestes:BusinessPartner` has to be passed as `iotae_devtest1_aejob_automobilestes:BusinessPartner`
- You cannot update an object ID using a PATCH request. The object ID specified in the request payload is ignored for update.

Request

URI: /ObjectType/v2/<FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')

Operation Type: CRUD

HTTP Method: [\[PATCH\]](#)

Permissions: <cdinstance>.u

Request Headers

Header	Required	Values
Content-Type	Yes	The content type of the payload

Header example: Content-Type: application/json

Request Parameters

Parameter	Required	Data Type	Description
ObjectInstanceID	Yes	String	Unique identifier which was auto-generated/specified while creating the object type instance

Request Example

```
/ObjectType/v2/iotae_devtest1_aejob_automobilestes:Material('MAT-01')
```

Payload

```
{
  "Density": "{\\"en\\":\\"400\\",\\"de\\":\\"400\\",\\"fr\\":\\"400\\"}",
  "State": "Solid"
}
```

Response

Response Status and Error Codes

Code	Description
204	No content for success

9.3.4 Read an Object Instance

With this method, you can get a single object instance for the object type.

Note

- For all the CRUD operations, the fully qualified Object Type ID in the URL should not contain dots(.). All the dots should be replaced with underscores. Example: Object Type `iotae.devtest1.aejob:automobilestes:BusinessPartner` has to be passed as `iotae_devtest1_aejob_automobilestes:BusinessPartner`

Request

URI: `/ObjectType/v2/<FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdinstance>.r

Request Parameters

Parameter	Required	Data Type	Description
ObjectInstanceID	Yes	String	Unique identifier which was auto-generated/specified while creating the object type instance

Request Header

Name	Required	Data Type	Description
Accept-Language	Optional	string	Accepted language header.

Note

Based on the choice of language, the values will be returned..

Request Example

```
/ObjectType/v2/iotae_devtest1_aejob_automobilestes:Material('Material1')
```

Response

Format: ATOM/JSON

Response Status and Error Codes

Code	Description
200	OK for Success

Response Payload Example

```
<?xml version="1.0" encoding="utf-8"?>
<entry xmlns="http://www.w3.org/2005/Atom" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservices" xml:base="http://localhost:9080/customdata-services/ObjectType/v2/">
  <id>http://localhost:9080/customdata-services/ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material1')</id>
  <title type="text">iotae_devtest1_aejob_automobilestes:Material</title>
  <updated>2019-01-07T11:46:11.05+05:30</updated>
  <category term="com.sap.appiot.iotae_devtest1_aejob_automobilestes:Material" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
  <link href="iotae_devtest1_aejob_automobilestes%3AMaterial('Material1')" rel="edit" title="iotae_devtest1_aejob_automobilestes:Material"></link>
  <content type="application/xml">
    <m:properties>
      <d:ObjectID>Material1</d:ObjectID>
```

```

        <d:Density>{"EN\":"300\"}</d:Density>
        <d:State>{"EN\":"null\"}</d:State>
    </m:properties>
</content>
</entry>[response example]

```

Date Format Difference between v1 and v2 API

If there are Date, DateTime or Timestamp data type properties in the response, you will get different formats of these properties when calling v1 and v2 version of [Read an Object Instance](#) and [Read all Object Instances](#) API with `$format=json`. For `$format=atom`, both versions of API will return the `yyyy-mm-ddThh:mm:ssZ` format.

API Version	Date Format	Example
v1	"\Date(<ticks>)\\"<ticks> = number of milliseconds since midnight Jan 1, 1970	"\Date(1633682658000)\"
v2	yyyy-mm-ddThh:mm:ssZ	2021-10-08T08:44:18Z

Example of calling v1 API

Request

URI: `/ObjectType/v1/stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133?`
`$format=json&$inlinecount=allpages`

HTTP Method: [GET](#)

Response

Sample Code

```

{
  "d": {
    "__count": "2",
    "results": [
      {
        "ModifiedOn": "/Date(1633682658000)/",
        "ProductionPlant": "1000",
        "ObjectID": "1eb289bf0f6ea53e4df973159cba56b3",
        "DateTest": null,
        "EpcIdUri": null,
        "Material": "FG-BATPACK_62KWH",
        "SalesOrderItem": "10",
        "__metadata": {
          "id": "http://localhost:9080/ObjectType/v1/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('1eb289bf0f6ea53e4df973159cba56b3')",
          "type": "com.sap.appiot.stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133",
          "uri": "http://localhost:9080/ObjectType/v1/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('1eb289bf0f6ea53e4df973159cba56b3')",
          "SalesOrder": "8258"
        }
      }
    ]
  }
}

```

```

    {
      "ModifiedOn": "/Date(1645690100000)/",
      "ProductionPlant": "1710",
      "ObjectID": "test_1",
      "DateTest": "/Date(1645574400000)/",
      "EpcIdUri": "test_1",
      "Material": "test_1",
      "SalesOrderItem": "test_1",
      "__metadata": {
        "id": "http://localhost:9080/ObjectType/v1/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('test_1')",
        "type": "com.sap.apptot.stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133",
        "uri": "http://localhost:9080/ObjectType/v1/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('test_1')",
        "SalesOrder": "test_1"
      }
    }
  ]
}

```

Example of calling v2 API

Request

URI: /ObjectType/v2/stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133?
\$format=json&\$inlinecount=allpages

HTTP Method: [GET](#)

Response

Sample Code

```

{
  "d": {
    "__count": "2",
    "results": [
      {
        "ModifiedOn": "2021-10-08T08:44:18Z",
        "ProductionPlant": "1000",
        "ObjectID": "1eb289bf0f6ea53e4df973159cba56b3",
        "DateTest": null,
        "EpcIdUri": null,
        "Material": "FG-BATPACK_62KWH",
        "SalesOrderItem": "10",
        "__metadata": {
          "id": "http://localhost:9080/ObjectType/v2/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('1eb289bf0f6ea53e4df973159cba56b3')",
          "type": "com.sap.apptot.stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133",
          "uri": "http://localhost:9080/ObjectType/v2/stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('1eb289bf0f6ea53e4df973159cba56b3')",
          "SalesOrder": "8258"
        }
      },
      {
        "ModifiedOn": "2022-02-24T08:08:20Z",
        "ProductionPlant": "1710",
        "ObjectID": "test_1",
        "DateTest": "2022-02-23T00:00:00Z",
        "EpcIdUri": "test_1",

```

```

        "Material": "test_1",
        "SalesOrderItem": "test_1",
        "__metadata": {
            "id": "http://localhost:9080/ObjectType/v2/
stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('test_1')",
            "type":
"com.sap.appiot.stg_edgestk_sh_smartsensing:A_SalesOrderItemType_0133",
            "uri": "http://localhost:9080/ObjectType/v2/
stg_edgestk_sh_smartsensing%3AA_SalesOrderItemType_0133('test_1')
        },
        "SalesOrder": "test_1"
    }
}
]
}
}

```

9.3.5 Read all Object Instances

With this method, you can get all the object instances for an object type.

Note

- For all the CRUD operations, the fully qualified Object Type ID in the URL should not contain dots(.). All the dots should be replaced with underscores. Example: Object Type `iotae.devtest1.aejob:automobilestes:BusinessPartner` has to be passed as `iotae_devtest1_aejob_automobilestes:BusinessPartner`

Request

URI: /ObjectType/v2/<FullyQualifiedObjectTypeIDWithUnderscores>

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <cdinstance>.r

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set

Parameter	Required	Data Type	Description
\$inlinecount	No	String	Total number of object types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the \$top and \$skip parameters, the result contains the total count of the object types available. - If you use this with \$filter parameter, the result contains the total count of the object types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; only valid fields are ObjectID and dynamic fields defined for the object type. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. The valid fields are ObjectID and dynamic fields defined for the object type.
\$select	No	String	Select condition for the data fields to be included in the result set; the only valid fields are ObjectID and dynamic fields defined for the object type.

Request Header

Name	Required	Data Type	Description
Accept-Language	Optional	string	Accepted language header.

i Note

Based on the choice of language, the values will be returned.

Request Example

```
/ObjectType/v2/iotae_devtest1_aejob_automobilestes:Material
```

Response

Format: ATOM/JSON

Response Status and Error Codes

Code	Description
200	OK for Success

Response Payload Example

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material1')",
          "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material1')",
          "type":
"com.sap.appiot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "Material1",
        "Density": "{\\\\"EN\\\\"":\\\\"300\\\\"}",
        "State": "{\\\\"EN\\\\"":\\\\"null\\\\"}"
      },
      {
        "__metadata": {
          "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('ABCD1234')",
          "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('ABCD1234')",
          "type":
"com.sap.appiot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "ABCD1234",
        "Density": "{\\\\"de\\\\"":\\\\"300\\\\"", \\\\"en\\\\"":\\\\"400\\\\"}",
        "State": "{\\\\"de\\\\"":\\\\"null\\\\"", \\\\"en\\\\"":\\\\"null\\\\"}"
      },
      {
        "__metadata": {
          "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P1')",
          "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P1')",
          "type":
"com.sap.appiot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P1",
        "Density": "{\\\\"en\\\\"":\\\\"null\\\\"}",
        "State": "{\\\\"en\\\\"":\\\\"null\\\\"}"
      },
      {
        "__metadata": {
          "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P3')",
          "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P3')",
          "type":
"com.sap.appiot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P3",
        "Density": "{\\\\"en\\\\"":\\\\"null\\\\"", \\\\"de\\\\"":\\\\"400\\\\"}"
      }
    ]
  }
}
```

```

        "State": "{\\\\"en\\\\":\\\\"null\\\\" , \\\\"de\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P4')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P4')",
            "type":
"com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P4",
        "Density": "{\\\\"de\\\\":\\\\"200\\\\" , \\\\"en\\\\":\\\\"null\\\\" , \\
\\fr\\\\":\\\\"200\\\\"}" ,
        "State": "{\\\\"de\\\\":\\\\"null\\\\" , \\\\"en\\\\":\\\\"Solid\\\\" , \\
\\fr\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material2')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material2')",
            "type":
"com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "Material2",
        "Density": "{\\\\"en\\\\":\\\\"500\\\\" , \\\\"de\\\\":\\\\"600\\\\"}" ,
        "State": "{\\\\"en\\\\":\\\\"null\\\\" , \\\\"de\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material3')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('Material3')",
            "type":
"com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "Material3",
        "Density": "{\\\\"de\\\\":\\\\"900\\\\"}" ,
        "State": "{\\\\"de\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P5')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P5')",
            "type":
"com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P5",
        "Density": "{\\\\"de\\\\":\\\\"200\\\\" , \\\\"en\\\\":\\\\"null\\\\" , \\
\\fr\\\\":\\\\"200\\\\"}" ,
        "State": "{\\\\"de\\\\":\\\\"null\\\\" , \\\\"en\\\\":\\\\"Solid\\\\" , \\
\\fr\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P6')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P6')",
            "type":
"com.sap.apptot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P6",

```

```

        "Density": "{\\\\"de\\\\":\\\\"200\\\\" , \\\\"en\\\\":\\\\"null\\\\" , \\\\"fr\\\\":\\\\"200\\\\"}",
        "State": "{\\\\"de\\\\":\\\\"null\\\\" , \\\\"en\\\\":\\\\"Solid\\\\" , \\\\"fr\\\\":\\\\"null\\\\"}"
    },
    {
        "__metadata": {
            "id": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P7')",
            "uri": "http://localhost:9080/customdata-services/
ObjectType/v2/iotae_devtest1_aejob_automobilestes%3AMaterial('P7')",
            "type":
"com.sap.apiot.iotae_devtest1_aejob_automobilestes:Material"
        },
        "ObjectID": "P7",
        "Density": "{\\\\"de\\\\":\\\\"200\\\\" , \\\\"en\\\\":\\\\"null\\\\"}",
        "State": "{\\\\"de\\\\":\\\\"null\\\\" , \\\\"en\\\\":\\\\"Solid\\\\"}"
    }
]
}
}

```

9.3.6 Delete an Object Instance

With this method, you can delete an object instance of the object type.

Note

- For all the CRUD operations, the fully qualified Object Type ID in the URL should not contain dots(.). All the dots should be replaced with underscores. Example: Object Type `iotae.devtest1.aejob:automobilestes:BusinessPartner` has to be passed as `iotae_devtest1_aejob_automobilestes:BusinessPartner`

Request

URI: /ObjectType/v2/<FullyQualifiedObjectTypeIDWithUnderscores>('<ObjectInstanceID>')

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <cdinstance>.d

Request Parameters

Parameter	Required	Data Type	Description
ObjectInstanceID	Yes	String	Unique identifier which was auto-generated/specified while creating the object type instance

Request Example

/ObjectType/v2/iotae_devtest1_aejob_automobilestes:Material('Material1')

Response

Response Status and Error Codes

Code	Description
204	No content for success

9.3.7 \$Batch

With this API, you can batch multiple calls in a single request.

i Note

Each batch request URL has to be encoded. For example:

Single request: `/iotae_devtest1_demo:Material`

Batch: `/iotae_devtest1_demo%3AMaterial`

Request

URI: `/ObjectType/v1/$batch`

Operation Type: CRUD

HTTP Method: *POST*

Permissions: `<cdinstance>.c,<cdinstance>.r,<cdinstance>.d,<cdinstance>.u`

Request Headers

Header	Required	Values
<code>sap-iot-ot</code>	Yes	The Object Type ID for which \$batch requests need to be executed Example: <code>iotae.devtest1.cdatabdemo:Material</code>
<code>Content-Type</code>	Yes	<code>multipart/mixed;batchboundary=<batch boundary></code> Example: <code>multipart/mixed;boundary=batch_mybatch</code>

Request Example

`POST /ObjectType/v2/$batch`

Payload

```
--batch_mybatch
Content-Type: application/http
Content-Transfer-Encoding:binary

GET iotae_devtest1_cdatademo%3AMaterial('0A444FC08A874E8DB6EFDBDE1D6C656C') HTTP/
1.1
sap-contextid-accept: header
Accept: application/json
Accept-Language: en
DataServiceVersion: 2.0
MaxDataServiceVersion: 2.0

--batch_mybatch
Content-Type: multipart/mixed; boundary=changeset_c1

--changeset_c1
Content-Type: application/http
Content-Transfer-Encoding: binary

POST iotae_devtest1_cdatademo%3AMaterial HTTP/1.1
Content-Type: application/json
Accept: application/json

{
  "MATNR":"A25"
}

--changeset_c1
Content-Type: application/http
Content-Transfer-Encoding:binary

PATCH iotae_devtest1_cdatademo%3AMaterial('0A444FC08A874E8DB6EFDBDE1D6C656C')
HTTP/1.1
Content-Type: application/json
Accept: application/json

{
  "MATNR":"A26"
}

--changeset_c1--
--batch_mybatch--
```

Response

Response Status and Error Codes

Code	Description
202	Accepted

Response Payload Example

```
--batch_863607c3-f1ea-47d9-87a7-e759c4e31740
```

```

Content-Type: application/http
Content-Transfer-Encoding: binary

HTTP/1.1 200 OK
DataServiceVersion: 2.0
Content-Type: application/json
Content-Length: 498

{"d":{"__metadata":{"id":"https://customdata-
sandbox.cfapps.sap.hana.ondemand.com:443/ObjectType/v2/iotae_devtest1_cdatademo
%3AMaterial('0A444FC08A874E8DB6EFDBDE1D6C656C')","uri":"https://customdata-
sandbox.cfapps.sap.hana.ondemand.com:443/ObjectType/v2/iotae_devtest1_cdatademo
%3AMaterial('0A444FC08A874E8DB6EFDBDE1D6C656C')","type":"com.sap.apptot.iotae_dev
test1_cdatademo:Material"},"ObjectID":"0A444FC08A874E8DB6EFDBDE1D6C656C","MATNR":
"A26","Material_Description":{"\\\\"en\\\\"":"\\\\"Sugar\\\\""}}}
--batch_863607c3-flea-47d9-87a7-e759c4e31740
Content-Type: multipart/mixed;
boundary=changeset_382827d0-9d10-46a6-92cd-3ed5f5ce7dd2

--changeset_382827d0-9d10-46a6-92cd-3ed5f5ce7dd2
Content-Type: application/http
Content-Transfer-Encoding: binary

HTTP/1.1 201 Created
DataServiceVersion: 2.0
Location: v2/
iotae_devtest1_cdatademo:Material('C7F5160D36CA4EF892D6699F20C7E2A5')
Content-Type: application/json
Content-Length: 447

{"d":{"__metadata":{"id":"https://customdata-
sandbox.cfapps.sap.hana.ondemand.com:443/ObjectType/v2/iotae_devtest1_cdatademo
%3AMaterial('C7F5160D36CA4EF892D6699F20C7E2A5')","uri":"https://customdata-
sandbox.cfapps.sap.hana.ondemand.com:443/ObjectType/v2/iotae_devtest1_cdatademo
%3AMaterial('C7F5160D36CA4EF892D6699F20C7E2A5')","type":"com.sap.apptot.iotae_dev
test1_cdatademo:Material"},"ObjectID":"C7F5160D36CA4EF892D6699F20C7E2A5","MATNR":
"A25"}}}
--changeset_382827d0-9d10-46a6-92cd-3ed5f5ce7dd2
Content-Type: application/http
Content-Transfer-Encoding: binary

HTTP/1.1 204 No Content
DataServiceVersion: 2.0

--changeset_382827d0-9d10-46a6-92cd-3ed5f5ce7dd2--
--batch_863607c3-flea-47d9-87a7-e759c4e31740--

```

9.4 Instance Associations

You can associate one or more object instances to other object instances or thing instances. This is possible only if an association already exists between the object types or the object type and the thing type respectively. Association-related operations are deprecated and will continue to be available on the AWS landscape for a limited period of time.

Resource Path: `http://<server address>[:<port number>]/[path]/CustomDataAssociation`

Example for a base URI in a cloud foundry environment: `https://sap-iotaeexplore.iot-sap.cfapps.eu10.hana.ondemand.com/customdata-associations/CustomDataAssociation`

Operations

CRUD Operations

HTTP Method	Operation	URI
<i>GET</i>	Read an Instance Association [page 712]	/CustomDataAssociation/v1/ObjectAssociations('<Association ID>')
<i>GET</i>	Read all Instance Associations [page 713]	/CustomDataAssociation/v1/ObjectAssociations
<i>POST</i>	Create an Instance Association [page 710]	/CustomDataAssociation/v1/ObjectAssociations
<i>DELETE</i>	Delete an Instance Association [page 715]	/CustomDataAssociation/v1/ObjectAssociations('<Association ID>')

Custom Operations

HTTP Method	Operation Type	Operation	URI
<i>GET</i>	\$metadata		/v1/\$metadata
<i>POST</i>	\$batch	\$Batch [page 716]	/CustomDataAssociation/v1/\$batch

9.4.1 Create an Instance Association

With this method, you can create an object instance association.

i Note

Only one association can be created in a POST request.

Request

URI: /CustomDataAssociation/v1/ObjectAssociations

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <thing>.c

Request Example

Payload

Format: JSON

/CustomDataAssociation/v1/ObjectAssociations

```
{
  "PrimaryObjectID": "BP1",
  "AssociatedObjectID": "MAT1",
  "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:BP1",
  "AssociatedEntity": "iotae.devtest1.aejob.automobilestes:MAT1",
  "EntityTypes": "ObjectTypeToObjectType",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Association between Partner BP1 and Material MAT1"
  }],
  "Relationship": "HAS A",
  "StartTime": "2019-05-17T13:00:56.229Z",
  "ExpiryTime": "2019-06-17T12:00:56.229Z"
}
```

Accepted EntityTypes

- ThingTypeToObjectType - To associate Thing type to Object type
- ObjectTypeToThingType - To associate Object type to Thing type
- ObjectTypeToObjectType - To associate Object type to Thing type

Accepted Relationship

- IS A
- HAS A
- PART OF

Response

Response Headers

Header	Description
Etag	87FF06A3B6784A3B9F4A6EC3F9EA0675

Response Status and Error Codes

Code	Description
201	Object association created successfully

Response Payload Example

```
{
  "d": {
    "results": [
      {
        "__metadata": {
```

```

        "id": "https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('E0E33B95BCB1490AB7C50A87C6C69988')",
        "uri": "https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('E0E33B95BCB1490AB7C50A87C6C69988')",
        "type": "com.sap.apptot.ObjectAssociation"
    },
    "AssociationID": "E0E33B95BCB1490AB7C50A87C6C69988",
    "PrimaryObjectID": "BP1",
    "AssociatedObjectID": "MAT1",
    "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:BP1",
    "AssociatedEntity": "iotae.devtest1.aejob.automobilestes:MAT1",
    "EntityTypes": "ObjectTypeToObjectType",
    "Relationship": "HAS A",
    "StartTime": "2019-05-17T13:00:56.229Z",
    "ExpiryTime": "2019-06-17T12:00:56.229Z",
    "CreationTime": "2019-03-06T09:23:08.195Z",
    "Description": "Association between Partner BP1 and Material
MAT1",
    "Descriptions": {
        "__deferred": {
            "uri": "https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('E0E33B95BCB1490AB7C50A87C6C69988')/Descriptions"
        }
    }
}
]
}
}

```

9.4.2 Read an Instance Association

With this method, you can read the details of an object instance association.

Request

URI: /CustomDataAssociation/v1/ObjectAssociations('<Association ID>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thing>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Associatio n ID	Yes	String	Unique identifier of the object associ- ation	Path

Response

Response Status and Error Codes

Code	Description
200	OK

Response Payload Example

Format: JSON

/CustomDataAssociation/v1/ObjectAssociations('CF42E985C3104789BD128CBC8A6B996B')

```
{
  "d": {
    "results": [{
      "AssociationId": "CF42E985C3104789BD128CBC8A6B996B",
      "PrimaryObjectID": "4B90908372BB4648BEA1EFDD56B0819C",
      "AssociatedObjectID": "72136789129",
      "PrimaryEntity": "core.automobiles:ABCXSeries",
      "AssociatedEntity": "core.automobiles:BusinessPartner",
      "EntityTypes": "ThingTypeToObjectType",
      "Description": "Association between Partner DEF and ABCXSeries1",
      "Relationship": "IS A",
      "StartTime": "2019-01-01T08:26:56.229Z",
      "ExpiryTime": "2019-05-31T08:26:56.229Z"
    }]
  }
}
```

9.4.3 Read all Instance Associations

With this method, you can read all object instance associations which are valid at the current time. If you want to read any past or future associations, you can use the StartTime/ExpiryTime filter.

Request

URI: /CustomDataAssociation/v1/ObjectAssociations

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thing>.r

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set

Parameter	Required	Data Type	Description
\$skip	No	Integer	Number of the first n records to be excluded from the result set
\$inlinecount	No	String	Total number of object types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of the object types available. • If you use this with \$filter parameter, the result contains the total count of the object types based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; only valid fields are AssociationID, PrimaryObjectID, PrimaryEntity, AssociatedObjectID, AssociatedEntity, Relationship, StartTime and ExpiryTime. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the separators – <i>and</i>, <i>or</i>. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Only valid fields are AssociationID, PrimaryObjectID, PrimaryEntity, AssociatedObjectID, AssociatedEntity, Relationship, StartTime and ExpiryTime.
\$select	No	String	Select condition for the data fields to be included in the result set; only valid fields are AssociationID, PrimaryObjectID, PrimaryEntity, AssociatedObjectID, AssociatedEntity, Relationship, StartTime and ExpiryTime.

Response

Response Status and Error Codes

Code	Description
200	OK

Response Payload Example

Format: JSON

/CustomDataAssociation/v1/ObjectAssociations

```
{
  "d": {
    "results": [{
      "AssociationId": "CF42E985C3104789BD128CBC8A6B996B",
      "PrimaryObjectID": "4B90908372BB4648BEA1EFDD56B0819C",
      "AssociatedObjectID": "72136789129",
      "PrimaryEntity": "core.automobiles:ABCXSeries",
      "AssociatedEntity": "core.automobiles:BusinessPartner",
      "EntityTypes": "ThingTypeToObjectType",
      "Description": "Association between Partner DEF and ABCXSeries1",
      "Relationship": "IS A",
      "StartTime": "2019-01-01T08:26:56.229Z",
      "ExpiryTime": "2019-05-31T08:26:56.229Z"
    },
    {
      "AssociationId": "CF42E985C3104789BD128CBC8A6C666B",
      "PrimaryObjectID": "4B90908372BB4648BEA1EFDD56B0819C",
      "AssociatedObjectID": "72136789130",
      "PrimaryEntity": "core.automobiles:ABCXSeries",
      "AssociatedEntity": "core.automobiles:BusinessPartner",
      "EntityTypes": "ThingTypeToObjectType",
      "Description": "Association between Partner DEF and ABCXSeries1",
      "Relationship": "IS A",
      "StartTime": "2019-07-01T08:26:56.229Z",
      "ExpiryTime": "2019-12-31T08:26:56.229Z"
    }
  ]
}
```

9.4.4 Delete an Instance Association

With this method, you can delete an object instance association.

Request

URI: /CustomDataAssociation/v1/ObjectAssociations('<Association ID>')

Operation Type: CRUD

HTTP Method: [DELETE](#)

Permissions: <thing>.d

Request Headers

Header	Required	Values
If-Match	Yes	Latest Etag value of the specified object instance association

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Association ID	Yes	String	Unique identifier of the object association	Path

Request Example

```
/CustomDataAssociation/v1/ObjectAssociations('CF42E985C3104789BD128CBC8A6B996B')
```

Response

Response Status and Error Codes

Code	Description
204	No content

9.4.5 \$Batch

With this API, you can batch multiple calls in a single request.

i Note

Request with Content-ID is not supported.

Request

URI: /CustomDataAssociation/v1/\$batch

Operation Type: CRUD

HTTP Method: [POST](#)

Permissions: <thing>.c, <thing>.r, <thing>.d

Request Headers

Header	Required	Values
Content-Type	Yes	multipart/mixed;batchboundary=<batch boundary> Example: multipart/mixed;boundary=batch_mybatch

Request Example

Request Header Content-Type: multipart/mixed;boundary=batch_mybatch

Payload

```
--batch_mybatch
Content-Type: application/http
Content-Transfer-Encoding: binary

GET ObjectAssociations('4C95D612A2BE43C5BF4DC145FCADD89D') HTTP/1.1
Accept: application/json
Accept-Language: en
DataServiceVersion: 2.0
MaxDataServiceVersion: 2.0

--batch_mybatch
Content-Type: multipart/mixed; boundary=changeset_c1

--changeset_c1
Content-Type: application/http
Content-Transfer-Encoding: binary

POST ObjectAssociations HTTP/1.1
Content-Type: application/json

{
  "PrimaryObjectID": "BP1",
  "AssociatedObjectID": "MAT1",
  "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:BP1",
  "AssociatedEntity": "iotae.devtest1.aejob.automobilestes:MAT1",
  "EntityTypes": "ObjectTypeToObjectType",
  "Descriptions": [
    {
      "LanguageCode": "en",
      "Description": "Association between Partner BP1 and Material MAT1"
    }
  ],
  "Relationship": "HAS A",
  "StartTime": "2019-08-18T13:00:56.229Z",
  "ExpiryTime": "2019-08-19T12:00:56.229Z"
}

--changeset_c1--
--batch_mybatch--
```

Response

Response Status and Error Codes

Code	Description
202	Accepted

Response Payload Example

```
--batch_deel43ca-c84b-4e1b-bad1-c023ba91c202
Content-Type: application/http
Content-Transfer-Encoding: binary

HTTP/1.1 200 OK
DataServiceVersion: 2.0
Content-Type: application/json
Content-Length: 1025

{"d":{"__metadata":{"id":"https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('4C95D612A2BE43C5BF4DC145FCADD89D')","uri":"https://
customdata-associations-sandbox.cfapps.sap.hana.ondemand.com:443/
CustomDataAssociation/v1/
ObjectAssociations('4C95D612A2BE43C5BF4DC145FCADD89D')","type":"com.sap.appiot.Ob
jectAssociation"},"AssociationID":"4C95D612A2BE43C5BF4DC145FCADD89D","PrimaryObje
ctID":"P12","AssociatedObjectID":"P56","PrimaryEntity":"iotae.devtest1.aejob.auto
mobilestes:Material","AssociatedEntity":"iotae.devtest1.aejob.automobilestes:Mate
rial3","EntityType":"ObjectTypeToObjectType","Relationship":"HAS
A","StartTime":"2019-01-17T18:03:50.000Z","ExpiryTime":"2020-12-31T23:59:59.000Z"
,"CreationTime":"2019-01-17T18:04:39.000Z","Description":null,"Descriptions":
{"__deferred":{"uri":"https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('4C95D612A2BE43C5BF4DC145FCADD89D')/Descriptions"}}}}
--batch_deel43ca-c84b-4e1b-bad1-c023ba91c202
Content-Type: multipart/mixed; boundary=changeset_48bf8927-353b-4998-
a6cf-9348c0718321

--changeset_48bf8927-353b-4998-a6cf-9348c0718321
Content-Type: application/http
Content-Transfer-Encoding: binary

HTTP/1.1 201 Created
ETag: 1700F7719CCA4C14A4CE854C050ED883
DataServiceVersion: 2.0
Location: v1/ObjectAssociations('2B94D029175B466ABC77C5480293DB06')
Content-Type: application/atom+xml; charset=utf-8; type=entry
Content-Length: 2105

<?xml version="1.0" encoding="utf-8"?><feed xmlns="http://www.w3.org/2005/Atom"
xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata"
xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservices"
xml:base="https://customdata-associations-sandbox.cfapps.sap.hana.ondemand.com:
443/CustomDataAssociation/v1/"><id>https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations</id><title type="text">ObjectAssociations</
title><updated>2019-02-18T02:57:21.825Z</updated><author><name></name></
author><link href="ObjectAssociations" rel="self" title="ObjectAssociations"></
link><entry><id>https://customdata-associations-
sandbox.cfapps.sap.hana.ondemand.com:443/CustomDataAssociation/v1/
ObjectAssociations('2B94D029175B466ABC77C5480293DB06')</id><title
type="text">ObjectAssociations</title><updated>2019-02-18T02:57:21.828Z</
updated><category term="com.sap.appiot.ObjectAssociation" scheme="http://
schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category><link
href="ObjectAssociations('2B94D029175B466ABC77C5480293DB06') " rel="edit"
```

```

title="ObjectAssociation"></link><link
href="ObjectAssociations('2B94D029175B466ABC77C5480293DB06')/Descriptions"
rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/Descriptions"
title="Descriptions" type="application/atom+xml;type=feed"></link><content
type="application/
xml"><m:properties><d:AssociationID>2B94D029175B466ABC77C5480293DB06</
d:AssociationID><d:PrimaryObjectID>BP1</
d:PrimaryObjectID><d:AssociatedObjectID>MAT1</
d:AssociatedObjectID><d:PrimaryEntity>iotae.devtest1.aejob.automobilestes:BP1</
d:PrimaryEntity><d:AssociatedEntity>iotae.devtest1.aejob.automobilestes:MAT1</
d:AssociatedEntity><d:EntityTypes>ObjectTypeToObjectType</
d:EntityTypes><d:Relationship>HAS A</
d:Relationship><d:StartTime>2019-08-18T13:00:56.229Z</
d:StartTime><d:ExpiryTime>2019-08-19T12:00:56.229Z</
d:ExpiryTime><d:CreationTime>2019-02-18T02:57:21.788Z</
d:CreationTime><d:Description>Association between Partner BP1 and Material MAT1</
d:Description></m:properties></content></entry></feed>
--changeset_48bf8927-353b-4998-a6cf-9348c0718321--
--batch_deel43ca-c84b-4e1b-bad1-c023ba91c202--

```

9.4.6 Create Instance Association with Standard Object Types

To create instance association with Standard Object Type Business Partner or Location, the same create instance association API must be used, specifying the standard object type name in the PrimaryEntity/AssociatedEntity.

Request

URI: /CustomDataAssociation/v1/ObjectAssociations

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <thing>.c

Request Example (Create instance association with Location standard object type)

Payload

Format: JSON

/CustomDataAssociation/v1/ObjectAssociations

```

{
  "PrimaryObjectID": "BP1",
  "AssociatedObjectID": "LOC1",
  "PrimaryEntity": "iotae.devtest1.aejob.automobilestes:BP1",
  "AssociatedEntity": "com.sap.iotaestandardcontent:LocationPoint",
  "EntityTypes": "ObjectTypeToObjectType",
  "Descriptions": [{
    "LanguageCode": "en",

```

```

"Description": "Association between Partner BP1 and Location LOC1"
}],
"Relationship": "HAS A",
"StartTime": "2019-05-17T13:00:56.229Z",
"ExpiryTime": "2019-06-17T12:00:56.229Z"
}

```

9.5 Role Templates and Scopes

Standard role templates provided by SAP for typical user profiles

Overview

The big number of different scopes that are needed to grant (or revoke) functional authorizations in SAP IoT can turn into a challenge for administrators who are in charge of assigning proper user profiles for the users of the system. To make this task easier, SAP provides a number of predefined role templates that an administrator may use as a blueprint for setting up individual roles as they are needed for a concrete organization. The basic procedure for this is as follows:

1. Derive a role from a role template.
2. Assign role (one or many) to a role collection.
3. Assign role collection (one or many) to a user group.

Role templates and scopes have a n:m relationship. That is, one template may contain many scopes, and one scope may be contained in many templates. The following sections show listings of the available role templates and the scopes that are contained in each template. The listings are broken down by the main areas of the SAP IoT Application Services platform.

i Note

Association-related operations are deprecated and will continue to be available on the AWS landscape for a limited period of time.

Master Data

Role Templates for Master Data

Role Template	Description	Scopes
Masterdata_Viewer	View master data	<code><cdconf>.r</code> <code><cdinstance>.r</code>

Role Template	Description	Scopes
Masterdata_Editor	Edit master data	
	• Read ObjectTypes	<cdconf>.r
	• Create ObjectTypes	<cdconf>.c
	• Delete ObjectTypes	<cdconf>.d
	• Update ObjectTypes	<cdconf>.u
	• Read Instances	<cdinstance>.r
	• Create instances	<cdinstance>.c
	• Delete instances	<cdinstance>.d
	• Update instances	<cdinstance>.u
	• Read ObjectTypeAssociations	<cdinstance>.r
	• Create ObjectTypeAssociations	<cdinstance>.c
	• Delete ObjectTypeAssociations	<cdinstance>.d
		<cdconf>.r
		<cdconf>.c
		<cdconf>.d
Thing_Engineer	Thing Engineer	
	• Read ObjectTypes	<cdconf>.r
	• Create ObjectTypes	<cdconf>.c
	• Delete ObjectTypes	<cdconf>.d
	• Update ObjectTypes	<cdconf>.u
	• Read Instances	<cdinstance>.r
	• Create instances	<cdinstance>.c
	• Delete instances	<cdinstance>.d
	• Update instances	<cdinstance>.u
	• Read instance associations	<cdinstance>.r
	• Create instance associations	<cdinstance>.c
	• Delete instance associations	<cdinstance>.d
	• Read ObjectTypeAssociations	<cdinstance>.u
	• Create ObjectTypeAssociations	<thing>.r
	• Delete ObjectTypeAssociations	<thing>.c
		<thing>.d
		<thing>.u
		<cdconf>.r
		<cdconf>.c
		<cdconf>.d
		<cdconf>.u

Note

The scopes mentioned here for Thing Engineer are specific to Master Data.

9.6 Value Data Types for Object Types and Properties

Display the list of supported data types for ObjectType creation

Value Data Type	Data Type	Length Mandatory	Value
String	String	No	i Note Maximum permissible length is 255 characters. You can increase the length for a property type even if the data already exists for this property. However, you cannot decrease the length for a property regardless of whether the data exists or not. Special characters forward slash (/) and caret (^) are not supported. i Note Default length is 127 characters.
Numeric	Integer	No	i Note Maximum permissible value is 2,147,483,647. Minimum permissible value is -2,147,483,648

Value Data Type	Data Type	Length Mandatory	Value
Numeric	Decimal	Yes	
	i Note When you set a decimal value for a property type, you must indicate the precision upto which you require the value. This value is defined in the format (x,y), where: • X indicates the overall digits in the value. The permissible range is between 1 to 10 digits. • Y indicates the number of decimal or fractional digits in the value. The permissible range is between 1 to X. For example, for a value 32.45, the format defined is (4,2). For a value 12345.123, the format defined is (8,3).		
NumericFlexible	Float	No	Value range is -3.4E+38 to +3.4E+38
	i Note This is used to store 32 bit floating point values.		
ThingID	String	No	Default is 32 characters
	This is used to store 32 character ThingID.		
BPID	String	No	Default is 32 characters
Timestamp	Timestamp	No	Value range is 0001-01-01 00:00:00 to 9999-12-31 23:59:59.9999999
	Corresponds to UTC date and time (with a precision of 0.1 microseconds).		
DateTime	Date time	No	Values range is 0001-01-01 00:00:00 to 9999-12-31 23:59:59
	Corresponds to UTC date and time (with seconds precision)		
Date	Date	No	Value range is 0001-01-01 to 9999-12-31

Value Data Type	Data Type	Length Mandatory	Value
Boolean	Boolean For Boolean data type, length is not required. So, length must NOT be passed in the payload.	No	Values supported are true and false .

i Note

You cannot change a Boolean data type to another data type and vice versa.

i Note

There is date format difference between v1 and v2 API. For details, see [Read an Object Instance \[page 698\]](#).

9.7 Limitations

- Object Type Annotation supports the following two values. Other values are not accepted.
 - `com.sap.apptot.security:spi`
 - `com.sap.apptot.security:pii`
- Property annotations accept only the values that are available in the same package. Other random values are not accepted.
- `$expand` is supported only for Get Object Types by ID (Single Object Type) and not for Get all Object Types.
- Only the below `$expand` values are supported for Get Object Types:
 - Single Expand
 - `$expand = Properties`
 - `$expand = Descriptions`
 - `$expand = Annotations`
 - `$expand = Properties/Annotations`
 - `$expand = Properties`
 - Multiple Expand
 - `$expand = Descriptions, Properties/Annotations, Properties/Descriptions`
 - `$expand = Descriptions, Annotations`
 - `$expand = Properties, Annotations`
- Batch requests with `Content-ID` header are not supported.
- `$batch` is only supported for object type instances and instance associations.

9.8 Audit Logs

The audit log service provides means for applications and services to store the audit log records and to comply with the SAP product standards SEC-215 (security event log), SEC-254 (log read access to sensitive personal data), SEC-265 (log changes to personal data), and SEC-257 (configuration change log). This is available for the following platforms:

- SAP HANA XS Advanced
- SAP CP Cloud Foundry @ AWS
- SAP CP Cloud Foundry @ OpenStack
- SAP CP Cloud Foundry @ Azure
- SAP CP Neo

Writing Audit Logs for Applications

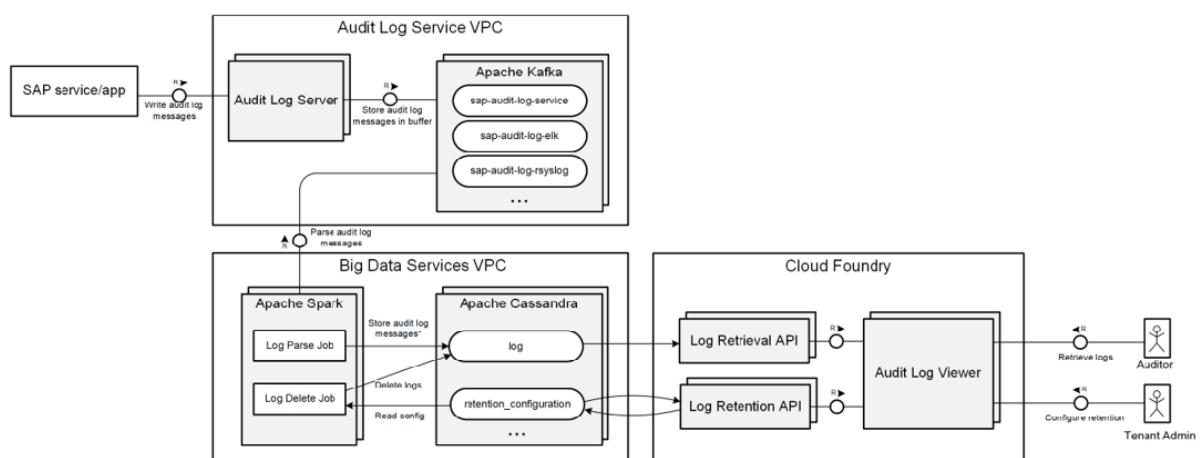
Cloud Foundry Applications should use the Audit Log Backing Service that is registered in the Cloud Foundry. The backing service is named `auditlog` and has only one unlimited standard plan.

Unable to View Audit Log Service in an Organization and Space

The audit log service is enabled by default for a limited number of organizations and spaces. On AWS Canary, there is no such limitation and the service is enabled for all the organizations and spaces. If you do not see it in the Cloud Foundry marketplace (cf m), then it is not enabled for your organization. It is planned to have a self-service UI for requesting services to be enabled for your organization.

Architecture

Following is the architecture of the data flow in audit logs:



* Audit log messages from all Kafka topics (represent different sources of audit log messages) are parsed. Only the audit log messages from the Audit log Write REST are stored separately and log cleaned accordingly so that to be retrieved from the Retrieval API afterwards. They are separated currently based on subaccount or org and space if tenant does not exist. The Retention on subaccount level as well as the retention on org and space (will be removed in the future) are applied only on the audit logs written via the Auditlog Write REST API that are arranged by subaccount.

Viewing Audit Logs

SAP CP Cloud Foundry

A self-service audit log viewer is available for all the audit logs written via the Audit Log Service REST API.

Viewing of Audit Logs

Audit logs can only use the SaaS App `Auditlog Viewer`. An important implication due to the use of `Auditlog Viewer` is that audit logs written for the PaaS tenant until now with `.setTenant(null)` are no longer retrievable. They have to be logged for the tenant (Subaccount ID) of the PaaS app. Thus the `Auditlog Viewer` can only retrieve the audit logs created for the Subaccount, where it is subscribed.

Getting Access to `Auditlog Viewer`

Audit logs can be viewed using the SaaS App `Auditlog Viewer`. It is available for any Subaccount in the [Subscriptions](#) tab. To get access to it, ensure that you are a Subaccount Admin and subscribe to it.

Using `Auditlog Viewer`

Once logged in, the audit logs are retrieved by pressing the button placed on the right side of the time filter.

i Note

- All the logs that are logged for the respective Subaccount are shown.
- Organization, Space and AppID are not available.
- Searching by [To Date](#) is rounded to the next full hour.

Audit log customer documentation

Audit Log Retrieval API on CF: <https://help.sap.com/viewer/65de2977205c403bbc107264b8eccf4b/Cloud/en-US/30ece35bac024ca69de8b16bff79c413.html>

Audit Log Viewer on CF: <https://help.sap.com/viewer/65de2977205c403bbc107264b8eccf4b/Cloud/en-US/e3baa5f1a0c64c44aac8ab3ea3d1b500.html>

SAP CP Neo

A self-service retrieval API is available. See the documentation on how to use the Audit Log Retrieval API:

<https://help.sap.com/viewer/65de2977205c403bbc107264b8eccf4b/Cloud/en-US/e4d818da43af43e1983df8e9e5caadb2.html>

SAP HANA XS Advanced

For SAP HANA XS Advanced with SAP Hana2 SP3, the audit logs are already stored in the Hana audit logging. For the SAP Hana installations prior Hana2 SP3, an audit log UI is still available and it is integrated into the XS Advanced Admin Tools. In order to use it, you can use the `XSA_ADMIN` user, which has the needed scopes

assigned. If you want to access it with a different user, you have to create a role collection and add the application role `AuditLogViewer`. The `AuditLogViewer` application role is a part of the application `auditlog-ui` and the role template `AuditLogViewer`. After that, you have to assign the role collection to the user.

Note

The Audit Log UI integrated in the XS Advanced Admin Tools is deprecated and expected to be removed with the upcoming versions for new installations.

Viewing Audit Logs for Master Data

The Audit Log entries written by the Master Data application API is viewed as below.

Create, Update and Delete of an instance writes a Data Modification Message whereas Read of an instance writes a Data Access Message. Based on the requirement, filter can be set on the time, user, data and so on to check the corresponding Audit Logs.

AuditLog Viewer 1.0			
testuser	Feb 18, 2019, 9:48:55 AM	Feb 18, 2019, 3:51:55 PM	
User	Time	Message	Category
testuser	18 Feb 2019, 15:51:28.023	Data Modification message. Attribute with name "Partner_Name" was changed from "" to "Acme AG". Attribute with name "ObjectID" was changed from "" to "Partner-01". The attributes are a part of an object with type "ObjectType" and id consisting of: OT1 "Partner-01". They belong to a subject with type "Partner", role "Owns" and id consisting of: OBJECTID1 "sap.apptot.cd.g:noah_citest01_cdatademo_Partner".	audit.data-modification

Log Entry Details	
Timestamp	18 Feb 2019, 15:51:28.023 +0530
Log Message	Data Modification message. Attribute with name "Partner_Name" was changed from "" to "Acme AG". Attribute with name "ObjectID" was changed from "" to "Partner-01". The attributes are a part of an object with type "ObjectType" and id consisting of: OT1 "Partner-01". They belong to a subject with type "Partner", role "Owns" and id consisting of: OBJECTID1 "sap.apptot.cd.g:noah_citest01_cdatademo_Partner".
IP	
User	testuser
Category	audit.data-modification
Data	<pre> 1 - { 2 "message_uuid": "1a7005b1-dc25-4d7c-96bd-5ca2b09f3590", 3 "time": "2019-02-18T10:21:28.023Z", 4 "tenant": "6b37714a-743c-49a9-bbfa-7245c0716662", 5 "org_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 6 "space_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 7 "app_or_service_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 8 "als_service_id": "fa7d5d39-2ef9-456c-8ccc-2d3044a9d3b9", 9 "user": "testuser", 10 "category": "audit.data-modification", 11 "format_version": "", 12 "message": { 13 "uid": "1a7005b1-dc25-4d7c-96bd-5ca2b09f3590", 14 "user": "testuser", 15 "time": "2019-02-18T10:21:28.023Z", 16 "object": { 17 "type": "ObjectType", 18 "id": { 19 "OT1": "Partner-01" 20 } 21 }, 22 "data_subject": { 23 "type": "Partner", 24 "role": "Owns", 25 "id": { </pre>

Data Modification Message

testuser	18 Feb 2019, 10:52:03.407	Data Access message. Attribute with name "CreatedByUser" was read. Attribute with name "LastChangedByUser" was read. The attributes are a part of an object with type "ThingType" and id consisting of: THINGTYPE "noah.citest01.qk0g3.core.refproptest:Car". They belong to a subject with type "Thing", role "Owns" and id consisting of: THINGID "014C4535C33A4557AE3F7AA42DD2C918". The message has the following attachments: .	audit.data-access

Log Entry Details	
Timestamp	18 Feb 2019, 10:52:03.407 +0530
Log Message	Data Access message. Attribute with name "CreatedByUser" was read. Attribute with name "LastChangedByUser" was read. The attributes are a part of an object with type "ThingType" and id consisting of: THINGTYPE "noah.citest01.qk0g3.core.refproptest:Car". They belong to a subject with type "Thing", role "Owns" and id consisting of: THINGID "014C4535C33A4557AE3F7AA42DD2C918". The message has the following attachments: .
IP	
User	testuser
Category	audit.data-access
Data	<pre> 1- { 2 "message_uuid": "2eda05eb-3b2d-4234-8772-95aa81864193", 3 "time": "2019-02-18T05:22:03.407Z", 4 "tenant": "6b37714a-743c-49a9-bbfa-7245c0716662", 5 "org_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 6 "space_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 7 "app_or_service_id": "92f1da92-e5b3-4cc5-8c90-964165af11c8", 8 "ols_service_id": "fa7d5d39-2ef9-456c-8ccc-2d3044a9d3b9", 9 "user": "testuser", 10 "category": "audit.data-access", 11 "format_version": "", 12 "message": { 13 "uuid": "2eda05eb-3b2d-4234-8772-95aa81864193", 14 "user": "testuser", 15 "time": "2019-02-18T05:22:03.407Z", 16 "channel": "SAP IoT AE Services GET_THINGS", 17 "object": { 18 "type": "ThingType", 19 "id": { 20 "THINGTYPE": "noah.citest01.qk0g3.core.refproptest:Car" 21 } 22 }, 23 "data_subject": { 24 "type": "Thing", 25 "role": "Owns", </pre>

Data Access Message

9.9 Data Protection and Privacy

General Data Protection Regulation Manager (GDPR) is an information framework that deals with the privacy of personal data. This service can be used by data subject to identify and handle the privacy of personal data in the system. SAP provides specific features and functions to support compliance with regard to relevant legal requirements, including data protection. SAP IoT delivers predefined annotations `com.sap.apptot.security:pii` and `com.sap.apptot.security:spi` to support compliance with regard to relevant legal requirements, including data protection.

You can assign the predefined annotations for object types during the following action:

- Create an object type or update an object type (in OData service)

After you define the annotations, all properties of the object type are considered as personal data or sensitive data based on the annotation defined. You can remove or add the annotation for the object type, only if data does not exist for the properties of the object type. Whenever you create or modify data for properties that are identified as personal data or sensitive data, the system must generate audit logs.

Object Type Configuration (OData Service)

In the following example payload for creating an object type, the predefined annotation `com.sap.appiot.security:spi` is assigned to the object type `iotae.devtest1.cdemo:Partner` to indicate that all properties of the object type are considered as sensitive data:

Request payload to create an object type with sensitive personal annotation:

`/CustomDataConfiguration/v2/Packages('iotae.devtest1.cdemo')/ObjectTypes`

```
{
  "Name": "iotae.devtest1.cdemo:Partner",
  "PackageName": "iotae.devtest1.cdemo",
  "Descriptions": [{
    "LanguageCode": "en",
    "Description": "Partner Data"
  }],
  "Source": "CRM_Data",
  "Annotations": [
    {
      "Name": "com.sap.appiot.security:spi"
    }
  ],
  "Properties": [
    {
      "Name": "Partner_Name",
      "Descriptions": [
        {
          "LanguageCode": "en",
          "Description": "Partner Name"
        }
      ],
      "Type": "String",
      "PropertyLength": "120"
    }
  ]
}
```

10 Custom Master Data Composite Services

In the previous section, we have seen the use of [Custom Master Data \[page 658\]](#) APIs. In order to obtain information about custom master data instances which are associated with a thing (using the custom master data APIs), a user must first use [Read an Instance Association \[page 712\]](#) to fetch the master data instance associated with the thing, and then use [Read an Object Instance \[page 698\]](#) to get details about the custom master data instance. Custom Master Data Composite Services allow the users to retrieve the same information without having to make multiple calls, that is, they can just use one composite API to get the data.

The Custom Master Data Composite Services consist of two services: [Composite Custom Master Data Basic Service \[page 730\]](#) and [Composite Custom Master Data Details Service \[page 738\]](#). The basic service retrieves a list of things along with the basic details of the custom master data. The details service retrieves a list of things along with their custom master data details, based on the object types specified in the request header. The service retrieves metadata and data for object types that are common across specified thing types.

i Note

Users are advised not to use underscores in ObjectType names. Names with underscores will give empty results. For instance, `iotae.devtest1.cdemo:Partner_Info` will give empty results for ObjectType Instances.

10.1 Composite Custom Master Data Basic Service

The service retrieves a list of things along with the basic details of the custom master data.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/CompositeMasterData/v1/`

Supported OData Features

Feature	Support
Query options	The current implementation supports the following query options, which can be passed as query or path parameters: • \$skip • \$top • \$orderby • \$filter • \$select • \$expand • \$inlinecount

10.1.1 Read Metadata of Composite Custom Master Data Basic Service

This service retrieves the metadata of Composite Custom Master Data Basic Service.

Request

URI: /CompositeMasterData/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <compcd>.r

Request Parameters

None

Request Example

```
/CompositeMasterData/v1/$metadata
```

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

Only media type supported is **XML**. The **XML** for this method has the structure as shown in the following example.

Example

```
/CompositeMasterData/v1/$metadata
```

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.apptot" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="ObjectInstance">
        <Key>
          <PropertyRef Name="ObjectType"></PropertyRef>
```

```

        <PropertyRef Name="ObjectId"></PropertyRef>
    </Key>
    <Property Name="ObjectId" Type="Edm.String"></Property>
    <Property Name="ObjectType" Type="Edm.String"></Property>
    <Property Name="StartTime" Type="Edm.DateTime"></Property>
    <Property Name="ExpiryTime" Type="Edm.DateTime"></Property>
</EntityType>
<EntityType Name="Thing">
    <Key>
        <PropertyRef Name="ThingId"></PropertyRef>
    </Key>
    <Property Name="ThingId" Type="Edm.String" Nullable="false">
        <Documentation>
            <LongDescription>Thing unique ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing description</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingName" Type="Edm.String" Nullable="false">
        <Documentation>
            <LongDescription>Thing name</LongDescription>
        </Documentation>
    </Property>
    <Property Name="AlternateId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing AlternateId</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingExternalId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing external id</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingType" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ObjectGroup" Type="Edm.String">
        <Documentation>
            <LongDescription>Object group used to create the Thing</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCustomerId" Type="Edm.String">
        <Documentation>
            <LongDescription>Business partner ID associated for the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingLocationId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing location ID</LongDescription>
        </Documentation>
    </Property>
    <NavigationProperty Name="ObjectInstance"
Relationship="com.sap.apptot.ObjectInstance" FromRole="ThingEntities"
ToRole="ObjectInstanceEntities"></NavigationProperty>
</EntityType>
    <Association Name="ObjectInstance">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.ObjectInstance" Multiplicity="*"
Role="ObjectInstanceEntities"></End>

```

```

        </Association>
        <EntityContainer Name="CompositeMasterDataAnalytics"
m:IsDefaultEntityContainer="true">
            <EntitySet Name="ObjectInstances"
EntityType="com.sap.appiot.ObjectInstance"></EntitySet>
            <EntitySet Name="Things" EntityType="com.sap.appiot.Thing"></
EntitySet>
            <AssociationSet Name="ObjectInstance"
Association="com.sap.appiot.ObjectInstance">
                <End EntitySet="Things" Role="ThingEntities"></End>
                <End EntitySet="ObjectInstances"
Role="ObjectInstanceEntities"></End>
            </AssociationSet>
        </EntityContainer>
    </Schema>
</edmx:DataServices>
</edmx:Edmx>

```

10.1.2 Read List of Things

This service retrieves a list of things along with custom master data.

Note

The service supports \$expand query parameter in the request URL with which you can see the details of the custom master data in your result set.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the __next link at the end in the response payload. However, the number of records retrieved depends on the query parameter \$top.

Request

URI: /CompositeMasterData/v1/Things

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <compcd>.r

Request Headers

None

Request Parameters

None

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set
\$inlinecount	No	String	Total number of things available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of things available. • If you use this with \$filter parameter, the result contains the total count of things based on the defined filter condition.
\$count	No	Boolean	Total number of things available based on the current user's authorizations; permissible values are true and false. If this is used in conjunction with the \$top and \$skip parameters, the result contains the total count of things available.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all thing entity fields are valid. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select		String	Select condition for the thing entity fields to be included in the result set.
\$filter		String	Filter condition to be applied; all thing entity fields and fields in navigation properties of object types are valid. Multiple filters are supported using the <i>and</i> separator. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter.

Request Examples

```
/CompositeMasterData/v1/Things
```

Assume, there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records.

```
/CompositeMasterData/v1/Things?$top=500
```

Assume, there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records until the top 500 records are retrieved.

Response

Response Status and Error Codes

Code	Description
200	Thing list retrieved successfully

Payload

Format: [JSON](#)

Media types supported are **JSON** and **XML**. The **JSON** for this method has the structure as depicted in the following example.

Example

The result set contains all things along with the basic details of custom master data.

Request URL Path: /CompositeMasterData/v1/Things?\$expand=ObjectInstance

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/Things('1A0A556907E44E64AF9D983B116105BB')",
          "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/Things('1A0A556907E44E64AF9D983B116105BB')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "1A0A556907E44E64AF9D983B116105BB",
        "ThingDescription": "Cooler001 Description",
        "ThingName": "Cooler001",
        "AlternateId": null,
        "ThingExternalId": "Cooler001",
        "ThingType": "core.cooler.package:CoolerType",
        "ObjectGroup": "693FE2A1823E45149ECDA575CC64C006",
        "ThingCustomerId": null,
        "ThingLocationId": null,
        "ObjectInstance": {
          "results": [
            {
              "ObjectId": "D062089C1F8B4E8AA1803455F701BF20",
              "ObjectType": "core.cooler.package:Product",
              "StartTime": "/Date(1558616456000)/",
              "ExpiryTime": "/Date(1560686456000)/"
            },
            {
              "ObjectId": "63BF2770BFF24FE295A969C25FEE4402",
              "ObjectType": "core.cooler.package:Address",
              "StartTime": "/Date(1558616456000)/",
              "ExpiryTime": "/Date(1561118456000)/"
            }
          ]
        }
      }
    ]
  }
}
```

```

    ]
  },
  {
    "__metadata": {
      "id": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('7A4F53C0C38F46E0874A66A3635BEB64')",
      "uri": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('7A4F53C0C38F46E0874A66A3635BEB64')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "7A4F53C0C38F46E0874A66A3635BEB64",
    "ThingDescription": "Cooler006 Description",
    "ThingName": "Cooler006",
    "AlternateId": null,
    "ThingExternalId": "Cooler006",
    "ThingType": "core.cooler.package:CoolerType",
    "ObjectGroup": "693FE2A1823E45149ECDA575CC64C006",
    "ThingCustomerId": null,
    "ThingLocationId": null,
    "ObjectInstance": {
      "results": [
        {
          "ObjectId": "B5EE38ADCC8E4E8BAD105848AC682D0A",
          "ObjectType": "core.cooler.package:Product",
          "StartTime": "/Date(1558616456000)/",
          "ExpiryTime": "/Date(1560945656000)/"
        },
        {
          "ObjectId": "7B39B8589E5A4915B387086A89AAB1CF",
          "ObjectType": "core.cooler.package:Address",
          "StartTime": "/Date(1558616456000)/",
          "ExpiryTime": "/Date(1561896056000)/"
        }
      ]
    }
  },
  {
    "__metadata": {
      "id": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('9208196DC0A4445B84D37D66AB614C8D')",
      "uri": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('9208196DC0A4445B84D37D66AB614C8D')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "9208196DC0A4445B84D37D66AB614C8D",
    "ThingDescription": "Cooler001 Description",
    "ThingName": "Cooler002",
    "AlternateId": null,
    "ThingExternalId": "Cooler002",
    "ThingType": "core.cooler.package:CoolerType",
    "ObjectGroup": "693FE2A1823E45149ECDA575CC64C006",
    "ThingCustomerId": null,
    "ThingLocationId": null,
    "ObjectInstance": {
      "results": [
        {
          "ObjectId": "A365DE2FBAEB4BF18B0B30C70E1B925D",
          "ObjectType": "core.cooler.package:Product",
          "StartTime": "/Date(1558616456000)/",
          "ExpiryTime": "/Date(1563537656000)/"
        },
        {
          "ObjectId": "051C3968885B408680D55A4A3F5FE362",

```

```

        "ObjectType": "core.cooler.package:Address",
        "StartTime": "/Date(1558616456000)/",
        "ExpiryTime": "/Date(1564488056000)/"
    }
}
},
{
    "__metadata": {
        "id": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('B3407370CFCF4F4EADA1BDCD7472E3EE')",
        "uri": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('B3407370CFCF4F4EADA1BDCD7472E3EE')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "B3407370CFCF4F4EADA1BDCD7472E3EE",
    "ThingDescription": "Cooler005 Description",
    "ThingName": "Cooler005",
    "AlternateId": null,
    "ThingExternalId": "Cooler005",
    "ThingType": "core.cooler.package:CoolerType",
    "ObjectGroup": "693FE2A1823E45149ECDA575CC64C006",
    "ThingCustomerId": null,
    "ThingLocationId": null,
    "ObjectInstance": {
        "results": [
            {
                "ObjectId": "8E70E64462214A93A2169B2C89136573",
                "ObjectType": "core.cooler.package:Product",
                "StartTime": "/Date(1558616456000)/",
                "ExpiryTime": "/Date(1562760056000)/"
            },
            {
                "ObjectId": "4522AB63B79547AB9CCE005E6287F4C6",
                "ObjectType": "core.cooler.package:Address",
                "StartTime": "/Date(1558616456000)/",
                "ExpiryTime": "/Date(1561896056000)/"
            }
        ]
    }
},
{
    "__metadata": {
        "id": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('DAAF7B9BCDC6421C95629CA984627628')",
        "uri": "https://composite-custom-master-data-
sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/v1/
Things('DAAF7B9BCDC6421C95629CA984627628')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "DAAF7B9BCDC6421C95629CA984627628",
    "ThingDescription": "Cooler003 Description",
    "ThingName": "Cooler003",
    "AlternateId": null,
    "ThingExternalId": "Cooler003",
    "ThingType": "core.cooler.package:CoolerType",
    "ObjectGroup": "693FE2A1823E45149ECDA575CC64C006",
    "ThingCustomerId": null,
    "ThingLocationId": null,
    "ObjectInstance": {
        "results": [
            {
                "ObjectId": "FD8EE8B1A322462689C4E4ACC2CEB3DB",
                "ObjectType": "core.cooler.package:Product",
                "StartTime": "/Date(1558616456000)/",

```

```

    },
    {
      "ObjectId": "24117A3D559B4153A0183A50A818B124",
      "ObjectType": "core.cooler.package:Address",
      "StartTime": "/Date(1558616456000)/",
      "ExpiryTime": "/Date(1561377656000)/"
    }
  ]
}

```

10.2 Composite Custom Master Data Details Service

This service retrieves a list of things along with their custom master data details, based on the object types specified in the request header. The service retrieves metadata and data for object types that are common across specified thing types.

OData Version: 2.0

Root URI: http://<server address>[:<port number>]/CompositeMasterData/Details/v1/

Supported OData Features

Feature	Support
Query options	The current implementation supports the following query options, which can be passed as query or path parameters: • \$skip • \$top • \$orderby • \$filter • \$select • \$expand • \$inlinecount

10.2.1 Read Metadata of Composite Custom Master Data Details Service

This service retrieves the metadata for object types that are common across thing types. It retrieves the metadata of Composite Custom Master Data Details Service.

i Note

If you do not specify the header parameters, the service retrieves only the thing entity.

Request

URI: /CompositeMasterData/Details/v1/\$metadata

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <compcd>.r

Request Headers

Header	Required	Values
sap-iot-ot	No	Object types separated by comma ","

Request Parameters

None

Request Example

```
/CompositeMasterData/Details/v1/$metadata
```

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

Only media type supported is **XML**. The **XML** for this method has the structure as shown in the following example.

Example

```
/CompositeMasterData/Details/v1/$metadata
```

Request header parameters sap-iot-ot with value core.cooler.package:Product,core.cooler.package:Address

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.appiot" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="Thing">
        <Key>
          <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
      </EntityType>
    </Schema>
  </DataServices>
</edmx:Edmx>
```

```

        <Property Name="ThingId" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Thing unique ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingDescription" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing description</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingName" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Thing name</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingExternalId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing external id</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingType" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ObjectGroup" Type="Edm.String">
            <Documentation>
                <LongDescription>Object group used to create the Thing</
LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingCustomerId" Type="Edm.String">
            <Documentation>
                <LongDescription>Business partner ID associated for the
Thing</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingLocationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing location ID</LongDescription>
            </Documentation>
        </Property>
        <NavigationProperty Name="DYN_ENT_core_cooler__Product"
Relationship="com.sap.apptot.DYN_ENT_core_cooler__Product"
FromRole="ThingEntities" ToRole="DYN_ENT_core_cooler__ProductEntities"></
NavigationProperty>
        <NavigationProperty Name="DYN_ENT_core_cooler__Address"
Relationship="com.sap.apptot.DYN_ENT_core_cooler__Address"
FromRole="ThingEntities" ToRole="DYN_ENT_core_cooler__AddressEntities"></
NavigationProperty>
    </EntityType>
    <EntityType Name="DYN_ENT_core_cooler__Product">
        <Key>
            <PropertyRef Name="ObjectType"></PropertyRef>
            <PropertyRef Name="ObjectID"></PropertyRef>
        </Key>
        <Property Name="ObjectType" Type="Edm.String"></Property>
        <Property Name="ObjectID" Type="Edm.String"></Property>
        <Property Name="core.cooler.package.Product.ProductName"
Type="Edm.String"></Property>
        <Property Name="core.cooler.package.Product.ProductDescription"
Type="Edm.String"></Property>
        <Property Name="core.cooler.package.Product.StartTime"
Type="Edm.DateTime"></Property>
        <Property Name="core.cooler.package.Product.ExpiryTime"
Type="Edm.DateTime"></Property>
    </EntityType>

```

```

        <EntityType Name="DYN_ENT_core_cooler__Address">
            <Key>
                <PropertyRef Name="ObjectType"></PropertyRef>
                <PropertyRef Name="ObjectID"></PropertyRef>
            </Key>
            <Property Name="ObjectType" Type="Edm.String"></Property>
            <Property Name="ObjectID" Type="Edm.String"></Property>
            <Property Name="core.cooler.package.Address.Country"
Type="Edm.String"></Property>
            <Property Name="core.cooler.package.Address.City"
Type="Edm.String"></Property>
            <Property Name="core.cooler.package.Address.StartTime"
Type="Edm.DateTime"></Property>
            <Property Name="core.cooler.package.Address.ExpiryTime"
Type="Edm.DateTime"></Property>
        </EntityType>
        <Association Name="DYN_ENT_core_cooler__Product">
            <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
            <End Type="com.sap.apptot.DYN_ENT_core_cooler__Product"
Multiplicity="*" Role="DYN_ENT_core_cooler__ProductEntities"></End>
        </Association>
        <Association Name="DYN_ENT_core_cooler__Address">
            <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
            <End Type="com.sap.apptot.DYN_ENT_core_cooler__Address"
Multiplicity="*" Role="DYN_ENT_core_cooler__AddressEntities"></End>
        </Association>
        <EntityContainer Name="CompositeMasterDataAnalytics"
m:IsDefaultEntityContainer="true">
            <EntitySet Name="Things" EntityType="com.sap.apptot.Thing"></
EntitySet>
            <EntitySet Name="DYN_ENT_core_cooler__Products"
EntityType="com.sap.apptot.DYN_ENT_core_cooler__Product"></EntitySet>
            <EntitySet Name="DYN_ENT_core_cooler__Addressss"
EntityType="com.sap.apptot.DYN_ENT_core_cooler__Address"></EntitySet>
            <AssociationSet Name="DYN_ENT_core_cooler__Product"
Association="com.sap.apptot.DYN_ENT_core_cooler__Product">
                <End EntitySet="Things" Role="ThingEntities"></End>
                <End EntitySet="DYN_ENT_core_cooler__Products"
Role="DYN_ENT_core_cooler__ProductEntities"></End>
            </AssociationSet>
            <AssociationSet Name="DYN_ENT_core_cooler__Address"
Association="com.sap.apptot.DYN_ENT_core_cooler__Address">
                <End EntitySet="Things" Role="ThingEntities"></End>
                <End EntitySet="DYN_ENT_core_cooler__Addressss"
Role="DYN_ENT_core_cooler__AddressEntities"></End>
            </AssociationSet>
        </EntityContainer>
    </Schema>
</edmx:DataServices>
</edmx:Edmx>

```

10.2.2 Read List of Things

This service retrieves a list of things for the specified object types of custom master data.

With this service, you can retrieve the list of things based on the following request header parameter:

Object type – You can list one or more object types separated by comma.

Service retrieves all things of thing type that are associated with the specified object types. The request header parameters are optional.

Note

The service supports \$expand query parameter in the request URL with which you can see the details of the custom master data in your result set. However, when the values provided in the request header parameter and in the \$expand query parameter differ, the values specified in the \$expand query parameter takes the precedence and the result set is retrieved only based on them. The request header parameters are ignored in such cases.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the __next link at the end in the response payload. However, the number of records retrieved depends on the query parameter \$top.

The table below illustrates the available things, thing types, and object types.

Things	Thing Type	Object Type
T1, T2	TT1	OT1, OT2
T3, T4	TT2	OT2, OT3, OT4
T5	TT3	OT1, OT2, OT4

The table below illustrates how data is retrieved for a given combination of request header parameters and \$expand query parameters:

Request	Request Header Parameters	Result Set Contains...	Based on the...
/things	OT1, OT2	T1, T2	Request header parameters
/things?\$expand=OT2	OT1, OT2	T1, T2, T3, T4, T5	\$expand query parameters (request header parameters are ignored)
/things?\$expand=OT1, OT2	OT1, OT2	T1, T2	Request header parameters and \$expand query parameters are same

Request

URI: /CompositeMasterData/Details/v1/Things

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <compcd>.r

Request Headers

Header	Required	Values
sap-iot-ot	No	Object types separated by comma ","

Request Parameters

None

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set
\$inlinecount	No	String	Total number of things available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of things available. • If you use this with \$filter parameter, the result contains the total count of things based on the defined filter condition.
\$count	No	Boolean	Total number of things available based on the current user's authorizations; permissible values are true and false. If this is used in conjunction with the \$top and \$skip parameters, the result contains the total count of things available.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all thing entity fields are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select		String	Select condition for the thing entity fields to be included in the result set.
\$filter		String	Filter condition to be applied; all thing entity fields and fields in navigation properties of object types are valid. Multiple filters are supported using the and separator. You can use the string functions such as substringof, startswith, and endswith to search data using \$filter.

Request Examples

```
/CompositeMasterData/Details/v1/Things
```

Assume there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records.

```
/CompositeMasterData/v1/Things?$top=500
```

Assume there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records until the top 500 records are retrieved.

Response

Response Status and Error Codes

Code	Description
200	Thing list retrieved successfully

Payload

Format: [JSON](#)

Media types supported are **JSON** and **XML**. The **JSON** for this method has the structure as depicted in the following example.

Example

Request URL Path: CompositeMasterData/Details/v1/Things?

\$expand=DYN_ENT_core_cooler__Product,DYN_ENT_core_cooler__Address

Request header parameter `sap-iot-ot` with value `core.cooler.package:Product,core.cooler.package:Address`

The result set contains all things that belong to the thing types associated with the object types specified in the request header.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('1A0A556907E44E64AF9D983B116105BB')",
          "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('1A0A556907E44E64AF9D983B116105BB')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "1A0A556907E44E64AF9D983B116105BB",
        "ThingDescription": "Cooler001 Description",
        "ThingName": "Cooler001",
        "AlternateId": null,
        "ThingExternalId": "Cooler001",
      }
    ]
  }
}
```

```

"core.cooler.package:CoolerType",
"693FE2A1823E45149ECDA575CC64C006",
"ThingCustomerId": null,
"ThingLocationId": null,
"DYN_ENT_core_cooler__Product": {
  "results": [
    {
      "ObjectType": "core.cooler.package:Product",
      "ObjectId": "D062089C1F8B4E8AA1803455F701BF20",
      "core.cooler.package.Product.ProductName":
"CocaCola",
      "core.cooler.package.Product.ProductDescription":
"CocaCola",
      "core.cooler.package.Product.StartTime": "/"
Date(1558616456000)/",
      "core.cooler.package.Product.ExpiryTime": "/"
Date(1560686456000)/"
    }
  ],
  "DYN_ENT_core_cooler__Address": {
    "results": [
      {
        "ObjectType": "core.cooler.package:Address",
        "ObjectId": "63BF2770BFF24FE295A969C25FEE4402",
        "core.cooler.package.Address.Country": "India",
        "core.cooler.package.Address.City": "Bangalore",
        "core.cooler.package.Address.StartTime": "/"
Date(1558616456000)/",
        "core.cooler.package.Address.ExpiryTime": "/"
Date(1561118456000)/"
      }
    ],
    {
      "__metadata": {
        "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/
CompositeMasterData/Details/v1/Things('7A4F53C0C38F46E0874A66A3635BEB64')",
        "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:
443/CompositeMasterData/Details/v1/Things('7A4F53C0C38F46E0874A66A3635BEB64')",

```

```

"type": "com.sap.appiot.Thing"
},
"ThingId":
"7A4F53C0C38F46E0874A66A3635BEB64",
"ThingDescription": "Cooler006 Description",
"ThingName":
"Cooler006",
"AlternateId":
null,
"ThingExternalId": "Cooler006",
"ThingType":
"core.cooler.package:CoolerType",
"ObjectGroup":
"693FE2A1823E45149ECDA575CC64C006",
"ThingCustomerId": null,
"ThingLocationId": null,
"DYN_ENT_core_cooler__Product": {
"results": [
{
"ObjectType": "core.cooler.package:Product",
"ObjectId": "B5EE38ADCC8E4E8BAD105848AC682D0A",
"core.cooler.package.Product.ProductName":
"Pepsi",
"core.cooler.package.Product.ProductDescription":
"Pepsi",
"core.cooler.package.Product.StartTime": "/"
Date(1558616456000)/",
"core.cooler.package.Product.ExpiryTime": "/"
Date(1560945656000)/"
}
],
},
"DYN_ENT_core_cooler__Address": {
"results": [
{
"ObjectType": "core.cooler.package:Address",
"ObjectId": "7B39B8589E5A4915B387086A89AAB1CF",
"core.cooler.package.Address.Country": "India",
"core.cooler.package.Address.City": "Hyderabad",
"core.cooler.package.Address.StartTime": "/"
Date(1558616456000)/",
"core.cooler.package.Address.ExpiryTime": "/"
Date(1561896056000)/"
}
]
}

```



```

    }
    ],
    },
    {
        "__metadata": {
            "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('9208196DC0A4445B84D37D66AB614C8D')",
            "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('9208196DC0A4445B84D37D66AB614C8D')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId":
        "9208196DC0A4445B84D37D66AB614C8D",
        "ThingDescription": "Cooler001 Description",
        "ThingName":
        "Cooler002",
        "AlternateId":
        null,
        "ThingExternalId": "Cooler002",
        "ThingType":
        "core.cooler.package:CoolerType",
        "ObjectGroup":
        "693FE2A1823E45149ECDA575CC64C006",
        "ThingCustomerId": null,
        "ThingLocationId": null,
        "DYN_ENT_core_cooler__Product": {
            "results": [
                {
                    "ObjectType": "core.cooler.package:Product",
                    "ObjectId": "A365DE2FBAEB4BF18B0B30C70E1B925D",
                    "core.cooler.package.Product.ProductName":
                    "Sprite",
                    "core.cooler.package.Product.ProductDescription":
                    "Sprite",
                    "core.cooler.package.Product.StartTime": "/"
                    Date(1558616456000)/",
                    "core.cooler.package.Product.ExpiryTime": "/"
                    Date(1563537656000)/"
                }
            ]
        },
        "DYN_ENT_core_cooler__Address": {
            "results": [
                {
                    "ObjectType": "core.cooler.package:Address",

```

```

        "ObjectId": "051C3968885B408680D55A4A3F5FE362",
        "core.cooler.package.Address.Country": "India",
        "core.cooler.package.Address.City": "Chennai",
        "core.cooler.package.Address.StartTime": "/"
Date(1558616456000) /",
        "core.cooler.package.Address.ExpiryTime": "/"
Date(1564488056000) /"
    }
}

},
{
    "__metadata": {
        "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('B3407370CFCF4F4EADA1BD7472E3EE')",
        "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/CompositeMasterData/Details/v1/Things('B3407370CFCF4F4EADA1BD7472E3EE')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId":
    "B3407370CFCF4F4EADA1BD7472E3EE",
    "ThingDescription": "Cooler005 Description",
    "ThingName":
    "Cooler005",
    "AlternateId":
    null,
    "ThingExternalId": "Cooler005",
    "ThingType":
    "core.cooler.package:CoolerType",
    "ObjectGroup":
    "693FE2A1823E45149ECDA575CC64C006",
    "ThingCustomerId": null,
    "ThingLocationId": null,
    "DYN_ENT_core_cooler__Product": {
        "results": [
            {
                "ObjectType": "core.cooler.package:Product",
                "ObjectId": "8E70E64462214A93A2169B2C89136573",
                "core.cooler.package.Product.ProductName":
                "ThumsUp",
                "core.cooler.package.Product.ProductDescription":
                "ThumsUp",
                "core.cooler.package.Product.StartTime": "/"
                "core.cooler.package.Product.ExpiryTime": "/"
Date(1558616456000) /",
Date(1562760056000) /"
            }
        ]
    }
}

```

```

    }
    ],
    "DYN_ENT_core_cooler__Address": {
    "results": [
        {
            "ObjectType": "core.cooler.package:Address",
            "ObjectId": "4522AB63B79547AB9CCE005E6287F4C6",
            "core.cooler.package.Address.Country": "India",
            "core.cooler.package.Address.City": "Mumbai",
            "core.cooler.package.Address.StartTime": "/"
Date(1558616456000)/",
            "core.cooler.package.Address.ExpiryTime": "/"
Date(1561896056000)/"
        }
    ]
    },
    {
        "__metadata": {
            "id": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:443/
CompositeMasterData/Details/v1/Things('DAAF7B9BCDC6421C95629CA984627628')",
            "uri": "https://composite-custom-master-data-sap.cfapps.sap.hana.ondemand.com:
443/CompositeMasterData/Details/v1/Things('DAAF7B9BCDC6421C95629CA984627628')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId":
"DAAF7B9BCDC6421C95629CA984627628",
        "ThingDescription": "Cooler003 Description",
        "ThingName":
"Cooler003",
        "AlternateId":
null,
        "ThingExternalId": "Cooler003",
        "ThingType":
"core.cooler.package:CoolerType",
        "ObjectGroup":
"693FE2A1823E45149ECDA575CC64C006",
        "ThingCustomerId": null,
        "ThingLocationId": null,
        "DYN_ENT_core_cooler__Product": {
        "results": [
            {
                "ObjectType": "core.cooler.package:Product",
                "ObjectId": "FD8EE8B1A322462689C4E4ACC2CEB3DB",

```

```

"Marinda",
"Marinda",
Date(1558616456000)/",
Date(1563969656000)/"
    }
    ],
    "DYN_ENT_core_cooler__Address": {
    "results": [
        {
            "ObjectType": "core.cooler.package:Address",
            "ObjectId": "24117A3D559B4153A0183A50A818B124",
            "core.cooler.package.Address.Country": "India",
            "core.cooler.package.Address.City": "Delhi",
            "core.cooler.package.Address.StartTime": "/",
            "core.cooler.package.Address.ExpiryTime": "/"
        }
    ]
}

```

11 Smart Sensing

With Smart Sensing, SAP IoT offers a suite of Fiori apps that help you identify and track all kinds of physical business objects maintained in your business system. Identifying and tracking is taken care of by scanners and sensors managed with SAP IoT.

The assumption is that each movement of a physical item representing a business object (that is, product, container, ...) has an implicit meaning for the progress of the business process execution. For example, moving a pallet through the door and onto a waiting truck means "goods issue". The manual effort to capture the process steps and update the IT systems in the backend should be minimized. That is, moving a box through the RFID gate at the warehouse outbound dock should automatically update the delivery status, send the corresponding advanced shipping notification (ASN), and trigger an update in the backend system of the recipient. This kind of integration aims at reducing efforts by letting the physical items automatically trigger the next processing step in the business process.

11.1 Auto-ID

Based on the auto-ID pattern specified for an object type in the *Business Context* app, you can call an API to generate auto-ID for its object instances. You can also remove auto-ID values from given object instances.

HTTP Method	Operation	URI	Example	Payload
POST	Generate an auto-ID value and assign it to the EpcIdUri field of an object instance	<base url>/v1/autoId/epcCodeAssignments/<object type>	https://sap-iot-noah-live-sis-subscriptions.cfapps.eu10.hana.ondemand.com/v1/autoId/epcCodeAssignments/iot.iot.cmdcache:A_KanbanContainerType3	≡, Sample Code <pre>[{ "objectId": "61" }]</pre>

i Note

Content-Type must be application/json.

HTTP Method	Operation	URI	Example	Payload
GET	Preview the next auto-ID to be generated	<code><base url>/v1/autoId/epcCodeAssignments/<object type>?simulateAssignment=true</code>	<code>https://sap-iot-noah-live-sis-subscriptions.cfapps.eu10.hana.ondemand.com/v1/autoId/epcCodeAssignments/iot.iot.cmdcache:A_KanbanContainerType3?simulateAssignment=true</code>	
⚠ Caution <code>simulateAssignment</code> is a required parameter. Do not set this parameter to false as the auto-ID generated will not be used in the object instance, thus wasted.				
DELETE	Remove the auto-ID value from the <code>EpcIdUri</code> field	<code><base url> /v1/autoId/epcCodeAssignments/<object type></code>	<code>https://sap-iot-noah-live-sis-subscriptions.cfapps.eu10.hana.ondemand.com/v1/autoId/epcCodeAssignments/iot.iot.cmdcache:A_KanbanContainerType3</code>	↩ Sample Code <pre>[{ "objectId": "61" }]</pre>
ℹ Note Content-Type must be application/json.				

ℹ Note

1. None of the API calls can be executed against object types that have "Auto-ID Setting" set to *None*.
2. `EpcIdUri` values are generated according to settings defined for the object type.

Related Information

[Create a Business Context](#)

12 Actions

An action is a system activity that can be triggered by a rule or another action.

Actions are used to model the system activities that shall be performed when a rule condition is fulfilled or when another action is configured to trigger further actions (sometimes referred to as an action chain). Actions serve as the link between highly technical IoT scenarios focused on sensor data on the one hand and classical business scenarios on the other hand, such as triggering a service request, ordering a spare part, or purchasing an asset as a replacement for an existing one. Also, for more complex scenarios, you can configure an action to trigger an entire workflow containing a predefined sequence of processing steps. Actions can also be triggered by decision support systems as recommended actions that have been prepared for handling certain business situations.

Prerequisites

For execution of actions that are configured for triggering activities or processes in remote systems, the user executing the action needs the relevant authorizations in the remote system.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/v1/Actions`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-noah-live-action-modeler.cfapps.eu10.hana.ondemand.com/v1/Actions`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create an Action [page 754]	<code>/Actions</code>	<code><action>.AM.c</code>
<i>GET</i>	Read an Action [page 757]	<code>/Actions ('<ID>')</code>	<code><action>.AM.r</code>
<i>GET</i>	Read all Actions [page 759]	<code>/Actions</code>	<code><action>.AM.r</code>
<i>PUT</i>	Update an Action [page 756]	<code>/Actions ('<ID>')</code>	<code><action>.AM.u</code>
<i>DELETE</i>	Delete Actions [page 762]	<code>/Actions ('<ID>')</code>	<code><action>.AM.d</code>

Related Information

[Rule Services \[page 1022\]](#)
[Segment Service \[page 1121\]](#)
[Event Services \[page 1194\]](#)

12.1 Create an Action

This service is used to create an action.

Request

With this service method, you create an action. By configuring the respective fields in the payload, you specify the action type (for example, email notification or in-app alert) as well as the event that is used as a trigger for the action.

For the text fields that are used to convey natural language information to end users, the `Action` service supports a parser engine for dynamic content. For more information on this feature, see the *Dynamic Content/Action Vocabulary* section in the corresponding chapter of the *Actions and Notifications* app, [Create an Action](#).

URI: `/v1/actions`

HTTP Method: `POST`

Authorization: `OAuth`

Request Example: `/v1/actions`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Request Body

Payload

```
{
  "actionRunResults": [],
  "actionType": "EMAIL",
  "eventName": null,
  "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
  "eventGUID": "4043",
  "name": "test public API",
  "description": "EMAIL",
```



```

    "thingTypeGUID": "iotae.automobiles:ABCXSeries",
    "status": 1,
    "severity": 2,
    "methodType": null,
    "authType": null,
    "destinationName": null,
    "triggeredEventOutbound": false,
    "outboundEventName": null,
    "respDocType": null,
    "invocationType": "AUTO",
    "header": "test",
    "body": "test",
    "requestBody": null,
    "notificationTemplateId": null,
    "notificationTypeKey": null,
    "notificationTypeVersion": null,
    "notificationLanguage": null,
    "notificationTemplateContent": null,
    "url": "",
    "actionParameters": [
      {
        "name": "thing",
        "path": "thing.id",
        "type": "THING",
        "namedPst": null
      },
      {
        "name": "thing",
        "path": "thing.description",
        "type": "THING",
        "namedPst": null
      }
    ],
    "actionRecipients": [
      "<email>"
    ]
  }

```

Response

Action created. Guid is: "<guid>"

Response Status and Error Codes

Code	Description
201 Created	Action created
400 Bad Request	Action was empty/Guid not allowed during action creation
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Action save failed

12.2 Update an Action

This service is used to update certain attributes associated with an action.

Request

URI: /v1/actions

HTTP Method: *PUT*

Authorization: OAuth

Request Example: /v1/actions

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Request Body

Payload

```
{
  "guid": "<guid>",
  "actionRunResults": [],
  "actionType": "EMAIL",
  "eventName": null,
  "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
  "eventGUID": "4043",
  "name": "test public API",
  "description": "EMAIL",
  "thingTypeGUID": "iotae.automobiles:ABCXSeries",
  "status": 1,
  "severity": 2,
  "methodType": null,
  "authType": null,
  "destinationName": null,
  "triggeredEventOutbound": false,
  "outboundEventName": null,
  "respDocType": null,
  "invocationType": "AUTO",
  "header": "test",
  "body": "test",
  "requestBody": null,
  "notificationTemplateId": null,
  "notificationTypeKey": null,
  "notificationTypeVersion": null,
  "notificationLanguage": null,
  "notificationTemplateContent": null,
  "url": "",
  "actionParameters": [
    {
```

```

    "name": "thing",
    "path": "thing.id",
    "type": "THING",
    "namedPst": null
  },
  {
    "name": "thing",
    "path": "thing.description",
    "type": "THING",
    "namedPst": null
  }
],
"actionRecipients": [
  "<email>"
]
}

```

Response

Action saved. Guid is: "<guid>"

Response Status and Error Codes

Code	Description
202 Accepted	Action saved
400 Bad Request	Action was empty
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Action Guid is missing

12.3 Read an Action

This service is used to retrieve the details of a specified action.

Request

URI: /v1/actions

HTTP Method: *GET*

Authorization: OAuth

Request Example: /v1/actions?guid=<guid>

Request Parameters

Parameter	Required	Data Type	Description
guid	Yes	String	Internal identifier for action

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>

Response

```
{
  "hasChildren": false,
  "action": {
    "createdBy": null,
    "createdTime": "2019-05-07T17:01:11.897Z",
    "modifiedBy": null,
    "modifiedTime": "2019-05-07T17:01:11.897Z",
    "guid": "69e66dbbadd5434cb4c7e558381659b0",
    "name": "EMAIL",
    "actionType": "EMAIL",
    "description": "EMAIL",
    "thingTypeGUID": "iotae.automobiles:ABCXSeries",
    "status": 0,
    "severity": "2",
    "invocationType": "AUTO",
    "notificationTemplateId": "5A4DA20F4396442EBF641B029C32F10D",
    "notificationTypeKey": "ACTION_10a33e3ae7b940129087552ff8f9f27d",
    "notificationTypeVersion": "1",
    "notificationLanguage": "EN",
    "notificationTemplateContent": null,
    "eventName": null,
    "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
    "eventGUID": "4031",
    "url": "",
    "methodType": null,
    "authType": null,
    "requestBody": null,
    "destinationName": null,
    "respDocType": null,
    "triggeredEventOutbound": false,
    "outboundEventName": null,
    "header": "test",
    "body": "test",
    "destinationDetails": null,
    "tenantId": null,
    "cacheInstruction": null,
    "actionParameters": [
      {
        "createdBy": null,
        "createdTime": "2019-05-07T17:01:11.915Z",
        "modifiedBy": null,
        "modifiedTime": "2019-05-07T17:01:11.915Z",
        "guid": "a9f39237bdd941c8a3cdd701a13502a6",
        "actionGUID": "69e66dbbadd5434cb4c7e558381659b0",
        "type": "MD",
        "path": "iotae.automobiles:ABCXSeries:Brand",
        "name": "Brand",
```

```

        "namedPst": null,
        "eventTriggerGUID": null
    }
],
"actionRecipients": [
    {
        "createdBy": null,
        "createdTime": "2019-05-07T17:01:11.916Z",
        "modifiedBy": null,
        "modifiedTime": "2019-05-07T17:01:11.916Z",
        "guid": "096390e0562f437fa09ab8d5e620c579",
        "recipientId": "<email>",
        "actionGUID": "69e66dbbadd5434cb4c7e558381659b0"
    }
],
"actionRunResults": [],
"targetObject": null,
"targetAction": null,
"actionTargetParameters": [],
"messagingTargetType": null,
"messagingTargetName": null
},
"missingProps": []
}

```

Response Status and Error Codes

Code	Description
200 OK	Response
404 Not Found	Action ID not found
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Retrieval of action failed

12.4 Read all Actions

This service is used to retrieve all the existing actions.

Request

URI: /v1/actions

HTTP Method: [GET](#)

Authorization: OAuth

Request Example: /v1/actions

Request Parameters

None

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>

Response

```
[
  {
    "createdBy": null,
    "createdTime": "2019-04-25T23:03:10.550Z",
    "modifiedBy": null,
    "modifiedTime": "2019-04-25T23:56:21.998Z",
    "guid": "<guid>",
    "name": "Service Ticket for low health level battery",
    "actionType": "EMAIL",
    "description": "create Service Ticket for low health level battery",
    "thingTypeGUID": "iotae.automobiles:ABCXSeries",
    "status": 0,
    "severity": null,
    "invocationType": "AUTO",
    "notificationTemplateId": null,
    "notificationTypeKey": null,
    "notificationTypeVersion": null,
    "notificationLanguage": null,
    "notificationTemplateContent": null,
    "eventName": null,
    "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
    "eventGUID": "em-1",
    "url": null,
    "methodType": "POST",
    "authType": null,
    "requestBody": null,
    "respDocType": "JSON",
    "triggeredEventOutbound": false,
    "outboundEventName": null,
    "header": null,
    "body": null,
    "destinationDetails": null,
    "tenantId": null,
    "cacheInstruction": null,
    "actionParameters": [],
    "actionRecipients": [],
    "actionRunResults": [],
    "targetObject": null,
    "targetAction": null,
    "actionTargetParameters": [],
    "messagingTargetType": null,
    "messagingTargetName": null
  },
  {
    "createdBy": null,
    "createdTime": "2019-04-16T23:48:25.495Z",
    "modifiedBy": null,
    "modifiedTime": "2019-04-16T23:53:46.777Z",
    "guid": "<guid>",
    "name": "email",
    "actionType": "EMAIL",
    "description": "create Service Ticket for low health level battery",
    "thingTypeGUID": "iotae.automobiles:ABCXSeries",
    "status": 0,
  }
]
```

```

    "severity": null,
    "invocationType": "AUTO",
    "notificationTemplateId": "TEST",
    "notificationTypeKey": "ACTION_1",
    "notificationTypeVersion": "1",
    "notificationLanguage": "EN",
    "notificationTemplateContent": null,
    "eventName": null,
    "eventType": "com.sap.appiot.eventtypes:RulesFiredEventType",
    "eventGUID": "email1",
    "url": null,
    "methodType": null,
    "authType": null,
    "requestBody": null,
    "destinationName": null,
    "respDocType": null,
    "triggeredEventOutbound": false,
    "outboundEventName": null,
    "header": "Test",
    "body": "Low fillLevel",
    "destinationDetails": null,
    "tenantId": null,
    "cacheInstruction": null,
    "actionParameters": [],
    "actionRecipients": [],
    "actionRunResults": [],
    "targetObject": null,
    "targetAction": null,
    "actionTargetParameters": [],
    "messagingTargetType": null,
    "messagingTargetName": null
  }
]

```

Response Status and Error Codes

Code	Description
200 OK	Response
404 Not Found	Action ID not found
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Retrieval of actions failed

12.5 Delete an Action

This service is used to delete an action with a specific action ID.

Request

URI: `/v1/actions`

HTTP Method: `DELETE`

Authorization: OAuth

Request Example: /v1/actions?guid=<guid>

Request Parameters

Parameter	Required	Data Type	Description
guid	Yes	String	Internal identifier for action

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Response

Response Status and Error Codes

Code	Description
204 No Content	Success
404 Not Found	Action not found
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Deletion of action failed

12.6 Delete Actions

This service is used to delete list of actions.

Request

URI: /v1/actions

HTTP Method: *DELETE*

Authorization: OAuth

Request Example: /v1/actions

Request Parameters

None

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Request body

```
[ "<guid>", "<guid>" ]
```

Response

Response Status and Error Codes

Code	Description
204 No Content	Success
401 Unauthorized	Authorization details are invalid/ expired/ not provided
500 Internal Server	Deletion of action failed

12.7 Create an Action Event

This service is used to create an action event.

Request

URI: /v1/action/event

HTTP Method: *POST*

Authorization: OAuth

Request Example: /v1/action/event

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>

Header	Required	Values
Content-Type	Yes	application/json

Request Body

Payload

```
{
  "cloudEventsVersion": "0.1",
  "eventID": "<eventId>",
  "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
  "eventTime": "2019-05-13T08:50:00.000Z",
  "contentType": "application/json",
  "data": {
    "ruleID": "<ruleId>",
    "thingId": "<thingId>",
    "ingestionTime": "2019-05-10T08:50:00.000Z",
    "source": []
  },
  "extensions": {
    "type": "Alert",
    "eventInfo": "NewEvent",
    "eventStatus": "Open",
    "eventSeverity": 1,
    "eventCode": "",
    "eventSource": "19999",
    "externalID": "<externalID>",
    "correlationID": "test"
  }
}
```

Response

Event has been handed over to the Kafka producer.

Response Status and Error Codes

Code	Description
200 OK	Event has been handed over to the Kafka producer
400 Bad Request	Required request body is missing
401 Unauthorized	Authorization details are invalid/ expired/ not provided

12.8 Update an Action Event

This service is used to update an action event.

Request

URI: `/v1/actionEvent`

HTTP Method: *PUT*

Authorization: OAuth

Request Example: `/v1/actionEvent`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Request Body

Payload

```
{"status": "Approved", "eventId": "<eventId>"}
```

Response

Response Status and Error Codes

Code	Description
202 Accepted	Received and published/ Received but not published due to status
401 Unauthorized	Authorization details are invalid/ expired/ not provided

12.9 Get Pending/all Action Events

This service is used to get the pending or all the action events.

Request

URI: /v1/actionEvent

HTTP Method: *GET*

Authorization: OAuth

Request Example: /v1/actionEvent?\$filter=pending /v1/actionEvent?\$filter=all

Request Parameters

Parameter	Required	Data Type	Description
\$filter=all	No	String	List of all action events
\$filter=pending	No	String	List of all pending action events

Request Headers

Header	Required	Values
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application/json

Response

```
[
  {
    "createdBy": null,
    "createdTime": "2019-02-21T00:24:24.822Z",
    "modifiedBy": null,
    "modifiedTime": "2019-02-21T00:28:19.495Z",
    "eventId": "<eventId>",
    "eventTime": "2019-02-21T00:23:00.808+0000",
    "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
    "sourceGUID": "3000",
    "eventContent": "{\n  \"cloudEventsVersion\": \"0.1\", \"eventID\": \"3000\",
    \"eventType\": \"com.sap.apptot.eventtypes:RulesFiredEventType\", \"eventTime\":
    \"2018-12-12T17:30:00Z\", \"contentType\": \"application/json\", \"data\": {\n    \"ruleID
    \": \"3000\", \"thingID\": \"<thingID>\", \"ingestionTime\": \"2018-12-12T18:00:00Z\",
    \"source\": [\n      {\n        \"propertySet\": \"core.automobiles:Engine\", \"properties\":
        [\n          {\n            \"objectName\": \"Temperature\", \"objectValue\": \"200\"
          }, {\n            \"objectName\": \"RPM\", \"objectValue\": \"3000\"
          }
        ]
      }
    ], \"extensions\": {\n      \"type\": \"Alert\", \"eventInfo\": \"Alert on temperature\",
    \"eventStatus\": \"Open\", \"eventSeverity\": 1, \"eventCode\": null, \"eventSource\": null,
    \"externalID\": \"Engine_0012\", \"correlationID\": \"E6\"
    }
  }
}"]
```

```

"status": "APPROVED",
"action": {
  "createdBy": null,
  "createdTime": "2019-05-09T04:46:50.449Z",
  "modifiedBy": null,
  "modifiedTime": "2019-05-09T04:54:52.608Z",
  "actionParameters": [
    {
      "createdBy": null,
      "createdTime": "2019-05-09T04:54:52.035Z",
      "modifiedBy": null,
      "modifiedTime": "2019-05-09T04:54:52.035Z",
      "actionGUID": "<actionGUID>",
      "type": "THING",
      "path": "thing.type",
      "name": "thing",
      "namedPst": null,
      "eventTriggerGUID": null,
      "guid": "<guid>"
    }
  ],
  "actionRecipients": [
    {
      "createdBy": null,
      "createdTime": "2019-05-09T04:54:52.036Z",
      "modifiedBy": null,
      "modifiedTime": "2019-05-09T04:54:52.036Z",
      "recipientId": "<email>",
      "actionGUID": "<actionGUID>",
      "guid": "<guid>"
    }
  ],
  "actionRunResults": null,
  "actionTargetParameters": [],
  "actionType": "EMAIL",
  "eventName": null,
  "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
  "eventGUID": "<eventGUID>",
  "name": "test",
  "description": "EMAIL",
  "thingTypeGUID": "iotae.automobiles:ABCXSeries",
  "status": 0,
  "severity": "2",
  "methodType": null,
  "authType": null,
  "destinationName": null,
  "triggeredEventOutbound": false,
  "outboundEventName": null,
  "respDocType": null,
  "invocationType": "AUTO",
  "header": "test",
  "body": "test",
  "requestBody": null,
  "notificationTemplateId": "test",
  "notificationTypeKey": "ACTION_1",
  "notificationTypeVersion": "1",
  "notificationLanguage": "EN",
  "targetObject": null,
  "targetAction": null,
  "messagingTargetType": null,
  "messagingTargetName": null,
  "destinationDetails": null,
  "tenantId": null,
  "notificationTemplateContent": null,
  "cacheInstruction": null,
  "url": "",
  "guid": "<guid>"
},

```

```

    "guid": "<guid>"
  },
  {
    "createdBy": null,
    "createdTime": "2019-02-21T00:24:24.822Z",
    "modifiedBy": null,
    "modifiedTime": "2019-02-21T00:28:19.495Z",
    "eventId": "<eventId>",
    "eventTime": "2019-02-21T00:23:00.808+0000",
    "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
    "sourceGUID": "3000",
    "eventContent": "{\n  \"cloudEventsVersion\": \"0.1\", \"eventID\": \"3000\",
    \"eventType\": \"com.sap.apptot.eventtypes:RulesFiredEventType\", \"eventTime\":
    \"2018-12-12T17:30:00Z\", \"contentType\": \"application/json\", \"data\": {\n    \"ruleID
    \": \"3000\", \"thingID\": \"<thingID>\", \"ingestionTime\": \"2018-12-12T18:00:00Z\",
    \"source\": [\n      {\n        \"propertySet\": \"core.automobiles:Engine\", \"properties\":
        [\n          {\n            \"objectName\": \"Temperature\", \"objectValue\": \"200\"
          }, {\n            \"objectName\": \"RPM\", \"objectValue\": \"3000\"
          }
        ]
      }, {\n        \"type\": \"Alert\", \"eventInfo\": \"Alert on temperature\",
        \"eventStatus\": \"Open\", \"eventSeverity\": 1, \"eventCode\": null,
        \"eventSource\": null, \"externalID\": \"Engine_0012\", \"correlationID\": \"E6\"
      }
    ]
  }",
    "status": "APPROVED",
    "action": {
      "createdBy": null,
      "createdTime": "2019-05-09T04:46:50.449Z",
      "modifiedBy": null,
      "modifiedTime": "2019-05-09T04:54:52.608Z",
      "actionParameters": [
        {
          "createdBy": null,
          "createdTime": "2019-05-09T04:54:52.035Z",
          "modifiedBy": null,
          "modifiedTime": "2019-05-09T04:54:52.035Z",
          "actionGUID": "<actionGUID>",
          "type": "THING",
          "path": "thing.type",
          "name": "thing",
          "namedPst": null,
          "eventTriggerGUID": null,
          "guid": "<guid>"
        }
      ]
    },
    "actionRecipients": [
      {
        "createdBy": null,
        "createdTime": "2019-05-09T04:54:52.036Z",
        "modifiedBy": null,
        "modifiedTime": "2019-05-09T04:54:52.036Z",
        "recipientId": "<email>",
        "actionGUID": "<actionGUID>",
        "guid": "<guid>"
      }
    ],
    "actionRunResults": null,
    "actionTargetParameters": [],
    "actionType": "EMAIL",
    "eventName": null,
    "eventType": "com.sap.apptot.eventtypes:RulesFiredEventType",
    "eventGUID": "<eventGUID>",
    "name": "test",
    "description": "EMAIL",
    "thingTypeGUID": "iotae.automobiles:ABCXSeries",
    "status": 0,
    "severity": "2",
    "methodType": null,
    "authType": null,
    "destinationName": null,
    "triggeredEventOutbound": false,
  }
]

```

```

        "outboundEventName": null,
        "respDocType": null,
        "invocationType": "AUTO",
        "header": "test",
        "body": "test",
        "requestBody": null,
        "notificationTemplateId": "test",
        "notificationTypeKey": "ACTION_1",
        "notificationTypeVersion": "1",
        "notificationLanguage": "EN",
        "targetObject": null,
        "targetAction": null,
        "messagingTargetType": null,
        "messagingTargetName": null,
        "destinationDetails": null,
        "tenantId": null,
        "notificationTemplateContent": null,
        "cacheInstruction": null,
        "url": "",
        "guid": "<guid>"
    },
    "guid": "<guid>"
}]

```

Response Status and Error Codes

Code	Description
202 Accepted	Received and published/ Received but not published due to status
401 Unauthorized	Authorization details are invalid/ expired/ not provided

13 Thing

The thing services allow you to model objects that you created using the configuration service. You can create a thing instance which constitutes to an individual tangible object.

IoT applications usually deal with very high volumes of data. To be able to handle data in a uniform and cost-effective way, the thing service consists of two main parts:

- Storage and retrieval of the thing configuration
This corresponds to the thing types and property set type details.
- Storing and reading data specific to a thing based on the definitions in the thing configuration
This corresponds to services such as creating data for a thing, and reading data such as properties, time series and so on.

i Note

- The thing configuration services return thing configuration information from the packages –
- within the same tenant to which a user belongs, only if the scope defines the package as private

Access Authorization for Things

Objects of type `Thing` are subject to the instance-based authorization concept that is implemented in SAP IoT. For more information, see [Object Instance-Based Authorization \[page 204\]](#). To grant access to a thing, a capability has to be derived from the predefined `CapabilityType` object for things. For more information on the `CapabilityType` payload needed for this purpose, see [Payload of CapabilityType "Thing" \[page 813\]](#).

Related Information

[Onboarding Things \[page 780\]](#)

[Thing Data \[page 770\]](#)

13.1 Thing Data

Overview of various data retrieval scenarios for thing data

After creating a thing instance, you can store and retrieve data for properties specific to a thing based on the definitions in the thing configuration. The varied type of data stored for the properties depends on the data categories such as [MasterData](#), [TimeSeriesData](#), [Parameters](#), [ReferencePropertyData](#), and [DerivedData](#) defined in the configuration. In this section, you will find the list of services offered by SAP IoT to retrieve data in different scenarios – master data history, aggregates, measurements, and composite data are to name a few. You can choose one of the services to retrieve data according to your business needs.

What you want to know?	Which service to choose?	What the service does?
The prior owners and the prior license plate details of a specific car (Historical data of a thing)	Read Data for a Thing [page 918]	Reads master data for a combination of thing ID, thing type, and property set within the specified time range.
The latest license plate details of multiple cars (Snapshot data across multiple things)	Read Property Set Data [page 923]	Reads master data for all property sets of the specified property set type. You can filter the result based on a specific thing ID or timestamp.
The latest license plate details along with other basic details, customer details, location details, and event details of all cars (Snapshot data across multiple things)	Read Thing Details with Property Set Type Data [page 1308] REST Service	Read the latest master data for the specified combination of property set type name and property set ID. The result also includes the basic details, customer details, and event details.
The latest license plate details along with other basic details, customer details, location details, and event details of all cars (Snapshot data across multiple things)	Read Things for Property Set of a Property Set Type [page 1322] OData Service	Read the latest master data for the specified property set type name and filter on the property set ID. The result also includes the basic details, customer details, and event details.
The sensor values for the front wheel of a specific car during 1st week of July 2018 (Historical data of a thing)	Read Time Series Data or Derived Data for a Thing [page 953]	Read time series data for a combination of thing ID, thing type, and property set within the specified time range. The time range must be within the retention period.
The latest value of all properties of a car in January 2017 (Snapshot data of a thing)	Read Snapshot Data Within a Time Range for a Thing [page 977]	Read snapshot of latest master data or time series data for the specified thing ID.
The sensor values for the front wheel of a specific car during last ten days of December 2015 (Historical data of a thing)	Read Time Series Data or Derived Data for a Thing [page 984]	Read time series data for a combination of thing ID, thing type, and property set within the specified time range. The time range must be outside the retention period.
The average speed per model and year across all cars (Aggregate data across multiple things)	Read Aggregates of Measurements [page 1002]	Reads aggregate measurements for average, median + 10 more aggregates for the specified property set type, grouped by time or other dimension properties within a time range.
The sensor values for wheels of multiple cars in the first half of 2018 (Historical data across multiple things)	Read Multiple Measurements [page 1013]	Read time series data for all things that uses a specific property set type. You can filter the data by thing ID and time range.
The location of the car, the pressure value of the front wheel of the car, and an aggregate of events raised on the sensor values of the car (Snapshot data of a thing)	Read Property Set Data and Events for a Thing [page 1426]	Read master data, time series data, and events of a specific thing ID. You can filter the result based on the thing type, property set type, and event type by specifying one or more of them as request header parameters.

What you want to know?	Which service to choose?	What the service does?
Extreme sensor values of the car in December 2017 with the split up of the time range into 31 segments (Aggregate data for a thing)	Read Time Series Data for Multiple Properties of a Thing Applying M4 Algorithm [page 967]	Reads the sensor values for a combination of thing ID, thing type, and multiple properties for a specific number of divisions within the specified time range. The service returns unique minimum value, maximum value, first occurring value, and last occurring value.
The unit of measure values and the threshold limits for the wheel of a car	Read Data for Reference Properties [page 931]	Reads the reference data such as unit of measure and threshold values available for the last one hour for the specified property set of a thing type .

Related Information

[Time Series Data Ingestion \[page 772\]](#)

[Thing: Master Data and Parameters Data \[page 909\]](#)

[Thing: Reference Property Data \[page 927\]](#)

13.2 Time Series Data Ingestion

Time series data ingestion in SAP IoT covers the following:

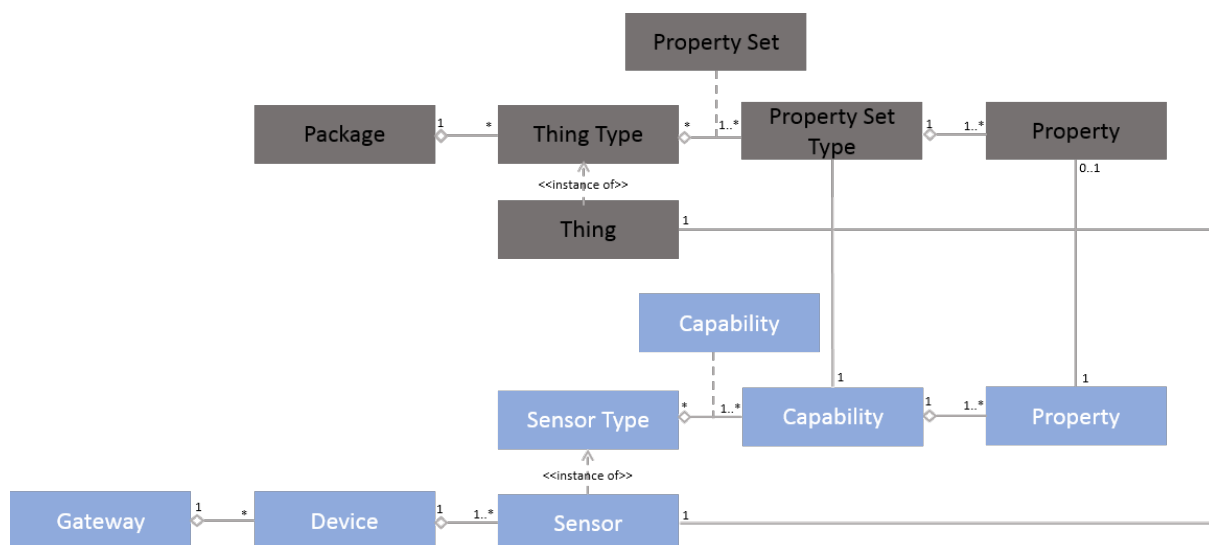
- Integration with device connectivity components to define device models
- Map the device models with SAP IoT thing model
- Receive sensor data from the devices
- Convert the raw data into time series data
- Store the time series data in SAP IoT Time Series Store

Speaking of things in the Internet of Things only makes sense if you extend the focus to the sensors that are attached to the things you want to control or monitor in an IoT scenario. It is the sensors that are the very source of the data that can be collected in the form of timeseries data. Here is how the various objects involved come together during thing onboarding.

Data Model Mapping

During the first iteration, the device model of IoT service will be mapped to the Thing Model as follows:

- A *Sensor* is mapped to a *Thing* via the *sensorId*.
- A *Capability* is mapped to a *PropertySetType* via the *capabilityId*.
- A *Property* to a *Property* via the *propertyId*.



Thing Onboarding

When setting up an IoT scenario, one major step is the so-called onboarding. This term refers to the process of establishing a relationship between a physical entity and its virtual counterpart known as the digital twin. The physical entities that can be onboarded comprise the following:

- Persons
- Organizations
- Things

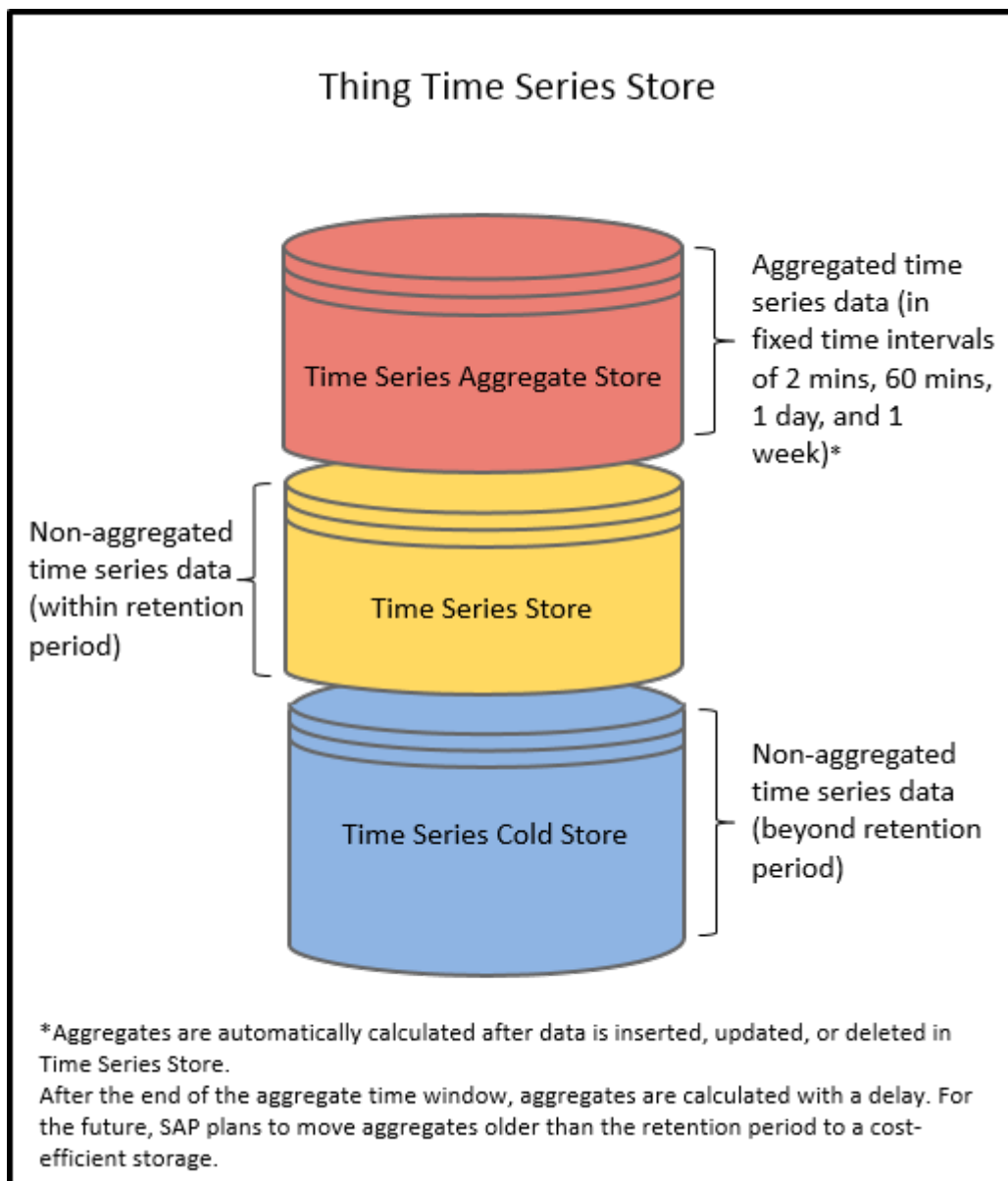
While onboarding of organizations and persons is covered by the Tenant Administration apps, the onboarding of things is a task that you perform with the Thing Modeler app. The onboarding process with the Tenant Administration apps basically means setting up a virtual mirror object for a real-world entity. In contrast to that, onboarding a thing does not only set up such a mirror object. Rather, a technical connection between a physical device and its digital twin is established. This connection is then used for transferring sensor data from a device into the IoT storage system for monitoring and analytics.

Thing Time Series Store

The Thing Time Series Store allows you to initialize the time series store for a tenant, manage retention period for a tenant, and manage time series data for Things belonging to a tenant. The time series store uses a tiered storage model containing the following tiers:

- Time Series Store
- Time Series Aggregate Store
- Time Series Cold Store

The following diagram illustrates the Thing Time Series Store:



You can create time series data for a thing using the REST-based API [Create Time Series Data or Derived Data for a Thing \[page 946\]](#) or you can use SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service) for importing time series data into SAP IoT by using the data ingestion services provided by the SAP IoT API.

Related Information

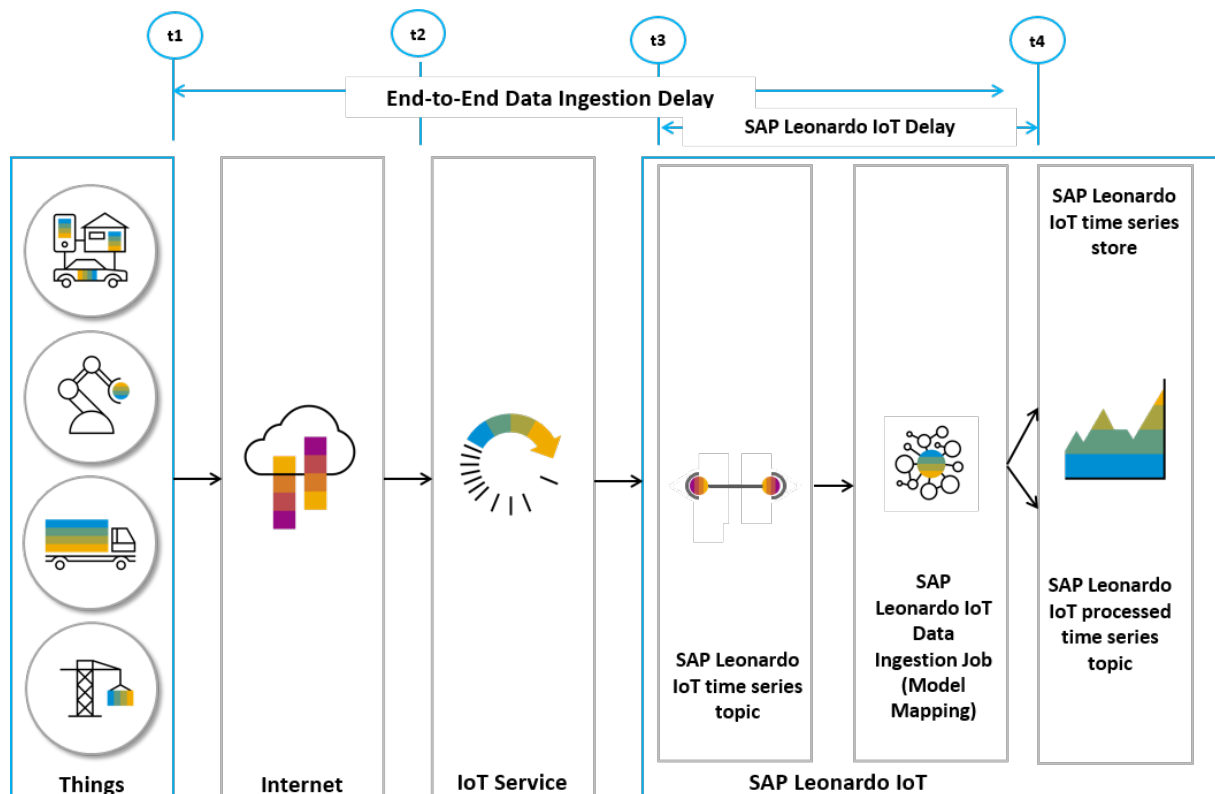
- [Sensors and Things \[page 816\]](#)
- [Thing Onboarding](#)
- [Thing: Time Series Data \[page 939\]](#)
- [Monitoring Time Series Data Ingestion Delay \[page 775\]](#)

13.2.1 Monitoring Time Series Data Ingestion Delay

Overview

The sensor data from the physical devices traverses different layers such as device management system (for example, SAP IoT services for SAP BTP for the Cloud Foundry Environment), virtual things modeled with SAP IoT, and is finally persisted in the Time Series Store. Monitoring the traversal of data helps the customer analyze the end-to-end ingestion delay – in other words, the time from when the data was emitted by the sensor until it was persisted in the Time Series Store.

The following illustration helps understand the different types of delay in data ingestion:



1. **Time t1:** A device sensor emits data.
2. **Time t2:** The time series data from sensor is transmitted over the internet and routed to SAP IoT services for SAP BTP for the Cloud Foundry Environment via REST call or MQTT protocol. The sensor device is identified, authenticated, and the data is validated.
3. **Time t3:** SAP IoT receives time series data from IoT Services.
4. **Time t4:** After processing the data, it is stored in the time series store.

Data Ingestion Delays

SAP IoT provisions the following data ingestion delays:

End-to-End Data Ingestion Delay (End_to_end_Delay) – Time between the business timestamp for a measurement sent by the sensor and the time when the measurement is stored in the Time Series Store. For example, in the above illustration the difference between time **t4** and time **t1** indicates the end-to-end data ingestion delay.

SAP IoT Delay (IoTAE_Ingest_Delay) – Time between the timestamp when a measurement is ingested into SAP IoT and the time when the measurement is stored in the Time Series Store. For example, in the above illustration the difference between time **t4** and **t3** indicates the SAP IoT delay.

_time – The time stamp when SAP IoT initiated the data ingestion delay calculation.

LastBusinessTimestampProcessed – Latest **_time** value in the sample set of ingested measurements. The value in this field helps to understand which ingested measurement was used for calculating the ingestion delay. For example, from the following random sample set of ingested measurements, the random **_time** value 1544086800000 (that is, 2018-12-06T09:00:00) is used for calculating the ingestion delay.

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "measures": [{
    "temperature": "27.63",
    "_time": 1544086800000
  }]
}
```

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "measures": [{
    "temperature": "28.63",
    "_time": 1544086802000
  }]
}
```

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "measures": [{
    "temperature": "25.23",
    "_time": 1544086804000
  }]
}
```

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "measures": [{
    "temperature": "29.63",
    "_time": 1544086806000
  }]
}
```

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "measures": [{
    "temperature": "20.63",
    "_time": 1544086808000
  }]
}
```

The delays are calculated during the ingestion process for a specific time interval, which is configurable and is one minute by default. However, in the following scenarios, the SAP IoT delay will not be updated for the specified time interval:

- Data is not ingested through SAP IoT services for SAP BTP for the Cloud Foundry Environment

- Ingested data is not processed
- Ingestion processing time is more than a minute

Enabling Data Ingestion Delay Monitoring

You must create a support ticket under the component `IOT-BSV-BDI` for monitoring the data ingestion delay. In the support ticket, you must specify the time interval for which the delay will be calculated. The supported time intervals are 30 seconds, one minute, two minutes, and five minutes. By default, the delay is calculated for one minute. After receiving an approval for the ticket, you must create a thing (per tenant) with a predefined alternate thing ID (`_SAPIOT_Monitoring_Thing`). The following is a sample payload to create a thing.

```
{
  "_externalId": "ingestion.monitor",
  "_alternateId": "_SAPIOT_Monitoring_Thing",
  "_name": "Thing",
  "_description": {
    "en": "English"
  },
  "_thingType": [
    "com.sap.iotaestandardcontent:SAPIOT_Monitoring"
  ],
  "_objectGroup": "883BB1AFC4A4425791543V2F2CFDD295"
}
```

For information on how to create a thing, see [Create a Thing \[page 781\]](#).

Once the monitoring is enabled, you can create a monitoring dashboard, for example, using IoT Application project template in SAP Web IDE or monitor the delay details using specific APIs provided by SAP IoT.

The following are the API services that will help you retrieve the delay details for the thing you have configured. You must specify the alternate thing ID in the request URL.

Read Time Series Data API

Request URL: `/Things(' _SAPIOT_Monitoring_Thing')/com.sap.iotaestandardcontent:SAPIOT_Monitoring/SAPIOT_DataIngest`

Response payload:

```
{
  "value": [
    {
      "time": "2018-12-04T09:33:11.945Z",
      "End_to_end_Delay": 3864,
      "IoTAE_Ingest_Delay": 3859,
      "LastBusinessTimestampProcessed": "2018-12-04T09:31:39.415Z"
    },
    {
      "time": "2018-12-04T09:32:11.945Z",
      "End_to_end_Delay": 3446,
      "IoTAE_Ingest_Delay": 3440,
      "LastBusinessTimestampProcessed": "2018-12-04T09:30:59.826Z"
    },
    {
      "time": "2018-12-04T09:31:11.971Z",
      "End_to_end_Delay": 3689,
      "IoTAE_Ingest_Delay": 3609,
      "LastBusinessTimestampProcessed": "2018-12-04T09:29:39.670Z"
    }
  ]
}
```

M4 Algorithm API

Request URL: /Things('_SAPIOT_Monitoring_Thing')/
com.sap.iotaestandardcontent:SAPIOT_Monitoring/SAPIOT_DataIngest?&
\$apply=sap.lineChart(divisions=400,property=%27IoTAE_Ingest_Delay%27%27)

Response payload:

```
{
  "value": [
    {
      "_time": "2018-12-04T09:05:12.011Z",
      "IoTAE_Ingest_Delay": 3429
    },
    {
      "_time": "2018-12-04T09:06:12.039Z",
      "IoTAE_Ingest_Delay": 3905
    },
    {
      "_time": "2018-12-04T09:07:12.023Z",
      "IoTAE_Ingest_Delay": 3637
    }
  ]
}
```

Snapshot API

Request URL: /Snapshot(thingId='_SAPIOT_Monitoring_Thing',fromTime='',dataCategory='')

Response payload:

```
{
  "_id": "E782B5429DC1436E96C40A10ED1049BF",
  "_thingType": [
    "com.sap.iotaestandardcontent:SAPIOT_Monitoring"
  ],
  "value": [
    {
      "com.sap.iotaestandardcontent:SAPIOT_Monitoring": [
        {
          "description": "",
          "_propertySetType": {
            "name": "com.sap.iotaestandardcontent:SAPIOTSERVICE",
            "description": ""
          },
          "/SAPIOTSERVICE": [
            {
              "Ingest_Delay": {
                "_unitOfMeasure": "",
                "description": "",
                "value": null,
                "qualityCode": null,
                "time": null
              }
            },
            {
              "IoT_Services_RTT": {
                "_unitOfMeasure": "",
                "description": "",
                "value": null,
                "qualityCode": null,
                "time": null
              }
            }
          ]
        }
      ]
    },
    {
      "/SAPIOT_DataIngest": [

```



```

    {
      "End_to_end_Delay": {
        "_unitOfMeasure": "",
        "description": "",
        "_value": 3393,
        "_qualityCode": null,
        "_time": "2018-12-04T10:09:11.946Z"
      }
    },
    {
      "IoTAE_Ingest_Delay": {
        "_unitOfMeasure": "",
        "description": "",
        "_value": 3378,
        "_qualityCode": null,
        "_time": "2018-12-04T10:09:11.946Z"
      }
    },
    {
      "LastBusinessTimestampProcessed": {
        "_unitOfMeasure": "",
        "description": "",
        "_value": "2018-12-04T10:05:49.889Z",
        "_qualityCode": null,
        "_time": "2018-12-04T10:09:11.946Z"
      }
    }
  ],
  "description": "",
  "_propertySetType": {
    "name": "com.sap.iotaestandardcontent:SAPIOT_DataIngest",
    "description": ""
  }
},
{
  "/SAPIOT_Forwarder": [
    {
      "BusinessTimestampProcessed": {
        "_unitOfMeasure": "",
        "description": "",
        "_value": null,
        "_qualityCode": null,
        "_time": null
      }
    },
    {
      "End_to_end_Delay": {
        "_unitOfMeasure": "",
        "description": "",
        "_value": null,
        "_qualityCode": null,
        "_time": null
      }
    }
  ],
  {
    "isAlive": {
      "_unitOfMeasure": "",
      "description": "",
      "_value": null,
      "_qualityCode": null,
      "_time": null
    }
  }
],
"description": "",
"_propertySetType": {
  "name": "com.sap.iotaestandardcontent:SAPIOT_Forwarder",
  "description": ""
}

```

```

    }
  ]
}

```

13.3 Onboarding Things

A thing is an instance of a thing type. Thing type and thing have a one-to-many relationship, that is, one thing type may be referenced by many things, while each thing is defined by exactly one thing type. For example, you can create a thing of a specific car model ABCXSeries of thing type Automobiles and specify values for the attributes defined in the Automobiles thing type.

You can use the thing services to create, delete, and retrieve things.

Base URI

- **Formal description:** `http://<server address>[:<port number>][<path>]/Things`
- Example for a base URI in a cloud foundry environment: `https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things`

Methods

Model APIs

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create a Thing [page 781]	<code>/Things</code>	<code><thing>.c</code>
<i>GET</i>	Read a Thing [page 798]	<code>/Things('<thing ID>')</code>	<code><thing>.r</code>
<i>GET</i>	Read all Things [page 810]	<code>/Things</code>	<code><thing>.r</code>
<i>POST</i>	Update a Thing [page 805]	<code>/Things('<thing ID>')</code>	<code><thing>.c</code>
<i>DELETE</i>	Delete a Thing [page 809]	<code>/Things('<thing ID>')</code>	<code><thing>.d</code> <code><file>.da</code>

i Note

`<thing>` refers to the thing application name.

`<auth>` refers to the authorization application name.

Related Information

[Create Multiple Things \[page 793\]](#)

13.3.1 Create a Thing

With this method, you can create a thing instance using a thing type or a thing template.

When you create a thing using this method, the system generates a unique ID for it. In addition, you can assign an alternate thing ID for a thing instance using this method. You can use the system generated thing ID or the alternate thing ID for all thing-relevant API calls. You cannot change the alternate thing ID after it is assigned to a thing. Thing ID and alternate thing ID have a one-to-one relationship within a specific tenant. To create multiple thing instances, see [Create Multiple Things \[page 793\]](#).

Thing Type or Thing Template

You can create a thing instance using a thing type or a thing template. However, the thing template is based on a thing type. The benefit of creating a thing instance using a thing template is that you can pre-populate data for a thing. When you create a thing instance using a thing template, internally the method `POST / Things('<thing ID>')/<thing type name>/<property set ID>` is called. The method copies the property values of the template along with the timestamp to the newly created thing instance. You can later change the pre-populated data for a thing.

i Note

We recommend not to specify both thing type and thing template in the request payload.

- If you specify the thing type and a thing template of the same thing type in the request payload, the service creates the thing and assigns values for its properties provided in the thing template.
- However, if the thing template does not belong to the same thing type specified in the request payload, the service displays an error message and the thing is not created.

Thing Template or Thing Data

When you create a thing, you can assign values for properties that belong to the property set type of data categories [MasterData](#) and [Parameters](#) without using the thing template. You can achieve this by including a separate data block in the request payload.

i Note

We recommend not to specify both thing template and data block in the request payload.

- If you specify both thing template and data block in the request payload, property values specified in the data block take the precedence.
- For example, the thing template contains properties and values for the property set type PST1. The data block contains properties and values for the property set type PST2. In such a scenario, the service creates a thing and assigns values from thing template and data block for the respective properties. If both thing template and data block contain properties and values for property set type PST1, the service creates a thing and assigns values from data block for the respective properties, and ignores the properties and values provided in the thing template.

The following table illustrates the combination of thing template and data block in the same request payload and the thing created as a result:

Thing Type	Thing Template	Data Block	Thing
TT1	TT1temp	Property set: npst1	T1
Property set: npst1	Property set: npst1	Property P1: 200	Property P1: 200
Property set type: PST1	Property P1: 100	Property P2: XYZ	Property P2: XYZ
Properties: P1, P2	Property P2: ABC	Property set: npst2	Property P3: 2017
Property set: npst2	Property set: npst2	Property P3: 2017	Property P4: 2.8
Property set type: PST2	Property P3: 2018	Property P4: 2.8	
Properties: P3, P4	Property P4: 1.2		
	TT1temp	Property set: npst2	T1
	Property set: npst1	Property P3: 2017	Property P1: 100
	Property P1: 100	Property P4: 2.8	Property P2: ABC
	Property P2: ABC		Property P3: 2017
			Property P4: 2.8

Note

- Thing type and thing have a one-to-many relationship. That is to say, one thing type may be referenced by many things, while each thing is defined by exactly one thing type. Similarly, thing template and thing have a one-to-many relationship. You can create multiple things based on a thing template, while each thing is created based on exactly one thing template.
- The thing type name and the thing template name must be fully qualified names that are prefixed with the package name. For example, `core.automobiles:ABCXSeries`.
- When you assign an object group to a thing, you are allowed to carry out the functions based on the capabilities defined for the user group. For more information about object groups, refer to [ObjectGroup \[page 205\]](#) and for more information about capabilities, refer to [Capabilities \[page 260\]](#).
- The data block in the request payload must not contain multiple data for the same property set.

Association between thing and custom master data

You can associate a thing instance to one or more object instances while creating the thing. This is possible only if an association is already created between the thing type and the object type, and one or more object instances are already created for the object types.

For example, the thing type **Truck** has an association with the object type **Vehicle** and the relationship is **HAS A**. You have already created one or object instances for the object type **Vehicle**. Based on this thing type and object type association, you can associate a thing instance of thing type **Truck** with one or more object instances of object type **Vehicle** while creating the thing instance. You can associate a thing with multiple object instances in a single POST request call.

i Note

- You can associate a thing with multiple objects of a specific object type, only if the association type is *onetomany* or *manytomany* between the thing type and the object type.
- You can associate a thing with multiple objects of different object types.
- You cannot add association details or update the association details when you update a thing.
- You cannot associate a thing instance with one or more thing instances using this service. It is always the association between the thing instance and the object instances.
- The expiry time of the thing and object association must be greater than the current date and less than the expiry time defined for the corresponding object type and thing type association.

Association type between thing type

TT1 and object type OT1

(OT1 has object instances obj1, obj2, obj3)

	Things of thing type TT1	Can be associated
onetoone	thing1	only with obj1 or obj2 or obj3
onetomany	thing1	with obj1 and obj2
manytoone	thing1	with obj1
	thing2	with obj1
manytomany		All thing instances of TT1 can be associated with one or more object instances of OT1

For more information, see [Custom Master Data \[page 658\]](#).

Naming Convention

Only the following characters are supported for `_externalID` and `_name`:

- Uppercase and lowercase alphabets *a* through *z* and *A* through *Z*
- Numeric digits *0* through *9*
- Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)

Only the following characters are supported for `_alternateID`:

- Uppercase and lowercase alphabets *a* through *z* and *A* through *Z*
- Numeric digits *0* through *9*
- Punctuation marks hyphen (-), underscore (_)

Request

URI: /Things

HTTP Method: *POST*

Permissions:

<thing>.c

Request Properties

Thing Object Properties

Property	Type	Mandatory	Maximum Length	Description
_externalId	string	No	255	Thing identifier (which is not unique) from an external system. You can create multiple things with the same external ID. For example, ABCXSeries001 is an external ID of a thing generated by an external system.
_alternateId	string	No	32	Thing identifier which is unique only within a specific tenant. You cannot change the alternate thing ID.
_name	string	Yes	255	Descriptive name of the thing. For example, ABCXSeries is a descriptive name used to refer to a thing.
_description	string	Yes	60	Description of a Thing in the specified language as defined in ISO Language Codes [page 1581] . The ISO code for the language is used here.
_thingType	Array of thing types	No	81	Array of thing types for a thing. It must correspond to one of the thing types found in a package. Currently, only one element is supported.
_thingTemplate	Array of thing templates	No		Array of thing templates for a thing. It must correspond to one of the thing types found in a package. Currently, only one element is supported.
_objectGroup	string	Yes	32	Object group ID for which the Thing has to be assigned to.
_location	string	No	32	Identifier for a Thing Location.
				i Note Assigning a value for this property is not mandatory. However, if a value is provided, it must be the unique identifier of the thing location (locationID).
_customer	string	No	32	Identifier for a Business Partner.
				i Note Assigning a value for this property is not mandatory. However, if a value is provided, it must be the unique identifier of the business partner (businessPartnerID of the relevant role).

Thing Data Object Properties

Property	Type	Description
<code>_time</code>	Date or timestamp	Date or time stamp for the properties. It appears only if relevant.
<code>{property type name}</code>	property type	Property type name as found in the package

Custom Master Data Association Object Properties

Property	Type	Mandatory	Maximum Length	Description
<code>AssociatedObjectID</code>	GUID	Yes	32	Unique identifier of the object instance created for an object type
<code>AssociatedEntity</code>	string	Yes	81	Unique name of the thing type
<code>Relationship</code>	string	Yes	50	Type of association between the thing type and the associated object type. The only supported values are HAS A , IS A , and PART OF .
<code>StartTime</code>	Timestamp	No	50	Time when the association between the thing instances and object instances is created
<code>ExpiryTime</code>	Timestamp	No	50	Expiry time after which the association between the thing instances and object instances becomes invalid

Request Example

```
/Things
```

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the structure as shown in the following examples:

- [Example 1 – Create a thing for a specific thing type \[page 786\]](#)
- [Example 2 – Create a thing with a specific alternate thing ID \[page 787\]](#)
- [Example 3 – Create a thing based on a thing template \[page 787\]](#)
- [Example 4 – Create a thing along with data for properties \[page 788\]](#)
- [Example 5 – Create thing with custom master data association \[page 788\]](#)

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
201	Thing created successfully

Note

The URL of the thing created is returned in the **Location Header** of the response.

Related Information

[ObjectGroup \[page 205\]](#)

[Location - resource-only](#)

[Business Partner \[page 29\]](#)

13.3.1.1 Example 1 – Create a thing for a specific thing type

The following request payload creates a thing of thing type `core.automobiles:ABCXSeries`.

```
{
  "_externalId": "ABCXSeries001",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC  xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_location": "BD622E3DA6A14C4D87CDEC935B000001",
  "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295"
}
```

Note

An error occurs if the `_objectGroup` property is not specified, empty, or has an invalid ID assigned to it.

Related Information

[Create a Thing \[page 781\]](#)

13.3.1.2 Example 2 – Create a thing with a specific alternate thing ID

The following request payload creates a thing with alternate thing ID.

```
{
  "_externalId": "ABCXSeries001",
  "_alternateId": " ABCXSeries001-alternateId",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC  xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_location": "BD622E3DA6A14C4D87CDEC935B000001",
  "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295"
}
```

Related Information

[Create a Thing \[page 781\]](#)

13.3.1.3 Example 3 – Create a thing based on a thing template

The following request payload creates a thing based on the a thing template `core.automobiles:ABC2SeriesTemplate`.

```
{
  "_externalId": "ABCXSeries001",
  "_alternateId": "ABCXSeries001-alternateId",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC  xSeries 001"
  },
  "_thingTemplate": [
    "core.automobiles:ABC2SeriesTemplate"
  ],
  "_location": "BD622E3DA6A14C4D87CDEC935B000001",
  "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295"
}
```

Related Information

[Create a Thing \[page 781\]](#)

13.3.1.4 Example 4 – Create a thing along with data for properties

The following request payload creates a thing along with data for properties of the property sets. The data block in this example contains values for properties `BodyStyle`, `Class`, and `WheelBase` of property set `car` and for properties `OriginPlace` and `Country` of property set `location`.

```
{
  "_externalId": "ABCXSeries001",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295",
  "data": {
    "car": {
      "BodyStyle": "Sedan",
      "Class": "E",
      "WheelBase": "invalid"
    },
    "location": {
      "OriginPlace": "Munich",
      "Country": "Germany"
    }
  }
}
```

Related Information

[Create a Thing \[page 781\]](#)

13.3.1.5 Example 5 – Create thing with custom master data association

The following request payload creates a thing along with custom master data association.

```
{
  "_externalId": " ABCXSeries001",
  "_name": " ABCXSeries",
  "_description": {
    "en": " Car Model ABC xSeries 001"
  },
  "_thingType": [
    " core.automobiles:ABCXSeries"
  ],
  "_objectGroup": " 473BB1AFC4A4415791543C3F2CFDD295",
  "customDataAssociation": [
    {
      "AssociatedObjectID": "FrontRWheel",

```

```

        "AssociatedEntity": "core.automobiles:Wheel",
        "Relationship": "HAS A",
        "Descriptions": [
            {
                "LanguageCode": "en",
                "Description": "Association between Thing ABCXSeries and
FrontRWheel"
            }
        ],
        "StartTime": "2018-05-17T13:00:56.229Z",
        "ExpiryTime": "2018-06-17T12:00:56.229Z"
    },
    {
        "AssociatedObjectID": "RearRWheel",
        "AssociatedEntity": "core.automobiles:Wheel",
        "Relationship": "HAS A",
        "StartTime": "2018-05-17T13:00:56.229Z",
        "ExpiryTime": "2018-06-17T12:00:56.229Z"
    },
    {
        "AssociatedObjectID": "RearLWheel",
        "AssociatedEntity": "core.automobiles:Wheel",
        "Relationship": "HAS A",
        "Descriptions": [
            {
                "LanguageCode": "en",
                "Description": " Association between Thing ABCXSeries and
RearLWheel"
            }
        ],
        "StartTime": "2018-05-17T13:00:56.229Z",
        "ExpiryTime": "2018-06-17T12:00:56.229Z"
    }
]
}

```

From the given request payload, you can infer the following:

- Thing type `core.automobiles:ABCXSeries` is already associated with the object type `core.automobiles:Wheel`. The association type is *onetomany* and the relationship is **HAS A**.
- Object instances `FrontRWheel` and `RearRWheel` are already created for the object type `core.automobiles:Wheel`. Note that you must provide the auto generated GUID for the object instances.
- The new thing instance is created and associated with the object instances `FrontRWheel` and `RearRWheel`.

Related Information

[Create a Thing \[page 781\]](#)

13.3.2 Create a Thing along with sensor assignment

Create a thing along with sensor assignment

Thing to Sensors Assignment

Prerequisites

Configure the IoT service credentials using Thing Modeler data mapping credentials API. See [Create Credentials \[page 822\]](#).

To onboard Thing Type along with its mappings with Sensor Types through convenience services, see [Thing Type and Sensor Type Mapping \[page 637\]](#).

Functional Overview

Thing REST service supports auto creation of Device, Sensors, Thing and Assignment in a single API without the need of separate calls to IoT Service APIs.

This will be achieved by the below implementation approach:

- REST Payload of Thing API now includes device, sensors and assignment object structure.
- This API will internally perform the following actions to create the artifacts:
 - REST APIs of IoT Services create Devices and Sensors and obtain the object IDs.
 - Creates a Thing.
 - Assigns sensors to the Thing.

Request

URI: `/Things`

HTTP Method: `POST`

Permissions:

`<thing>.c`

Request Properties

Sensor Assignment Properties

Parent Key	Property	Type	Mandatory	Maximum Length	Description
<code>_assignment</code>	<code>_mappingId</code>	GUID	Yes	32	Thing Type to Sensor Type Mapping ID
<code>_devices</code>	<code>_name</code>	string	Yes	81	Name of the IoT Service device

Parent Key	Property	Type	Mandatory	Maximum Length	Description
_devices	_gatewayName	string	Yes, if device needs to be newly created	81	Gateway ID of IoT Service This is immutable and cannot be updated for an existing device. It means if the payload has a device with an ID, then that device should not have the gateway name.
_devices	_alternateId	string	No	81	Alternate ID of IoT Service Device This is immutable and cannot be updated for an existing device. It means If the payload has a device with an ID, then that device should not have the alternate ID.
_sensors	_name	string	Yes	81	Name of the IoT Service sensor
_sensors	_alternateId	string	No	81	Alternate ID of IoT Service Sensor
_sensors	_sensorTypeId	string	Yes	81	Sensor Type ID of the IoT Service sensor

Note

This part of the documentation is only relevant to you if you do not have a new SAP IoT license under which the Device Connectivity feature is an integral part of SAP IoT.

You can find out which type of license you're using by going to your SAP BTP subaccount in the SAP BTP Cockpit and looking under Subscriptions.

- If you're subscribed to SAP IoT (new license: oneproduct application plan), this documentation is not relevant to you.
- If you're subscribed to SAP Leonardo IoT (older license: standard application plan), this documentation is relevant to you.

13.3.2.1 Create a thing with sensor assignment

Thing REST service supports auto creation of Device, Sensors, Thing and Assignment in a single API without the need of separate calls to IoT Service APIs. For more information, see [Create a Thing \[page 781\]](#)

The following request payload creates a thing along with its sensor assignment:

```
{
  "_externalId": "Demo-Cooler-Thing-01",
  "_name": "Demo-Cooler-Thing-01",
  "_description": {
    "en": "Demo Cooler"
  }
}
```

```

    },
    "_thingType": [
      " core.coolerpkg:CoolerType"
    ],
    "_objectGroup": "C18E47BEEF1D41149BB3AFFEB38BF66B",
    "_assignment": {
      "_devices": [
        {
          "_name": "DemoCooler",
          "_gatewayName": "3",
          "_sensors": [
            {
              "_name": "ConvPressureSensor",
              "_sensorTypeId": "5e70f20b-c0cb-4146-8c8b-eeae96a86f01"
            },
            {
              "_name": "ConvReedSensor",
              "_sensorTypeId": "0b0aa063-3ddc-4920-8a8a-50744b4676d5"
            },
            {
              "_name": "ConvCoolerSensor",
              "_sensorTypeId": "3376ab0a-34b2-4c46-877b-3d76f676d77f"
            }
          ]
        }
      ]
    },
    "_mappingId": "b807fece-b5b9-44ed-a7b4-4daffba5a691"
  }
}

```

Related Information

[Create a Thing \[page 781\]](#)

13.3.2.2 Create a thing with sensor assignment using alternate ID

The following request payload creates a thing along with the assignment to sensors. However, instead of sensor ID and device ID, you can use the alternate ID of the sensor and the device. The alternate ID of sensors and devices are not mandatory fields.

```

{
  "_externalId": "Demo-Cooler-Thing-01",
  "_name": "Demo-Cooler-Thing-01",
  "_description": {
    "_en": "Demo Cooler"
  },
  "_thingType": [
    " core.coolerpkg:CoolerType"
  ],
  "_objectGroup": "C18E47BEEF1D41149BB3AFFEB38BF66B",
  "_assignment": {
    "_devices": [
      {
        "_name": "DemoCooler",
        "_gatewayName": "3",

```

```

    "_alternateId" : "101",
    "_sensors": [
      {
        "_name": "ConvPressureSensor",
        "_alternateId" : "201",
        "_sensorTypeId": "5e70f20b-c0cb-4146-8c8b-eeae96a86f01"
      },
      {
        "_name": "ConvReedSensor",
        "_alternateId" : "202",
        "_sensorTypeId": "0b0aa063-3ddc-4920-8a8a-50744b4676d5"
      },
      {
        "_name": "ConvCoolerSensor",
        "_alternateId" : "203",
        "_sensorTypeId": "3376ab0a-34b2-4c46-877b-3d76f676d77f"
      }
    ]
  },
  "_mappingId": "b807fece-b5b9-44ed-a7b4-4daffba5a691"
}

```

13.3.3 Create Multiple Things

With this method, you can create multiple thing instances for a specific thing type.

When you create multiple things using this method, it is mandatory that you provide a unique alternate ID for each and every thing instance. The method validates the request payload and initiates the thing creation job at the backend. In addition to the thing type, you can specify the thing template created for that thing type.

As a result, the method displays the response message 202 accepted and generates a correlation ID. You can find the correlation ID in the response header. For every correlation ID, the method generates unique log IDs one each for the number of things specified in the request payload. Using the correlation ID and the log ID, you can know the success or failure status of individual things. For more information, see [Monitoring and Logging \[page 1541\]](#).

The multiple things that you are planning to create using this method, must belong a specific thing type. You cannot create things for multiple thing types or multiple thing templates in the same request payload. The things in the request payload must belong to only one object group and you cannot provide different object groups for different things.

Note

Only creation of multiple things is supported, and you cannot update multiple things.

Request URI: /v2/Things

Response Header

Header	Description
correlationid	Unique correlation ID generated for the service executed.

Payload Examples

- [Example 1 – Create multiple things for a thing type \[page 794\]](#)
- [Example 2 – Create multiple things using thing template \[page 795\]](#)

13.3.3.1 Example 1 – Create multiple things for a thing type

The following request payload creates multiple things for the specified thing type:

```
{
  "_thingType": "core.automobiles:ABCXSeries",
  "_objectGroup": "EFE8B81D89194CFDBA93672EE27053B",
  "things": [
    {
      "_externalId": "ABCXCar-extid",
      "_alternateId": "ABCXCar-altid",
      "_name": "ABCXCar",
      "_description": {
        "_en": "ABC Car of X Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    },
    {
      "_externalId": "ABCX1Car-extid",
      "_alternateId": "ABCX1Car-altid",
      "_name": "ABCX1Car",
      "_description": {
        "_en": "ABC Car of X1 Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    },
    {
      "_externalId": "ABCX2Car-extid",
      "_alternateId": "ABCX2Car-altid",
      "_name": "ABCX2Car",
      "_description": {
        "_en": "ABC Car of X2 Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    }
  ]
}
```

Related Information

[Create Multiple Things \[page 793\]](#)

13.3.3.2 Example 2 – Create multiple things using thing template

The following request payload creates multiple things for the specified thing type. In addition, based on the thing template specified, property data will be created for the thing.

```
{
  "_thingType": "core.automobiles:ABCXSeries",
  "_thingTemplate": "core.automobiles:ABCXSeriesTemp",
  "_objectGroup": "EFE8B81D89194CFDBA936722EE27053B",
  "things": [
    {
      "_externalId": "ABCXCar-extid",
      "_alternateId": "ABCXCar-altid",
      "_name": "ABCXCar",
      "_description": {
        "_en": "ABC Car of X Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    },
    {
      "_externalId": "ABCX1Car-extid",
      "_alternateId": "ABCX1Car-altid",
      "_name": "ABCX1Car",
      "_description": {
        "_en": "ABC Car of X1 Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    },
    {
      "_externalId": "ABCX2Car-extid",
      "_alternateId": "ABCX2Car-altid",
      "_name": "ABCX2Car",
      "_description": {
        "_en": "ABC Car of X2 Series"
      },
      "_location": "029611A5D3B64815B4DA404B72DDD16F",
      "_customer": "3C4E1C7A1E984309A608623C2425DA0D"
    }
  ]
}
```

Related Information

[Create Multiple Things \[page 793\]](#)

13.3.4 Read a Thing by Alternate ID

With this method, you can retrieve details of a thing with a specific alternate thing ID.

Request

URI: `/ThingsByAlternateId('<alternateId>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Headers

Parameter	Required	Description
Accept-Language	No	Language of the thing description. The default language is EN.
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip.deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
alternate ID	Yes	String	Unique thing identifier assigned by the user while creating a thing.

Request Example

```
/ThingsByAlternateId('ABCXSeries001-alternateId')
```

Response

Response Properties

Property	Type	Description
_id	String	Unique thing identifier generated by the system while creating a thing.
_externalId	String	Thing identifier from an external system.
_alternateId	String	Thing identifier which is unique only within a specific tenant.
_name	String	Name of the thing.
_description	String	Description of a thing in a specified language.
_thingType	Array of thing types	Array of thing types for the thing.
_location	String	Identifier for the location.
_customer	String	Identifier for the business partner.
_objectGroup	String	Object group ID for which the Thing has to be assigned.

Response Status and Error Codes

Code	Description
200	Thing with specific alternate ID retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_externalId": "ABCXSeries001",
  "_alternateId": "ABCXSeries001-alternateId",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC  xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_location": "BD622E3DA6A14C4D87CDEC935B000001",
  "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295"
}
```

13.3.5 Read a Thing

With this method, you can read the generic fields and the thing type associated with the specified thing.

Note

If you have created a thing using a thing template with the file property specified, this method does not retrieve the file content for the thing. You must use /

`Snapshot(thingId='<ID>',fromTime='<timestamp>',dataCategory='<dataCategory>')`
or `/v2/`

`Snapshot(thingId='<ID>',fromTime='<timestamp>',toTime='<timestamp>',dataCategory='<dataCategory>')` to retrieve the file content of a thing.

Request

URI: `/Things ('<ID>')`

HTTP Method: [GET](#)

Permissions:

`<thing>.r`

Request Header Parameters

Parameter	Required	Description
Accept-Language	No	Language of the thing description. The default language is EN .
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the un-compressed response.

Request Parameter

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.

Request Example

```
/Things ('503B8711B5D0445688E7FF7ACFC2177A')
```

The below request will get the thing and its assignment details.

```
{
  "_id": "92B98497566F48E4A0867569941F9CF1",
  "_externalId": "Demo-Cooler-Thing-01",
  "_name": "Demo-Cooler-Thing-01",
  "_description": {
    "_en": "Demo Cooler"
  },
  "_thingType": [
    "iotae.sandboxhdbd1.conv.services.demo.package:CoolerType"
  ],
  "CreatedByUser": "testuser",
  "CreatedTime": "2019-02-07T06:10:41.899Z",
  "LastChangedByUser": "testuser",
  "LastChangedTime": "2019-02-07T06:10:41.899Z",
  "_assignment": {
    "_id": "79721DA29EAA41A6ACACEC7920F9A9D5",
    "_devices": [
      {
        "_id": "174",
        "_name": "DemoCooler",
        "_alternateId": "101",
        "_gatewayName": "3",
        "_sensors": [
          {
            "_id": "733",
            "_name": "ConvPressureSensor",
            "_alternateId": "201",
            "_sensorTypeId": "5e70f20b-c0cb-4146-8c8b-eeae96a86f01",
            "_operation": null
          },
          {
            "_id": "734",
            "_name": "ConvReedSensor",
            "_alternateId": "202",
            "_sensorTypeId": "0b0aa063-3ddc-4920-8a8a-50744b4676d5",
            "_operation": null
          },
          {
            "_id": "732",
            "_name": "ConvCoolerSensor",
            "_alternateId": "203",
            "_sensorTypeId": "3376ab0a-34b2-4c46-877b-3d76f676d77f",
            "_operation": null
          }
        ]
      }
    ]
  },
  "_mappingId": "b807fece-b5b9-44ed-a7b4-4daffba5a691"
},
"_objectGroup": "C18E47BEEF1D41149BB3AFFEB38BF66B"
}
```

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
_id	string	Unique thing identifier generated by the system while creating a thing.
_externalId	string	Thing identifier from an external system.
_alternateId	string	Thing identifier which is unique only within a specific tenant.
_name	string	Name of the thing.
_description	string	Description of a thing in a specified language.
_thingType	Array of thing types	Array of thing types for the thing.
_location	string	Identifier for the location.
_customer	string	Identifier for the business partner.
_objectGroup	string	Object group ID for which the Thing has to be assigned to.

Response Status and Error Codes

Code	Description
200	Thing retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_externalId": "ABCXSeries001",
  "_name": "ABCXSeries",
  "_description": {
    "en": "Car Model ABC  xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_location": "BD622E3DA6A14C4D87CDEC935B000001",
  "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295",
  "CreatedByUser": "abc@xyz.com",
  "CreatedTime": "2018-09-04T11:42:14.662Z",
  "LastChangedByUser": "abc@xyz.com",
  "LastChangedTime": "2018-09-04T11:42:14.662Z"
}
```

If you assigned an alternate thing ID while creating a thing, the response payload contains the `_alternateId` field.

```
{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_externalId": "ABCXSeries001",
  "_alternateId": "ABCXSeries001-alternateId",
  "_name": "ABCXSeries",
  ...
}
```

```

    "_description": {
      "en": "Car Model ABC   xSeries 001"
    },
    "_thingType": [
      "core.automobiles:ABCXSeries"
    ],
    "_location": "BD622E3DA6A14C4D87CDEC935B000001",
    "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
    "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295",
    "_CreatedByUser": "abc@xyz.com",
    "_CreatedTime": "2018-09-04T11:42:14.662Z",
    "_LastChangedByUser": "abc@xyz.com",
    "_LastChangedTime": "2018-09-04T11:42:14.662Z"
  }

```

13.3.6 Read Thing Configuration Details for a Thing

Retrieves metadata for a thing

With this method, you can retrieve thing configuration details for a specified thing. The result set contains thing types and property sets to which the specified thing belongs.

Request

URI: `/Things('<thing ID>')/Configuration`

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is EN .
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the un-compressed response.

Request Parameters

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for a thing.

Request Example

`/Things('<thing ID>')/Configuration`

Response

Format: *JSON*

Response Properties

Property	Type	Description
Value	Array of thing type objects	Array of thing type objects returned.
propertySets	Array of property set objects	Array of property set objects (that belong to the property set type) returned.

Response Status and Error Codes

Code	Description
200	Configuration details retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "thingTypes": [{
    "name": "core.automobiles:ABC2Series",
    "description": {
      "en": "ABC2Series electric car"
    },
    "propertyTypes": [{
      "id": "engine",
      "description": {
        "en": "Engine Usage"
      },
      "propertySetType": "core.automobiles:Engine"
    }, {
      "id": "drive_fr",
      "description": {
        "en": "Drive Front Right"
      },
      "propertySetType": "core.automobiles:DriveUnit"
    }, {
      "id": "drive_fl",
      "description": {
        "en": "Drive Front Left"
      },
      "propertySetType": "core.automobiles:DriveUnit"
    }, {
      "id": "car",
      "description": {
        "en": "Car Usage"
      },
      "propertySetType": "core.automobiles:Car"
    }, {
      "id": "wheel_fr",
```



```

        "description": {
            "en": "Wheel Front Right"
        },
        "propertySetType": "core.automobiles:Wheel"
    }, {
        "id": "wheel_fl",
        "description": {
            "en": "Wheel Front Left"
        },
        "propertySetType": "core.automobiles:Wheel"
    }, {
        "id": "wheel_rr",
        "description": {
            "en": "Wheel Rear Right"
        },
        "propertySetType": "core.automobiles:Wheel"
    }, {
        "id": "wheel_rl",
        "description": {
            "en": "Wheel Rear Left"
        },
        "propertySetType": "core.automobiles:Wheel"
    }
    ]
}],
"propertySetTypes": [{
    "name": "core.automobiles:Car",
    "description": {
        "en": "Master Data for car"
    },
    "dataCategory": "MasterData",
    "propertyTypes": [{
        "value": {
            "id": "BodyStyle",
            "description": {
                "en": "Car Body Style"
            },
            "type": "String",
            "length": "127"
        },
        {
            "value": {
                "id": "Class",
                "description": {
                    "en": "Car Class"
                },
                "type": "String",
                "length": "127"
            },
            {
                "value": {
                    "id": "WheelBase",
                    "description": {
                        "en": "Car Wheel Base"
                    },
                    "type": "Numeric",
                    "length": ""
                },
                {
                    "value": {
                        "id": "RegistrationNumber",
                        "description": {
                            "en": "Car Registration Number"
                        },
                        "type": "String",
                        "length": "127"
                    },
                    {
                        "value": {

```

```

        "id": "Colour",
        "description": {
            "en": "Car Colour"
        },
        "type": "String",
        "length": "127"
    }
}
}], {
    "name": "core.automobiles:Wheel",
    "description": {
        "en": "Sensory parameters for wheel"
    },
    "dataCategory": "TimeSeriesData",
    "propertyTypes": [{
        "value": {
            "id": "Pressure",
            "description": {
                "en": "Wheel pressure"
            },
            "type": "Numeric",
            "length": "",
            "unitOfMeasure": "PA"
        }, {
            "value": {
                "id": "Temperature",
                "description": {
                    "en": "Wheel temperature"
                },
                "type": "Numeric",
                "length": ""
            }
        }
    ]
}, {
    "name": "core.automobiles:DriveUnit",
    "description": {
        "en": "Sensory parameters for drive unit"
    },
    "dataCategory": "TimeSeriesData",
    "propertyTypes": [{
        "value": {
            "id": "RotationSpeed",
            "description": {
                "en": "Drive unit rotation speed"
            },
            "type": "Numeric",
            "length": ""
        }, {
            "value": {
                "id": "PowerConsumption",
                "description": {
                    "en": "Drive unit power consumption"
                },
                "type": "Numeric",
                "length": ""
            }
        }
    ]
}, {
    "name": "core.automobiles:Engine",
    "description": {
        "en": "Sensory parameters for engine"
    },
    "dataCategory": "MasterData",
    "propertyTypes": [{
        "value": {
            "id": "Type",

```

```

        "description": {
            "en": "Engine type"
        },
        "type": "String",
        "length": "127"
    },
    {
        "value": {
            "id": "Capacity",
            "description": {
                "en": "Engine capacity"
            },
            "type": "Numeric",
            "length": "",
            "unitOfMeasure": "MM"
        }
    },
    {
        "value": {
            "id": "Torque",
            "description": {
                "en": "Engine torque"
            },
            "type": "Numeric",
            "length": "",
            "unitOfMeasure": "NM"
        }
    },
    {
        "value": {
            "id": "Transmission",
            "description": {
                "en": "Engine transmission"
            },
            "type": "String",
            "length": "254",
            "unitOfMeasure": ""
        }
    }
}

```

Related Information

[Thing Configuration \[page 358\]](#)

13.3.7 Update a Thing

With this method, you can update attributes such as external ID, name, or object group of a thing.

In the payload of the request, you assign values to those fields that you want to modify. For example, to set a new name, you may pass the desired string for the `<_name>` field in the payload of the service request.

i Note

<_externalID> and <_customer> are optional fields in the request payload and this method updates these optional fields as follows:

- If you specify a value for these optional fields in the request payload, the method replaces the old value with the new value.
- If you do not specify these fields in the request payload, the method retains the original value.

Request

URI: /Things ('<ID>')

HTTP Method: *POST*

Permissions:

<thing>.c

Request Parameter

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.

Request Example

/Things ('503B8711B5D0445688E7FF7ACFC2177A')

Sensor Assignment Properties

Parent Key	Property	Type	Mandatory	Maximum Length	Description
_assignment	_id	GUID	Yes	32	Unique identifier of the assignment
_assignment	_mappingId	GUID	Yes	32	Thing Type to Sensor Type Mapping ID

Parent Key	Property	Type	Mandatory	Maximum Length	Description
_devices	_id	string	Yes (if sensors are to be added, or updated or deleted to/from the device, and also if the device name is to be updated)	81	ID of the IoT Service device
_devices	_name	string	Yes	81	Name of the IoT Service device
_devices	_gateway-Name	string	Yes, if device needs to be newly created	81	Gateway ID of IoT Service This is immutable and cannot be updated for an existing device. It means if the payload has a device with an ID, then that device should not have the gateway name.
_devices	_alternateId	string	No	81	Alternate ID of IoT Service Device This is immutable and cannot be updated for an existing device. It means if the payload has a device with an ID, then that device should not have the alternate ID.
_sensors	_id	string	Yes (if sensor is to be updated or deleted)	81	ID of the IoT Service sensor
_sensors	_operation	string	Yes (if sensor is to be updated or deleted)		ADD: Creates a new sensor, adds it to the device in IoT Services, and adds the sensor to the assignment in SAP IoT. DELETE: Deletes the existing sensor from IoT Services, and deletes the sensor from the assignment in SAP IoT. UPDATE: Updates the sensor name, alternate ID, or sensor type ID of the sensor.

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "_externalId": "ABCXSeries001",
  "_name": "ABCXSeries",
  "_description": {
```

```

    "en": "Car Model ABC  xSeries 001"
  },
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "location": "BD622E3DA6A14C4D87CDEC935B000001",
  "customer": "4D622E3DA6A14C4D87CDEC935B000001",
  "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295"
}

```

Note

- An error occurs if the **_objectGroup** property is not specified, empty, or has an invalid ID assigned to it.
- You cannot modify the thing type when you update a thing.

The below request deletes the sensor that has an ID "733", updates the name and alternate ID of the sensor that has an ID "734" and adds a new sensor NewConvPressureSensor to the assignment.

<https://apiiot-mds.cfapps.sap.hana.ondemand.com/>

Things ('92B98497566F48E4A0867569941F9CF1')

```

{
  "_id": "92B98497566F48E4A0867569941F9CF1",
  "_externalId": "Demo-Cooler-Thing-01",
  "_name": "Demo-Cooler-Thing-01",
  "description": {
    "en": "Demo Cooler"
  },
  "_thingType": [
    "iotae.sandboxhdb1.conv.services.demo.package:CoolerType"
  ],
  "assignment": {
    "id": "79721DA29EAA41A6ACACEC7920F9A9D5",
    "devices": [
      {
        "id": "174",
        "name": "DemoCooler",
        "sensors": [
          {
            "id": "733",
            "name": "ConvPressureSensor",
            "sensorTypeId": "5e70f20b-c0cb-4146-8c8b-eeae96a86f01",
            "operation": "DELETE"
          },
          {
            "id": "734",
            "name": "ConvReedSensorUpdated",
            "alternateId": "302",
            "sensorTypeId": "0b0aa063-3ddc-4920-8a8a-50744b4676d5",
            "operation": "UPDATE"
          },
          {
            "name": "NewConvPressureSensor",
            "sensorTypeId": "3376ab0a-34b2-4c46-877b-3d76f676d77f",
            "operation": "ADD"
          }
        ]
      }
    ]
  },
  "_mappingId": "b807fece-b5b9-44ed-a7b4-4daffba5a691"
},
"_objectGroup": "C18E47BEEF1D41149BB3AFFEB38BF66B"
}

```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Thing updated successfully

13.3.8 Delete a Thing

This service is used to delete the specified thing.

If a thing is deleted, all the corresponding time series data, events, reference properties, files, sensor assignment, and custom master data association are also deleted.

- If the thing is associated with a thing hierarchy (parent-child relationship created between things), the system displays an error message and does not delete the thing. Start removing the parent-child relationship between the things in the corresponding hierarchies, and then delete the thing.
- If the thing is part of a thing group, the system displays an error message and does not delete the thing.

Note

Files for a thing are deleted only if the user has the `<file>.da` scope authorization assigned.

Request

URI: `/Things ('<ID>')`

HTTP Method: *DELETE*

Permissions:

`<thing>.d`

`<file>.da`

Request Parameter

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')
```

```
/Things('thing ID')
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
204	Thing deleted successfully

13.3.9 Read all Things

With this method, you can read all the available things.

A user who is assigned to a tenant for a cloud platform provider (TO) with `crossTenantScope` Capability can read things that are created in all tenants, regardless of the tenant to which they are logged on. For more information about different capabilities, see [Capabilities \[page 260\]](#).

i Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

To avoid performance decline, the system in future versions will automatically limit collective GET requests to a maximum of 500 objects that can be retrieved with one single call.

Use of `$count` as well degrades performance. Hence, a use of `$count` must also be judiciously chosen.

Therefore, for use cases where it is crucial for you to ensure that objects more than 500 have to be retrieved, you need to use paging options such as `$top` and `$skip`.

Request

URI: /Things

HTTP Method: [GET](#)

Permissions:

<thing>.r

Request Header Parameters

Parameter	Required	Description
Accept-Language	No	Language of the Thing description. The default language is en .
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

None

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$count	No	Boolean	Total number of thing objects available based on the current user's authorizations; permissible values are true and false. The following results apply, if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of thing objects available. • If you use this with \$filter parameter, the result contains the total count of thing objects based on the defined filter condition.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are _id , _name , _externalId . To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are _id , _name , _externalId , _alternateId , _thingType , _objectGroup . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the and separator. You can use the string functions such as substringof , startswith , and endswith to search data using <code>\$filter</code> . Valid fields are _externalId , _name , _thingType , and _alternateId . For more information, see Filter Conditions (\$filter) [page 1550].
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are _id , _name , _externalId , _thingType , _location , _customer .

Request Example

```
/Things?$filter=_thingType eq 'core.automobiles:ABCXSeries'&$count=true
```

Retrieves all things where the thing type is `core.automobiles:ABCXSeries` and the total number of thing objects that match the filter criterion.

```
/Things?$filter=_thingType eq 'core.automobiles:ABCXSeries'&$count=true&$select=_thingType, _externalID
```

Retrieves all things where the thing type is `core.automobiles:ABCXSeries` and the total number of thing objects that match the filter criterion.. However, with `$select` query parameter, only the fields [_thingType](#) and [_externalId](#) are displayed for all the retrieved things.

```
/Things?$filter=_alternateId eq 'ABCXSeries001-alternateId'
```

Retrieves the thing with alternate thing ID `ABCXSeries001-alternateId`.

```
/Things?$filter=_alternateId eq 'ABCXSeries001-alternateId' or _alternateId eq 'ABC2Series-alternateId'
```

Retrieves two things with their respective alternate thing ID `ABCXSeries001-alternateId` and `ABC2Series-alternateId`.

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
value	Array of thing objects	Array of things returned upon application of the filter conditions.

Response Status and Error Codes

Code	Description
200	Things retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "count": 1,
  "value": [{
    "_id": "<thingID>",
    "_externalId": "ABCXSeries001",
    "_name": "ABCXSeries",
    "_description": {
      "en": "Car Model ABC  xSeries 001"
    },
    "_thingType": [
      "core.automobiles:ABCXSeries"
    ],
    "location": "BD622E3DA6A14C4D87CDEC935B000001",
    "_customer": "4D622E3DA6A14C4D87CDEC935B000001",
    "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295",
    "_assignmentId": "79721DA29EAA41A6ACACEC7920F9A9D5",
    "CreatedByUser": "abc@xyz.com",
    "CreatedTime": "2018-09-04T11:42:14.662Z",
    "LastChangedByUser": "abc@xyz.com",
    "LastChangedTime": "2018-09-04T11:42:14.662Z"
  ]
}
```

13.3.10 Payload of CapabilityType "Thing"

Presents the payload structure of CapabilityType "Thing"

The payload of the `CapabilityType` service consists of two main parts:

- **vocabulary:** This part mirrors the payload elements of the `Thing` service. Any values that you enter here limit the scope of objects to those things that match the passed values.

- **actions:** This part defines which of the three possible types of action (read, write delete) shall be allowed for the **Thing** objects specified in the vocabulary.

Payload

```
{
  "ID": "FFFFFFFFF00000000FFFFFFFFF0003",
  "name": "thing:thing",
  "vocabulary": {
    "attributes": [
      {
        "path": {
          "field": "Customer",
          "dimension": "$property"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "ExternalId",
          "dimension": "$thing"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "Location",
          "dimension": "$property"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "ThingType",
          "dimension": "$thingtypes"
        },
        "valueType": {
          "type": "String",
          "length": 127
        }
      },
      {
        "path": {
          "field": "ObjectGroup",
          "dimension": "$assignment"
        },
        "valueType": {
          "type": "HierarchyAssignment"
        }
      },
      {
        "path": {
          "field": "Thing",
          "dimension": "$thing"
        }
      }
    ]
  }
}
```

```

    },
    "valueType": {
      "type": "String",
      "length": 127
    }
  },
  {
    "path": {
      "field": "Name",
      "dimension": "$thing"
    },
    "valueType": {
      "type": "String",
      "length": 127
    }
  },
  {
    "path": {
      "field": "AlternateId",
      "dimension": "$thing"
    },
    "valueType": {
      "type": "String",
      "length": 127
    }
  }
]
},
"actions": {
  "actions": [
    {
      "name": "Read"
    },
    {
      "name": "Write"
    },
    {
      "name": "Delete"
    }
  ]
}
}

```

Related Information

[CapabilityType \[page 220\]](#)

13.4 Sensors and Things

Describes the role and relationship of sensors and things

Overview

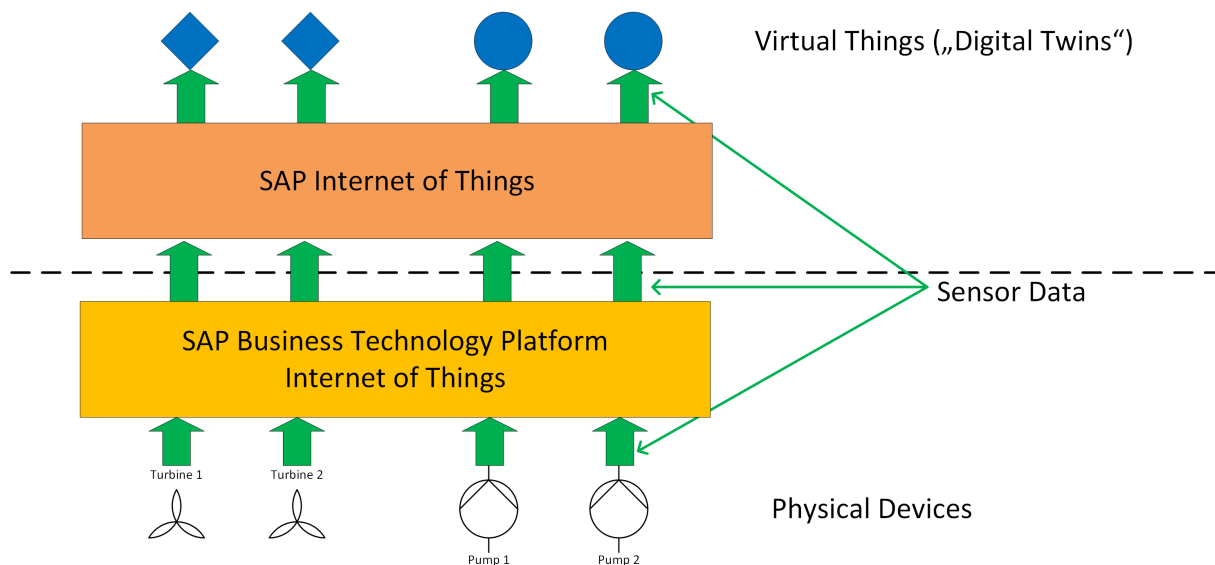
Speaking of things in the Internet of Things only makes sense if you extend the focus to the sensors that are attached to the things you want to control or monitor in an IoT scenario. It is the sensors that are the very source of the data that can be collected in the form of timeseries data. Here is how the various objects involved come together during thing onboarding.

Onboarding Steps

Onboarding of a thing consists of the following activities:

- Identifying the physical devices to be covered in an IoT scenario.
- For each type of device: Defining a thing type with a property set that reflects the different kinds of sensor data that the device can provide. During thing type definition, the system automatically scans the device model and tries to match the sensors found in the device model with the properties that belong to the thing type.
- Create a device model, that is, a software layer (typically provided by SAP IoT services for SAP BTP) that mirrors the sensor types and sensors that are part of a physical device.
- For each device: Define a thing based on the previously defined thing types.

Here is a diagram showing the various object levels and software layers involved:



As the diagram suggests, each of the physical devices sends one stream of sensor data through the different layers to the virtual things modeled with SAP IoT.

i Note

Each sensor can be understood as an entity with a complex inner structure. Because of that, each single sensor can provide different types of data streams in parallel.

The services that you find grouped together in this section are dealing with retrieving the devices and sensors that have been brought into the reach of SAP IoT and how the mapping between sensors and things can be accomplished. With that, you have programmatic access to an important part of an IoT scenario that is otherwise available only during creation of a thing in the Thing Modeler app.

In contrast to almost all other services offered by SAP IoT, the services related to sensors and things are very limited in their functional scope and don't provide the complete set of CRUD methods.

Mapping of Data Types Provided by SAP IoT services for SAP BTP for the Cloud Foundry Environment to SAP IoT Data Types

SAP IoT has no immediate access to physical devices. Rather, it relies on the SAP IoT services for SAP BTP layer that is in charge of providing a unified access to sensor-enabled hardware of all kinds. However, the type system of SAP IoT services for SAP BTP for the Cloud Foundry Environment is slightly different from the one that has been implemented for SAP IoT. For this reason, the data types of both layers must be mapped. The mapping itself is taken care of by the system, so there is no need for manual activities here. The following table explains which types correspond to each other:

SAP IoT	SAP IoT services for SAP BTP for the Cloud Foundry Environment	Comment
Numeric	integer	
Numeric(s,n)	double, float	May lead to a loss of precision if the received value does not fit it the specified scale and precision
NumericFlexible	double, float	May lead to a loss of precision if the received value does not fit it the specified scale and precision
String	string	
Boolean	Boolean	
Date	date, long	
DateTime	date, long	
Timestamp	date, long	
JSON	Not supported	
LargeString	string	
ByteArray	Not supported	
Not supported	binary	
ThingID	string	
BusinessPartnerID	string	

SAP IoT	SAP IoT services for SAP BTP for the Cloud Foundry Environment	Comment
GeoJSON	string	

Related Information

<https://help.sap.com/viewer/18e345f32da643fc90c029facb5c0248/latest/en-US/d1eacdde3e2e48499bfb11cbdaf8d7de.html>

13.4.1 Flexible Mapping (OData)

Flexible approach of mapping sensor properties to thing properties

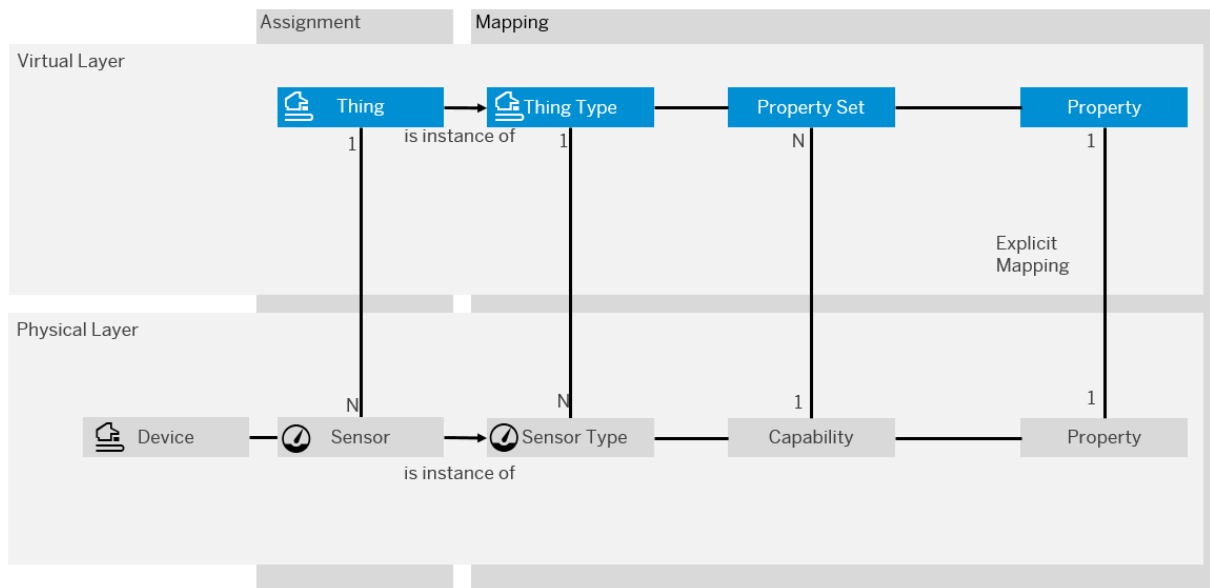
Overview

When it comes to mapping the sensor properties of a physical device to the properties of a virtual thing, earlier versions of SAP IoT have followed a name-based approach. This means that a sensor property could only be mapped to a thing property of the same data type and the same name.

SAP IoT now offers a much more powerful approach for the same purpose named "flexible mapping". As the name suggests, flexible mapping gives you much more freedom and flexibility with regard to the way you can model the relationship between the physical and the virtual layer of an IoT scenario.

Flexible mapping gives you a lot of freedom when it comes to modeling decisions with regards to mapping sensor properties to thing properties. The flexible approach supports a much more refined data model compared to the name-based approach that was offered in earlier releases of SAP IoT.

Architecture



Flexible Mapping (OData) - Thing and Device Model

In the above image, you see that some of the relationships have been extended from 1:1 to 1:N (which increases the reuse potential of the affected entities) and that additional entities (assignments and sensor types) appear in the device model. You can also see the difference between mapping (type level) and assignment (instance level).

Features

Here is a list of the most important and powerful features that let flexible mapping stand out compared to name-based mapping:

- Architectural distinction between entities on type level and on instance level
- Supports mapping of sensor properties and thing properties without having to ensure that equal names are used on both layers.
- Supports the mapping of properties belonging to multiple sensor types to the properties of one thing type (n:1).
- Supports the definition of multiple different mappings for the same thing type.
- Sensor properties that belong to different device capabilities can be mapped to the properties of multiple property sets.
- Supports human-readable master data for mappings so that users don't have to bother about highly technical IDs.

Limitations

Although we have chosen to call the new approach of mapping device capabilities to thing properties "flexible mapping", that doesn't mean that everything is possible. Instead, the following architectural basic conditions apply:

- Sensor properties that belong to different device capabilities cannot be mapped to the properties of a single thing property set.
- One sensor type cannot be mapped to a particular thing type more than once.

❖ Example

Sensor type ST1 may comprise various individual sensors for different value dimensions (such as pressure, temperature, acceleration). You might want to install the same sensor type at various positions of a machine where you want to use different subsets of sensors at each position. However, this is currently **not** supported.

- A particular set of sensor types can be mapped only once to the same thing type.

❖ Example

Sensor types ST1, ST2 and ST3 have been mapped to thing type TT1. After that, you are free to define additional mappings for TT1 such as (TT1 - ST1), (TT1 - ST2), (TT1 - ST2, ST3). However, it is not allowed to define a second mapping (TT1 - ST1, ST2, ST3) because this particular combination already exists.

- The master data fields of a mapping (**<Name>**, **<Description>**) are **not** part of any kind of translation workflow. The texts that you maintain for these fields will appear the same, regardless of your logon language.

i Note

Regardless of this limitation, you can still do something to support multiple languages: You may maintain multiple **<language>: <description text>** pairs in the **<Description>** field, for example: "en": "Fan", "de": "Ventilator", "fr": "Ventilateur". It is then up to your applications accessing the mapping at runtime to pick the text in the language that matches best the current browser or user profile settings.

Related Information

[Credentials \[page 821\]](#)

[Mapping \[page 829\]](#)

[Assignment \[page 853\]](#)

13.4.1.1 Credentials

Service for authenticating SAP IoT accesses to objects residing on the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer.

i Note

The Credentials service described in this chapter and its subchapters is only relevant if you have an older license under which the device connectivity feature is **not** an integral part of SAP Leonardo IoT.

If you have a newer SAP IoT license ([oneproduct](#) service plan), then this part of the documentation is **not** relevant for you. This is because with the newer SAP IoT license, device connectivity has become an integral part of SAP IoT. Therefore, there's no need for accessing external product services.

You can find out which type of license you're using by going to your SAP BTP subaccount in the SAP BTP Cockpit and looking under [Subscriptions](#):

- If you're subscribed to SAP IoT ([oneproduct](#) service plan), the Credentials service described here is **not** relevant for you.
- If you're subscribed to SAP Leonardo IoT ([standard](#) service plan), the Credentials service described here is relevant for you.

When an application based on SAP IoT tries to associate a thing with the sensors of a physical device, it depends on the resources offered via the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer. Since this layer comes with a user and authorization management of its own, the application has to verify that it is authorized to access device and sensor data. This service offers the methods that are needed for that purpose.

i Note

The Credentials service is needed only in scenarios where the target value feature for thing attributes is used (for more information, see [Thing: Reference Property Data \[page 927\]](#)). In contrast to that, the service is **not** needed for scenarios where sensor data is only used for analytical purposes.

The Credentials service always operates within the scope of the tenant you are logged on to. There is no support for cross-tenant operations with this service.

With the latest release of SAP IoT services for SAP BTP for the Cloud Foundry Environment (4.28.0), the authorization data in the Credentials service is updated to support IoTservices tenant and instance-specific details.

Base URI:

- Formal description: `http://<server address>[:<port number>]/v1/credentials`
- Example for a base URI in a cloud foundry environment: `https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/credentials`

Permissions: none

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create Credentials [page 822]	/v1/credentials	n/a
<i>GET</i>	Read Credentials [page 824]	/v1/credentials	n/a
<i>PUT</i>	Update Credentials [page 826]	/v1/credentials	n/a
<i>DELETE</i>	Delete Credentials [page 828]	/v1/credentials	n/a

Payload

For POST, PUT, and GET, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "user"      : { "type": "string", "maxLength": 256, "required": "true" },
  "password"  : { "type": "string", "maxLength": 256, "required": "true" },
  "host"      : { "type": "string", "maxLength": 128, "required": "true" },
  "instanceId": { "type": "string", "maxLength": 55, "required": "false" },
  "iotTenantId": { "type": "string", "maxLength": 55, "required": "false" }
}
```

13.4.1.1.1 Create Credentials

Setting the credentials for accessing sensor data

With this service method, you define the authentication data that are used by an application based on SAP IoT to access sensor data provided by a physical device via the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer.

Request

URI: /v1/credentials

HTTP Method: *POST*

Permissions: none.

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
user	Yes	string	User ID for logging on to the SAP IoT services for SAP BTP layer.	Request body
password	Yes	string	Password for logging on to the SAP IoT services for SAP BTP layer.	Request body
host	Yes	string	Landscape-specific ID string of the SAP IoT services for SAP BTP service instance to connect to.	Request body
instanceId	No	string	Instance ID for accessing SAP IoT services for SAP BTP service version 4.28.0 or above	Request body
iotTenantId	No	string	Tenant for accessing SAP IoT services for SAP BTP service version 4.28.0 or above, to support tenant-specific enhancements	Request body

Request Example

/v1/credentials

The following request payload is used to create credentials if you are using SAP IoT services for SAP BTP for the Cloud Foundry Environment version 4.28.0 and above.

```
{
  "user": "root",
  "password": "pass1",
  "host": "kafkatest-sandbox.canary.cp.iot.sap",
  "instanceId": "kafkatest-sandbox",
  "iotTenantId": "1450145528"
}
```

Payload

For POST, PUT, and GET, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "user"      : { "type": "string", "maxLength": 256, "required": "true" },
  "password"  : { "type": "string", "maxLength": 256, "required": "true" },
  "host"      : { "type": "string", "maxLength": 128, "required": "true" },
  "instanceId": { "type": "string", "maxLength": 55, "required": "false" },
  "iotTenantId": { "type": "string", "maxLength": 55, "required": "false" }
}
```

Response

Response Headers

Header	Description
location	URL pointing to the newly created Credentials instance
ETag	Entity tag of the newly created Credentials instance

Response Status and Error Codes

Code	Description
201	Credentials created successfully
400	Request could not be processed due to invalid or missing parameters
409	Credentials passed by the method exist already

Response Example

The following is the response payload after creating the credentials, if you are using SAP IoT services for SAP BTP for the Cloud Foundry Environment version 4.28.0 and above.

```
{
  "user": "root",
  "tenantId": "test-sandbox",
  "host": "kafkatest-sandbox.canary.cp.iot.sap",
  "instanceId": "kafkatest-sandbox",
  "iotTenantId": "1450145528"
}
```

Related Information

[Credentials \[page 821\]](#)

13.4.1.1.2 Read Credentials

Retrieving the credentials for accessing sensor data

With this service method, you retrieve the authentication data that are required by an application based on SAP IoT to access sensor data provided by a physical device via the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer. The actual value of the credentials data is defined by the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer, and it is specific for each tenant.

i Note

With the latest release of SAP IoT services for SAP BTP for the Cloud Foundry Environment (4.28.0), the authorization data includes tenant ID and instance ID in the response payload, if you provided these values while creating the credentials.

Request

URI: `/v1/credentials`

HTTP Method: *GET*

Permissions: none.

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

None.

Request Example

`/credentials`

With this request, all the credentials for the current tenant are returned.

Response

Response Headers

Header	Description
Authorization	JWT (JSON Web Token)
ETag	Entity tag of the retrieved Credentials object

Response Status and Error Codes

Code	Description
200	Credentials retrieved successfully
404	Not Found - Request successfully processed, no return value (e.g., no credentials available for the specified tenant)

Response Example

The following is the response payload after creating the credentials, if you are using SAP IoT services for SAP BTP for the Cloud Foundry Environment version 4.28.0 and above.

```
{
  "user": "root",
  "tenantId": "test-sandbox",
  "host": "kafkatest-sandbox.canary.cp.iot.sap",
  "instanceId": "kafkatest-sandbox",
  "iotTenantId": "1450145528"
}
```

Related Information

[Credentials \[page 821\]](#)

13.4.1.1.3 Update Credentials

With this method, you change the credentials needed for accessing data provided by the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer

You use this method to change the credentials needed to access the sensor data provided by the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer. This is useful to adapt the service to a changed situation with regards to the credentials in effect. For example, a company-wide security policy may require that the credentials must be changed after a fixed period of time to protect the system against unauthorized access. Such changes in the underlying layer must then be reflected by calling this method.

Request

URI: `/v1/credentials`

HTTP Method: `PUT`

Permissions: none.

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)
If-Match	Yes	Check if cached version matches server version of the credentials

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
user	Yes	string	User ID for logging on to the SAP IoT services for SAP BTP layer.	Request body
password	Yes	string	Password for logging on to the SAP IoT services for SAP BTP layer.	Request body
host	Yes	string	Landscape-specific ID string of the SAP IoT services for SAP BTP service instance to connect to.	Request body
instanceId	No	string	Instance ID for accessing SAP IoT services for SAP BTP service version 4.28.0 or above	Request body

Parameter	Required	Data Type	Description	Parameter Type
iotTenantId	No	string	Tenant for accessing SAP IoT services for SAP BTP service version 4.28.0 or above, to support tenant-specific enhancements	Request body

Request Example

/v1/credentials

```
{
  "user": "root",
  "password": "pass2",
  "host": "kafkatest-sandbox.canary.cp.iot.sap",
  "instanceId": "kafkatest-sandbox",
  "iotTenantId": "1450145528"
}
```

Note

If you are using SAP IoT services for SAP BTP for the Cloud Foundry Environment version 4.28.0 and above, you must also include the parameters `instanceId` and `iotTenantId` in the request payload.

Payload

For POST, PUT, and GET, only media type JSON is supported. The JSON for these methods has the following structure:

```
{
  "user"      : { "type": "string", "maxLength": 256, "required": "true" },
  "password"  : { "type": "string", "maxLength": 256, "required": "true" },
  "host"      : { "type": "string", "maxLength": 128, "required": "true" },
  "instanceId": { "type": "string", "maxLength": 55, "required": "false" },
  "iotTenantId": { "type": "string", "maxLength": 55, "required": "false" }
}
```

Response

Response Headers

Header	Description
ETag	Entity tag of the updated credentials

Response Status and Error Codes

Code	Description
200	Credentials updated successfully

Related Information

[Credentials \[page 821\]](#)

13.4.1.1.4 Delete Credentials

Deleting the credentials for accessing sensor data

With this service method, you delete the authentication data that are in effect for an application based on SAP IoT to access sensor data provided by a physical device via the SAP IoT services for SAP BTP for the Cloud Foundry Environment layer. Once the credentials have been deleted with this method, none of the applications that exist in the specified tenant can access sensor data of the specified data provider. This is because the credentials data is valid for an entire tenant.

Request

URI: `/v1/credentials`

HTTP Method: `DELETE`

Permissions: none.

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)
If-Match	Yes	Check if cached version matches server version of the credentials

Request Parameters

None.

Request Example

`/v1/credentials`

With this request, you delete the credentials that are in effect for granting the current tenant `sap-iotaedemo` access to sensor data provided by the default device data provider.

Response

Response Status and Error Codes

Code	Description
204	Credentials deleted successfully

Related Information

[Delete Credentials \[page 828\]](#)

13.4.1.2 Mapping

Service for managing the mapping of a thing to a physical device on type level

With this service, you can set up a connection between the sensor types of a physical device and a virtual thing type that represents the device in an IoT scenario. To accomplish this, the devices must already be modeled with the respective methods provided by the SAP IoT services for SAP BTP layer. SAP IoT services for SAP BTP provides unified access to sensors and devices of various kinds, and it serves as a hardware abstraction layer for solutions like SAP IoT.

Note

Defining mappings for sensor types and thing types is a prerequisite for the consecutive creation of assignments between sensors and things on instance level. For more information, see [Assignment \[page 853\]](#).

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]/v1/Mappings`
- Example for a base URI in a cloud foundry environment: `https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/Mappings`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Methods

HTTP Method	Action	URI	Scopes
POST	Create a Mapping [page 830]	/v1/Mappings	<thing>.r
GET	Read a Mapping [page 834]	/v1/Mappings/<mappingID>	<thing>.r
GET	Read all Mapping Master Data [page 836]	/v1/Mappings/MasterData	<thing>.r
GET	Read all Mapping IDs [page 838]	/v1/Mappings/mappingIds	<thing>.r
PUT	Update a Mapping [page 840]	/v1/Mappings/<mappingID>	<thing>.r
PUT	Update Mapping Master Data [page 842]	/v1/Mappings/<mappingID>/MasterData	<thing>.r
DELETE	Delete a Mapping [page 844]	/v1/Mappings/<mappingID>	<thing>.r
GET	Validate a Mapping [page 845]	/v1/Mappings/<mappingID>/validate	<thing>.r
GET	Propose Mappings [page 847]	/v1/Mappings/proposal? thingTypeId='<ThingTypeID>'&sensor TypeId='<SensorTypeID>' /v1/ Mappings/proposal? thingId='<ThingID>'&sensorId='<Sen sorID>'	<thing>.r

Related Information

[Assignment \[page 853\]](#)

[Thing Type \[page 374\]](#)

13.4.1.2.1 Create a Mapping

With this method, you associate a thing type with a sensor type.

After a physical device has been made available by SAP IoT services for SAP BTP for higher-level software layers like SAP IoT, you can establish a mapping between the sensor properties of the device and the properties of the virtual thing. This procedure is often referred to as "onboarding a thing". To accomplish this, you execute this service method and pass the sensor type ID, the thing type ID as well as the actual property mapping in the payload of the method.

Although technically not required, we recommend making use of the non-mandatory master data fields `<name>` and `<description>`. They are meant for providing a place where human-readable texts can be kept describing the purpose of a particular mapping. All other identifying attributes in this context are highly technical and non-intuitive, so your life will be easier when you take this opportunity.

i Note

Successful mapping of device sensors to things depends on a number of prerequisites. For more information, see [Requirements for Successful Thing Onboarding](#).

Mapping of Data Types Provided by SAP IoT services for SAP BTP for the Cloud Foundry Environment to SAP IoT Data Types

SAP IoT has no immediate access to physical devices. Rather, it relies on the SAP IoT services for SAP BTP layer that is in charge of providing a unified access to sensor-enabled hardware of all kinds. However, the type system of SAP IoT services for SAP BTP for the Cloud Foundry Environment is slightly different from the one that has been implemented for SAP IoT. For this reason, the data types of both layers must be mapped. The mapping itself is taken care of by the system, so there is no need for manual activities here. The following table explains which types correspond to each other:

SAP IoT	SAP IoT services for SAP BTP for the Cloud Foundry Environment	Comment
Numeric	integer	
Numeric(s,n)	double, float	May lead to a loss of precision if the received value does not fit it the specified scale and precision
NumericFlexible	double, float	May lead to a loss of precision if the received value does not fit it the specified scale and precision
String	string	
Boolean	Boolean	
Date	date, long	
DateTime	date, long	
Timestamp	date, long	
JSON	Not supported	
LargeString	string	
ByteArray	Not supported	
Not supported	binary	
ThingID	string	
BusinessPartnerID	string	
GeoJSON	string	

Request

URI: /v1/Mappings

HTTP Method: *POST*

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
name	No	string(max. 127 characters)	Name of the mapping	Request body
description	No	Array	Description of the mapping for each language with the corresponding ISO language code	Request body
thingTypeId	Yes	string	Technical ID of the thing type to be mapped to a sensor type	Request body
sensorTypeId	Yes	string	Technical ID of the sensor type to be mapped to a thing type	Request body
(measures targetValues).capabilityId	Yes	string		Request body
(measures targetValues).propertyMappings	Yes	array of objects	Set of mappings between physical device capabilities and virtual thing type properties; 1 or more mappings required; applies to either measured values or target values	Request body
(measures targetValues).propertyMappings.CapabilityPropertyId	Yes	string	Device (sensor) capability to be mapped to a property; applies to either measured values or target values	Request body

Parameter	Required	Data Type	Description	Parameter Type
(measures. propertyMa ppings.nps tPropertyI d targetValu es.propert yMappings. npstRefPro pertyId)	Yes	string	Property to be mapped to a device (sensor) capability; applies to either measured values or target values	Request body

Note

If you want to map sensor data to a property in a property set that has been defined for calculated values, you can use the `(measures.propertyMappings.<...>` parameters for that. These parameters can handle both measured values as well as calculated values.

Mapping Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	60	Description of the object

Request Example

```
{
  "name": "My First Mapping",
  "description": {
    "en": "My test description",
    "de": "Meine Testbeschreibung"
  },
  "thingTypeId": "com.iotae.demo.pidi:CoffeeMachine",
  "mappings": [
    {
      "sensorTypeId": "75128d4c-b52e-4a10-8b8f-46ad81917fc5",
      "measures": [
        {
          "capabilityId": "576",
          "namedPropertySetId": "Fill_Level_Water",
          "propertyMappings": [
            {
              "capabilityPropertyId": "9dda2b90-00af-485a-bdc0-02888ef73dfc",
              "npstPropertyId": "Temperature"
            }
          ]
        }
      ]
    },
    {
      "targetValues": [
        {
          "capabilityId": "581",
          "namedPropertySetId": "Brewing_Unit",
          "propertyMappings": [
            {
              "capabilityPropertyId": "f1f2f276-c9a3-4c0e-a3cb-d9823e6baa72",
              "npstRefPropertyId": "Pressure"
            }
          ]
        }
      ]
    }
  ]
}
```

```
}
  ]
}
]
}
]
```

The example above demonstrates how you can create a mapping between the properties of a sensor type and the properties of a thing type. In this example, there are actually two different kinds of mappings being established simultaneously:

- One mapping for measured values (read out the current value measured by a sensor): Temperature
- One mapping for target values (set a desired value for the device): Pressure

Since all the values are passed on to the service via arrays, you could as well establish as many mappings as you like (or, as there are capabilities and properties available) in one single call of the service method.

Response

Response Status and Error Codes

Code	Description
201	New mapping created successfully
400	Bad request (for example, wrong or missing parameters)

Related Information

[Mapping \[page 829\]](#)

13.4.1.2.2 Read a Mapping

Retrieves the mapping data for the mapping with the specified ID from the database

You call this method to retrieve the technical details of the mapping with the specified ID. You typically call this method after retrieving the list of mapping IDs that belong to a particular thing type with the help of the [Read all Mapping IDs \[page 838\]](#) service method.

Request

URI: `/v1/Mappings/<mappingID>`

HTTP Method: [GET](#)

Permissions:

<thing>.r
<thingconf!t5>.r
<thing!t5>.r
<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Technical ID of the mapping	Path

Request Example

```
GET /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594
```

Response

Response Header

Header	Description
ETag	Entity tag of the retrieved mapping object.

Response Status and Error Codes

Code	Description
200	Mapping retrieved successfully
400	Bad request. Request could not be processed due to invalid or missing parameters

Response Example

```
{
  "name": "My First Mapping",
  "description": {
    "en": "My test description"
  },
  "thingTypeId": "com.iotae.demo.pidi:CoffeeMachine",
  "mappings": [
    {
      "sensorTypeId": "75128d4c-b52e-4a10-8b8f-46ad81917fc5",
      "measures": [
        {
```

```

        "capabilityId": "576",
        "namedPropertySetId": "Fill_Level_Water",
        "propertyMappings": [
            {
                "capabilityPropertyId": "9dda2b90-00af-485a-bdc0-02888ef73dfc",
                "npstPropertyId": "Temperature"
            }
        ]
    },
    ],
    "targetValues": []
}
]
}

```

In the above example, the mapping returned for the specified ID contains exactly one pair of sensor type capability/thing type property, namely the measured value for the temperature dimension.

Related Information

[Mapping \[page 829\]](#)

[Read all Mapping IDs \[page 838\]](#)

13.4.1.2.3 Read all Mapping Master Data

Retrieves the master data of a mapping for the specified object ID

With this service method, you retrieve the master data (that is, the mandatory ID as well as the non-mandatory name and description) of the mapping objects that belong to the specified IDs. As input parameter, you may provide both sensor type IDs as well as thing type IDs.

Request

URI: `/v1/Mappings/MasterData`

HTTP Method: `GET`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingTypeId	No	string	ID of the thing type for which you want to retrieve mappings.	Query string
sensorTypeId	No	string	ID of the sensor type for which you want to retrieve mappings.	Query string
\$skip	No	integer	Number of the first n records to be excluded from the result set	Query string
\$top	No	integer	Number of records to include in the result set	Query string

Note

If the \$top parameter is omitted, the method returns up to 1000 entries. You can increase the parameter to a maximum value of 10000. If this is not sufficient, you need to call the service method multiple times.

Request Example

```
GET /v1/Mappings/MasterData?thingTypeId=sap-dev.demoPackage:ThingType1
```

Response

Response Status and Error Codes

Code	Description
200	Master data retrieved successfully
400	Bad request. Request could not be processed due to invalid or missing parameters

Response Example

```
[
  {
    "id" : "6fc8f297-431a-43f7-a42e-dbf584c76594",
    "name" : "Default Mapping",
    "description" : {
      "en": "Default mapping for thing type"
    }
  },
  {
    "thingTypeId" : "sap-dev.demoPackage:ThingType1",
    "sensorTypeIds" : ["SensorType1", "SensorType2"],
    "etag": 1
  }
]
```

```
]
```

In the above example, the method returns exactly one mapping object where the properties of the thing type passed as input parameter are mapped to the capabilities of two different sensor types.

Related Information

[Mapping \[page 829\]](#)

13.4.1.2.4 Read all Mapping IDs

Retrieves the IDs of all mappings defined for the specified thing type or sensor type

With this method, you can retrieve the complete list of mapping IDs that have been created for the thing type, or sensor type, respectively, passed as input parameter to the method.

Unlike most of the other "Read all..." methods in the SAP IoT framework, this method is **not** technically limited to a maximum number of objects to be retrieved with one call. This is because the number of useful mappings has a "natural" limit derived from the number of supported properties or device capabilities. These numbers fall almost always into a range that is not critical in terms of server load.

If no mappings exist, the method returns an empty array in its payload.

i Note

You may call this method by passing the ID of either a sensor type or a thing type, but not both.

Request

URI: `/v1/Mappings/mappingIds`

HTTP Method: `GET`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingTypeId	No	string	ID of the thing type	Query
sensorTypeId	No	string	ID of the sensor type	Query

Note

Although, from a technical perspective, both `thingTypeId` as well as `sensorTypeId` are flagged as **not** required, you still need to provide exactly one of them when you call this service method. That is, the two parameters are mutually exclusive.

If the `$top` parameter is omitted, the method returns up to 1000 entries. You can increase the parameter to a maximum value of 10000. If this is not sufficient, you need to call the service method multiple times.

Request Example

```
GET /v1/Mappings/mappingIds?thingTypeId=com.iotae.demo.pidi:CoffeeMachine
GET /v1/Mappings/mappingIds?sensorTypeId=75128d4c-b52e-4a10-8b8f-46ad81917fc5
```

The above example illustrates the two different options of calling this service method by either passing a thing type ID or a sensor type ID. Under the assumption that the thing type and the sensor type mentioned are mapped to each other, both flavors of this method call yield the same result.

Response

Response Status and Error Codes

Code	Description
200	Mappings retrieved successfully, or No mapping found for the specified ID (empty array).

Response Example

```
[
  "75128d4c-b52e-4a10-8b8f-46ad81917fc5",
  "f1f2f276-c9a3-4c0e-a3cb-d9823e6baa72"
]
```

In the above example, the method has returned two different mapping IDs for the specified object type. You could now use the returned IDs as input for the [Read a Mapping \[page 834\]](#) method. Keep in mind that each of

the returned mapping objects may contain up to two different sets of mappings (measured values or target values) between sensor type properties and thing type properties.

Related Information

[Mapping \[page 829\]](#)

[Read a Mapping \[page 834\]](#)

13.4.1.2.5 Update a Mapping

With this method, you modify the technical details of a mapping relationship

You use this method to update the technical details of a mapping by directly modifying the fields in the method payload. In other words, you can access and change all of the data that has been stored for a mapping, such as sensor type, capabilities, properties, and so on. Of course, you need to take care that after the update, the properties referenced by the mapping still match (for example, no data type conflicts) and make sense from a business perspective.

i Note

When updating a mapping, you always need to provide the entire payload, not only the fields to be updated. Otherwise, fields that are **not** provided will be reset to their default values.

If an assignment between the thing instance and the physical device already exists for the mapping, you cannot update the mapping by deleting or editing the already existing capability, properties and property set type, properties. Instead, you can only update the mapping as follows:

- Map a new capability property of the sensor device to a property of the property set type
- Map a new device capability to the property set type

While this service method focuses on the technical details of a mapping, you can also modify the master data of a mapping. To accomplish this, use the [Update Mapping Master Data \[page 842\]](#) method.

Request

URI: `/v1/Mappings/<mappingID>`

HTTP Method: `PUT`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (Java Web Token)
If-Match	Yes	Check if cached version matches server version of the Mapping object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Technical identifier of the mapping to be updated	Path
Payload	Yes	JSON	Complete payload of the mapping containing the updated field values	Request body

Request Example

```
PUT /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594
{
  "name": "My First Mapping",
  "description": {
    "en": "My test description"
  },
  "thingTypeId": "com.iotae.demo.pidi:CoffeeMachine",
  "mappings": [{
    "sensorTypeId": "75128d4c-b52e-4a10-8b8f-46ad81917fc5",
    "measures": [{
      "capabilityId": "576",
      "namedPropertySetId": "Fill_Level_Water",
      "propertyMappings": [{
        "capabilityPropertyId": "9dda2b90-00af-485a-bdc0-02888ef73dfc",
        "npstPropertyId": "Temperature"
      }]
    }],
    {
      "capabilityId": "578",
      "namedPropertySetId": "Flow_Water",
      "propertyMappings": [{
        "capabilityPropertyId": "9eeb3c81-99be-574z-ced1-23999fe84egd",
        "npstPropertyId": "Speed"
      }]
    }
  ],
  "targetValues": [{
    "capabilityId": "581",
    "namedPropertySetId": "Brewing_Unit",
    "propertyMappings": [{
      "capabilityPropertyId": "f1f2f276-c9a3-4c0e-a3cb-d9823e6baa72",
      "npstRefPropertyId": "Pressure"
    }]
  }]
}]
}
```

Modifies the mapping with the specified ID and replaces its field values according to the payload provided in the request body. In the above example, the mapping is updated with the new mapping between the capability 578 and the property set type Flow_Water.

Response

Response Status and Error Codes

Code	Description
200	Mapping updated successfully

Related Information

[Mapping \[page 829\]](#)

[Update Mapping Master Data \[page 842\]](#)

13.4.1.2.6 Update Mapping Master Data

With this method, you modify the master data of a mapping relationship

You use this method to update the master data of a mapping by directly modifying the `<name>` and `<description>` fields in the method payload. This is especially helpful when you find that the highly technical field values stored for the mapped entities do not really help you much in understanding what a particular mapping is about.

i Note

When updating a mapping, you always need to provide the entire payload, not only the fields to be updated. Otherwise, fields that are **not** provided will be reset to their default values.

While this service method focuses on the master data of a mapping, you can also modify the technical details of a mapping. To accomplish this, use the [Update a Mapping \[page 840\]](#) method.

Request

URI: `/v1/Mappings/<mappingID>/MasterData`

HTTP Method: `PUT`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (Java Web Token)
If-Match	Yes	Check if cached version matches server version of the Mapping object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Technical identifier of the mapping to be updated	Path
Payload	Yes	JSON	Complete payload of the mapping containing the updated field values	Request body

Request Example

```
PUT /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594/MasterData
{
  "id" : "6fc8f297-431a-43f7-a42e-dbf584c76594",
  "name" : "Default Mapping",
  "description" : {
    "en": "Default mapping for thing type"
  },
  "thingTypeId" : "sap-dev.demoPackage:ThingType1",
  "sensorTypeIds" : ["SensorType1", "SensorType2"]
}
```

Modifies the mapping with the specified ID and replaces its field values according to the payload provided in the request body.

Response

Response Header

Header	Description
ETag	Entity tag of the retrieved mapping object.

Response Status and Error Codes

Code	Description
200	Mapping updated successfully

Response Example

```
{
  "id" : "6fc8f297-431a-43f7-a42e-dbf584c76594",
  "name" : "Default Mapping",
  "description" : {
    "en": "Default mapping for thing type"
  }
}
```

```
"thingTypeId" : "sap-dev.demoPackage:ThingType1",
"sensorTypeIds" : ["SensorType1", "SensorType2"]
}
```

Related Information

[Mapping \[page 829\]](#)

[Update a Mapping \[page 840\]](#)

13.4.1.2.7 Delete a Mapping

With this method, you delete the mapping between a thing type and its sensor types

You use this method to delete a sensor/thing mapping on type level. After deleting a mapping, all sensor types that were part of the mapping are no longer available to the thing type.

Note

You can only delete a mapping on type level after all corresponding sensor thing assignments on instance level have been deleted.

Request

URI: /v1/Mappings/<mappingID>

HTTP Method: *DELETE*

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Header	Required	Values
If-Match	Yes	Check if cached version matches server version of the Mapping object

i Note

Instead of supplying a particular ETag value of the assignment to be deleted, you can also provide a wildcard ("*"). Using the wildcard ensures that the assignment is deleted in any case, even if it has been modified by a concurrent process.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Technical identifier of the mapping to be deleted	Path

Request Example

```
DELETE /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594
```

Response

Response Status and Error Codes

Code	Description
204	Mapping deleted successfully.
400	Bad request (for example, no mapping ID provided)
404	Not found (for example, the mapping has already been deleted in the meantime; may be avoided by providing ETag = * as request parameter)

Related Information

[Mapping \[page 829\]](#)

[Delete an Assignment \[page 862\]](#)

13.4.1.2.8 Validate a Mapping

Helps you determine the root source of data ingestion errors

In a Big Data business scenario that you have set up with the tools and services of SAP IoT it is not unusual that from time to time you will encounter error log entries. Such entries indicate that the sensors attached to your

monitored things have sent data, but something has gone wrong during the data ingestion process, that is, the transfer of incoming data streams into the various persistence layers in the backend of the SAP IoT infrastructure.

One potential root cause for such errors are changes to the involved data structures used in a given thing and device model, such as renamed fields, field type modifications, etc. The `validate` service method analyzes the error log for the specified mapping and makes you aware of all errors that were caused by data incompatibilities between sender and receiver within the SAP IoT infrastructure.

Request

URI: `/v1/Mappings/<mappingID>/validate`

HTTP Method: `GET`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (Java Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Technical identifier of the mapping to be validated	Path

Request Example

```
GET /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594/validate
```

Response

Response Status and Error Codes

Code	Description
200	Validation executed successfully

i Note

Even if errors are detected during the validation, the service method still returns HTTP status code 200 for "successful execution". The "success" here refers to executing the validation, but **not** necessarily to the formal correctness of the mapping that has been validated. Formal errors found in the mapping are reflected by error messages that the method returns as its payload in the response body (see the following example).

Response Example

```
[
  "Could not find thing type with ID:
  de.vtest.test.tmdmpostman.odata:ThingTypeValidate"
]
```

Related Information

[Mapping \[page 829\]](#)

[Error Messages \[page 864\]](#)

13.4.1.2.9 Propose Mappings

Lets the system analyze sensor capabilities and thing properties and propose a mapping

In earlier releases of SAP IoT, the only way to set up a mapping between the properties of physical devices and virtual things was to find pairs of properties in both objects involved with the same name and data type. While the flexible mapping introduced with version 1.62 is no longer limited to only accept property pairs with matching names, you can still have the system present a proposal of matching properties based on these criteria. Creating such a proposal is the purpose of this service method.

The method can be parameterized in two different ways:

- type-based (that is, thing type and sensor type)
- instance-based (that is, thing and sensor)

After execution, the method returns the calculated mapping proposal in the response payload. It is then up to you to either modify or accept the proposed mapping and store it in the database by handing the payload over to the [Create a Mapping \[page 830\]](#) method.

Request

URI:

a) /v1/Mappings/proposal?thingTypeId='<ThingTypeID>'&sensorTypeId='<SensorTypeID>'

b) /v1/Mappings/proposal?thingId='<ThingID>'&sensorId='<SensorID>'

HTTP Method: [GET](#)

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (Java Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingTypeId	No	string	Technical identifier of the thing type involved in the mapping.	Query string
sensorTypeId	No	string	Technical identifier of the sensor type involved in the mapping.	Query string
thingId	No	string	Technical identifier of the thing involved in the mapping.	Query string
sensorId	No	string	Technical identifier of the sensor involved in the mapping.	Query string

Note

Although, from a technical perspective, all the parameters listed above are flagged as **not** required, you still need to provide exactly one pair of them when you call this service method (either type-based or instance-based). That is, the two pairs of parameters are mutually exclusive. Also, it is **not** allowed to combine a parameter referring to an instance with another referring to a type.

Request Example

```
a) GET /v1/Mappings/proposal?
thingTypeId=com.iotae.demo.pidi:CoffeeMachine&sensorTypeId=75128d4c-
b52e-4a10-8b8f-46ad81917fc5
b) GET /v1/Mappings/proposal?thingId=6fc8f297-431a-43f7-a42e-
dbf584c76594&sensorId=8976
```

The above example demonstrates both flavors of calling the proposal method, either type-based (a) or instance-based (b).

Response

Response Status and Error Codes

Code	Description
200	Mapping proposal created successfully

Response Example

```
{
  "thingTypeId": "com.iotae.demo.pidi:CoffeeMachine",
  "mappings": [
    {
      "sensorTypeId": "75128d4c-b52e-4a10-8b8f-46ad81917fc5",
      "measures": [
        {
          "capabilityId": "576",
          "namedPropertySetId": "Fill_Level_Water",
          "propertyMappings": [
            {
              "capabilityPropertyId": "9dda2b90-00af-485a-bdc0-02888ef73dfc",
              "npstPropertyId": "Temperature"
            }
          ]
        }
      ]
    },
    {
      "targetValues": [
        {
          "capabilityId": "581",
          "namedPropertySetId": "Brewing_Unit",
          "propertyMappings": [
            {
              "capabilityPropertyId": "f1f2f276-c9a3-4c0e-a3cb-d9823e6baa72",
              "npstRefPropertyId": "Pressure"
            }
          ]
        }
      ]
    }
  ]
}
```

In the above example, the method has proposed the mapping of two sensor type capabilities to two corresponding properties of a thing type. Moreover, the properties fall into two different technical categories (`<measures>` and `<targetValues>`).

Related Information

[Mapping \[page 829\]](#)

[Create a Mapping \[page 830\]](#)

13.4.1.2.10 Read all Assignments for a Mapping

Retrieves a list of all sensor/thing assignments based on the specified mapping.

With this method, you can retrieve a list of all sensor/thing assignments on instance level that have been created based on the specified sensor type/thing type mapping on type level. You may want to use the resulting list for analytical purposes or as a preliminary step for a cleanup action, when you want to get rid of a particular mapping but have to delete the referring assignments first.

i Note

Unlike the collective GET request method of the [Assignment \[page 853\]](#) service (see the *Related Information* section below), this method is always focused on the assignments related to a particular mapping.

Request

URI: /v1/Mappings/<mappingID>/assignments

HTTP Method: [GET](#)

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Unique ID of the mapping for which you want to retrieve the existing assignments	Path

Request Example

```
GET /v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594/assignments
```

The request above returns a list of all sensor/thing assignments on instance-level that have been created by reference to the mapping with the specified ID.

Response

Response Status and Error Codes

Code	Description
200	Assignment retrieved successfully

Response Example

```
[
  {
    "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
    "thingId": "A68BCF0D32914C19AACD1225AF887330",
    "sensorIds": ["220", "221"],
    "mappingId": "6fc8f297-431a-43f7-a42e-dbf584c76594",
    "ETag": 1
  }
]
```

From the response payload given in the above example, you can see that for the specified mapping, there is only one assignment (represented by its `id`). Along with the assignment, the method also provides the thing and sensors involved.

Related Information

[Mapping \[page 829\]](#)

[Delete all Assignments for a Mapping \[page 851\]](#)

[Read all Assignments \[page 858\]](#)

13.4.1.2.11 Delete all Assignments for a Mapping

Deletes all sensor/thing assignments based on the specified mapping.

With this method, you can delete all sensor/thing assignments on instance level that have been made by reference to the specified mapping. This is useful when you want to carry out a cleanup activity for a mapping that is no longer needed. Calling this method should be preceded by calling the [Read all Assignments for a Mapping \[page 850\]](#) method, which lets you get an overview of all affected assignments.

i Note

This method is different compared to almost all other Delete methods that are available in the API services of SAP IoT because it aims at deleting an entire set of assignments at once rather than focusing on one single assignment.

Request

URI: /v1/Mappings/<mappingID>/assignments

HTTP Method: *DELETE*

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
mappingID	Yes	string	Unique ID of the mapping for which you want to retrieve the existing assignments	Path

Request Example

```
/v1/Mappings/6fc8f297-431a-43f7-a42e-dbf584c76594/assignments
```

In this example, all assignments related to the mapping with the specified ID are deleted. After successful execution, you can delete the specified mapping itself.

Response

Response Status and Error Codes

Code	Description
204	Assignments deleted successfully.
400	Bad request (for example, no mapping ID provided)
404	Not found (for example, the assignments have already been deleted in the meantime; may be avoided by providing ETag = * as request parameter)

Related Information

[Mapping \[page 829\]](#)

[Read all Assignments for a Mapping \[page 850\]](#)

13.4.1.3 Assignment

Service for managing the mapping of a thing to a physical device on instance level

With this service, you can set up a connection between the sensors of a physical device and a virtual thing that represents the device in an IoT scenario. To accomplish this, the devices must already be modeled with the respective methods provided by the SAP IoT services for SAP BTP layer. SAP IoT services for SAP BTP provides unified access to sensors and devices of various kinds, and it serves as a hardware abstraction layer for solutions like SAP IoT.

Note

Defining assignments for sensors and things on instance level requires that a mapping of the involved thing types and sensor types has already been created.

Base URI:

- Formal description: `https://<server address>[:<port number>][<path>]/v1/Assignments`
- Example for a base URI in a cloud foundry environment: `https://tm-data-mapping.cfapps.eu10.hana.ondemand.com/v1/Assignments`

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Methods

HTTP Method	Action	URI	Scopes
POST	Create an Assignment [page 854]	<code>/v1/Assignments</code>	<code><thing>.r</code>
GET	Read an Assignment [page 857]	<code>/v1/Assignments/<assignmentID></code>	<code><thing>.r</code>
GET	Read all Assignments [page 858]	<code>/v1/Assignments</code>	<code><thing>.r</code>
PUT	Update an Assignment [page 860]	<code>/v1/Assignments/<assignmentID></code>	<code><thing>.r</code>

HTTP Method	Action	URI	Scopes
<i>DELETE</i>	Delete an Assignment [page 862]	/v1/Assignments/<assignmentID>	<thing>.r

Related Information

[Mapping \[page 829\]](#)

13.4.1.3.1 Create an Assignment

With this method, you associate a thing with a sensor

After a physical device has been made available by SAP IoT services for SAP BTP for higher-level software layers like SAP IoT, you can establish an assignment between the properties of the virtual thing and the sensor properties of the device. This procedure is often referred to as "onboarding a thing". To accomplish this, you execute this service method and pass the sensor ID as well as the thing ID in the payload of the method. In addition, you need to provide the ID of a mapping between the corresponding sensor types and thing type.

You can use this method not only to create one assignment per call. Instead, it is possible to pass an array of many assignments in one call. This is useful, for example, when you have to provide sensor/thing assignments for an entire shop floor at once (as opposed to a continual onboarding of things over a longer period of time). This kind of mass operations can be done with the same service method by simply providing all the pairs of properties and capabilities at once in the payload of the request.

i Note

Calling this service method with a payload for multiple assignments is limited to a maximum of 250 assignments per call.

Prerequisite

To create an assignment on instance level, there must be a mapping referencing the superordinate types of the sensor and thing involved.

Request

URI: /v1/Assignments

HTTP Method: *POST*

Permissions:

<thing>.r

<thingconf!t5>.r

```
<thing!t5>.r  
<thing!t5>.conf.r
```

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingId	Yes	string	Technical ID of the thing to be mapped to one or more sensors	Request body
sensorIds	Yes	string	Array of technical IDs of the sensors to be mapped to a thing	Request body
mappingId	Yes	string	Technical ID of the sensor type/thing type mapping on type level	Request body

Request Example

```
POST /v1/Assignments  
{  
  "thingId": "A68BCF0D32914C19AACD1225AF887330",  
  "sensorIds": ["220", "221"],  
  "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"  
}
```

In the above example, the thing with the specified ID is assigned to two sensors (220, 221). The specified `<mappingID>` points to a mapping object where the respective sensor type is mentioned from which the two sensors have been derived.

```
POST /v1/Assignments  
[  
  {  
    "thingId": "A68BCF0D32914C19AACD1225AF887330",  
    "sensorIds": ["220", "221"],  
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"  
  },  
  {  
    "thingId": "B68BCF0D32914C19AACD1225AF887330",  
    "sensorIds": ["222", "223"],  
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"  
  }  
]
```

In the above example, four sensors (220, 221, 222, 223) are assigned to two different things. The fact that the specified `<mappingID>` is the same for both mappings indicates that both things are instances of the same thing type.

Response

Response Headers

Header	Description
location	URL path to the newly created assignment
ETag	Entity tag used to identify a particular instance of an assignment

Response Status and Error Codes

Code	Description
201	Assignment created successfully
400	Bad Request - Request could not be processed due to invalid or missing parameters

Response Example

```
POST /v1/Assignments
{
  "thingId": "A68BCF0D32914C19AACD1225AF887330",
  "sensorIds": ["220", "221"],
  "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"
}
```

In the above example, you see the result payload for a POST request for only one single assignment to be created. For this flavor of calling the service method, the ETag value is **not** part of the payload. Rather, it is returned in the `<ETag>` header field.

```
POST /v1/Assignments
[
  {
    "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
    "thingId": "A68BCF0D32914C19AACD1225AF887330",
    "sensorIds": ["220", "221"],
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26",
    "ETag": 1
  },
  {
    "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
    "thingId": "B68BCF0D32914C19AACD1225AF887330",
    "sensorIds": ["222", "223"],
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26",
    "ETag": 2
  }
]
```

In the above response payload, you see the result for the simultaneous creation of two assignments with one call. Note that for this execution mode, the correct `<ETag>` value of the created assignments can only be read from the payload. This is for the simple reason that the `<ETag>` header field can of course only hold one value at a time, not many.

Related Information

[Assignment](#) [page 853]

[Create a Mapping](#) [page 830]

13.4.1.3.2 Read an Assignment

Retrieves the assignment data for the assignment with the specified ID from the database

You call this method to retrieve the technical details of the assignment with the specified ID. You typically call this method after having retrieved the list of assignmentIDs that belong to a particular thing or sensor with the help of the [Read all Assignments](#) [page 858] service method.

Request

URI: /v1/Assignments/<assignmentID>

HTTP Method: *GET*

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
assignment ID	Yes	string	[Description, possible values, default values]	Path

Request Example

```
GET /v1/Assignments/f38fac75-7e65-4953-86a9-92330adf4e3a
```

Response

Response Headers

Header	Description
ETag	Entity tag used to identify a particular instance of an assignment

Response Status and Error Codes

Code	Description
200	Assignment retrieved successfully
404	Not found - Requested resource was not found

Response Example

```
{
  "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
  "thingId": "A68BCF0D32914C19AACD1225AF887330",
  "sensorIds": ["220", "221"],
  "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"
}
```

Related Information

[Assignment \[page 853\]](#)

[Read all Assignments \[page 858\]](#)

13.4.1.3.3 Read all Assignments

Retrieves the all assignments defined for the specified thing or sensor

With this method, you can retrieve the complete list of assignments that have been created for the thing, or sensor, respectively, passed as input parameter to the method. Note that the two parameters should be considered mutually exclusive. You can also omit both parameters. In that case, the system returns a complete list of all existing assignments on instance level.

Request

URI: `/v1/Assignments`

HTTP Method: *GET*

Permissions:

<thing>.r
<thingconf!t5>.r
<thing!t5>.r
<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingId	No	string	Unique identifier of the thing for which assignments shall be retrieved	Query string
sensorId	No	string	Unique identifier of the sensor for which assignments shall be retrieved	Query string
\$skip	No	integer	Number of the first n records to be excluded from the result set	Query string
\$top	No	integer	Number of records to include in the result set	Query string

Note

Although, from a technical perspective, both `thingId` as well as `sensorId` are flagged as **not** required, you still should provide only one of them when you call this service method. That is, the two parameters should be considered mutually exclusive. If, however, you decide to provide both parameters simultaneously, you should be aware that you can always accomplish the same result with a more simple request. In addition, if the combined values for both parameters don't match with any record in the database, the method returns an empty result.

If the `$top` parameter is omitted, the method returns up to 1000 entries. You can increase the parameter to a maximum value of 10000. If this is not sufficient, you need to call the service method multiple times.

Request Example

```
GET /v1/Assignments
GET /v1/Assignments?thingId=A68BCF0D32914C19AACD1225AF887330
GET /v1/Assignments?sensorId=220
```

The above example shows the three different flavors of reading assignments:

- Unfiltered request
- Read assignments for a specified thing
- Read assignments for a specified sensor

Response

Response Status and Error Codes

Code	Description
200	Assignments retrieved successfully, or No mapping found for the specified ID (empty array).

Response Example

```
GET /v1/Assignments?thingId=A68BCF0D32914C19AACD1225AF887330
[
  {
    "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
    "thingId": "A68BCF0D32914C19AACD1225AF887330",
    "sensorIds": ["220", "221"],
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26",
    "ETag": 1
  }
]
```

Related Information

[Assignment \[page 853\]](#)

13.4.1.3.4 Update an Assignment

With this method, you modify the technical details of a sensor/thing assignment

You use this method to update the technical details of an assignment by directly modifying the fields in the method payload. In other words, you can access and change all of the data that has been stored for an assignment, such as the list of sensors assigned, the thing as well as the referenced mapping on type level. Of course, you need to take care that after the update, the entities referenced by the assignment still match (for example, no type conflicts) and make sense from a business perspective.

i Note

This service method supports updating of only one single assignment per call. That is, you cannot provide an array of multiple assignments in the request payload.

Request

URI: /v1/Assignments/<assignmentID>

HTTP Method: *PUT*

Permissions:

<thing>.r

<thingconf!t5>.r

<thing!t5>.r

<thing!t5>.conf.r

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)
If-Match	Yes	Check if cached version matches server version of the Assignment object

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
assignment ID	Yes	string	Unique identifier of the assignment to be updated	Path
Payload	Yes	JSON	Request payload containing all updated values	Request body

Request Example

```
PUT /v1/Assignments/f38fac75-7e65-4953-86a9-92330adf4e3a
{
  "thingId": "A68BCF0D32914C19AACD1225AF887330",
  "sensorIds": ["210", "211", "212"],
  "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"
}
```

In the above example, three sensors are assigned to the specified thing.

Response

Response Headers

Header	Description
ETag	Entity tag of the updated Assignment object

Response Status and Error Codes

Code	Description
200	Assignment updated successfully

Response Example

```
{
```

```

    "id": "f38fac75-7e65-4953-86a9-92330adf4e3a",
    "thingId": "A68BCF0D32914C19AACD1225AF887330",
    "sensorIds": ["210", "211", "212"],
    "mappingId": "adfed57a-a537-4078-813b-ee8381e9fe26"
  }

```

Related Information

[Assignment \[page 853\]](#)

13.4.1.3.5 Delete an Assignment

With this method, you delete one or more sensor/thing assignments

You use this method to delete existing assignments. For this, the method supports different calling conventions, which lets you decide to either delete a particular assignment specified by its ID or to delete all existing assignments for a particular thing.

Request

URI:

- `/v1/Assignments/<assignmentID>`
- `/v1/Assignments?thingId=<thingID>`

HTTP Method: *DELETE*

Permissions:

`<thing>.r`

`<thingconf!t5>.r`

`<thing!t5>.r`

`<thing!t5>.conf.r`

Request Headers

Header	Required	Values
Authorization	Yes	JWT (JSON Web Token)

Header	Required	Values
If-Match	Yes	Check if cached version matches server version of the Assignment object

Note

Instead of supplying a particular ETag value of the assignment to be deleted, you can also provide a wildcard ("*"). Using the wildcard ensures that the assignment is deleted in any case, even if it has been modified by a concurrent process.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
assignment Id	Yes	string	Unique identifier of the assignment	Path
thingId	Yes	string	Unique identifier of the thing whose assignments shall be deleted	Query string

Note

The two parameters cannot be combined in one call, that is, they are mutually exclusive. In addition, the syntax for the two ways of calling the method differs due to the different parameter type (path versus query string).

Request Example

```
DELETE /v1/Assignments/f38fac75-7e65-4953-86a9-92330adf4e3a
DELETE /v1/Assignments?thingId=A68BCF0D32914C19AACD1225AF887330
```

The two DELETE requests in the example illustrate the two different flavors of this method:

- Deleting a particular assignment specified by its ID.
- Deleting all assignments that exist for the specified thing.

Response

Response Status and Error Codes

Code	Description
204	Assignment deleted successfully.
400	Bad request (for example, no assignment ID provided)
404	Not found (for example, the assignment has already been deleted in the meantime; may be avoided by providing ETag = * as request parameter)

Related Information

[Assignment \[page 853\]](#)

13.4.2 Error Messages

A service that provides access to error messages

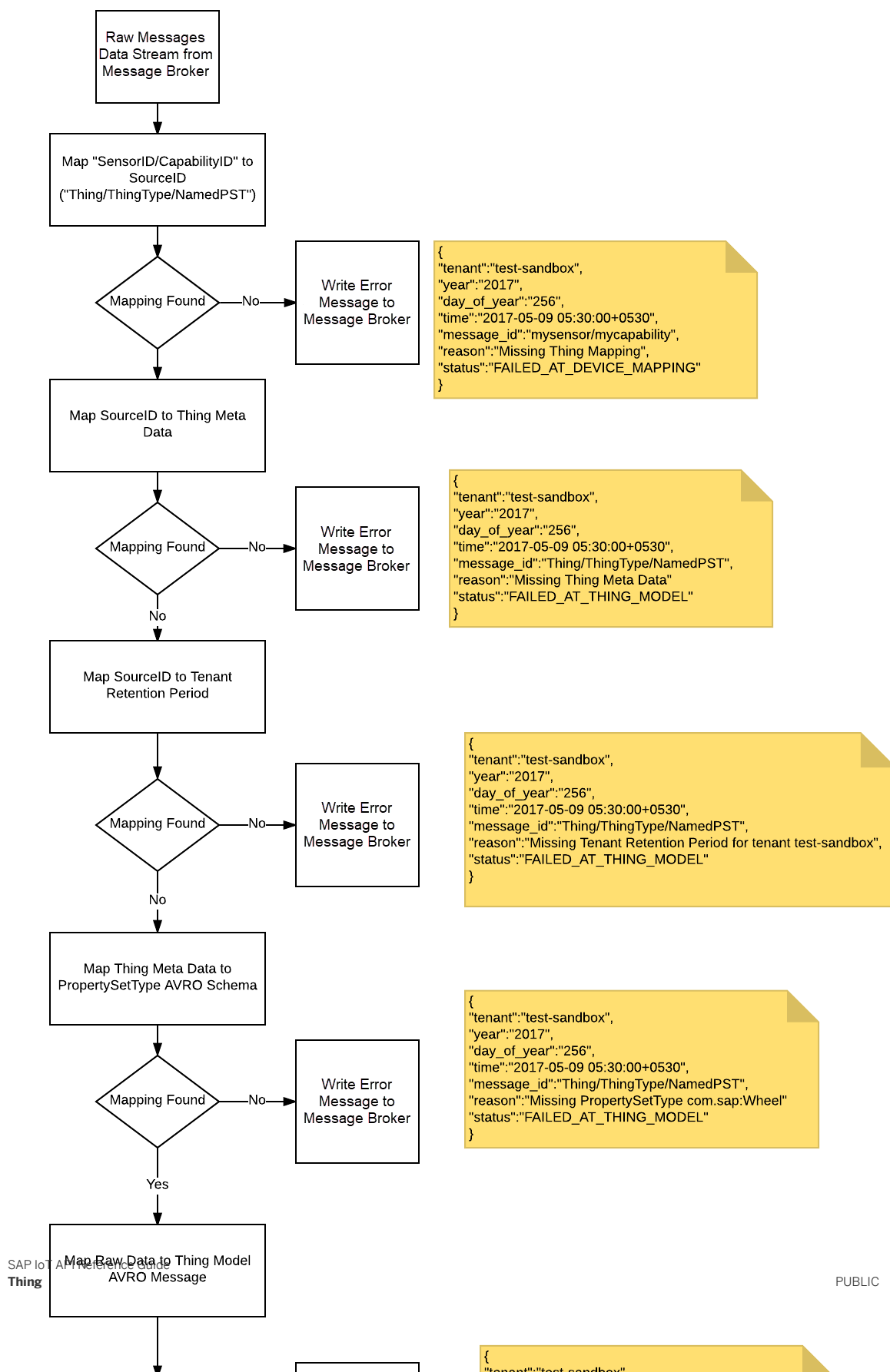
Overview

Like any other piece of software, SAP IoT contains a set of several hundreds of error messages that are written to the error log whenever a service call cannot be executed successfully. A subset of these messages is dealing with problems that may occur during processing of incoming sensor data (typically, problems related to sensor/thing mapping or to the involved data types). Here, the system tries to collect as much information as possible to describe the root cause of the error as accurate as possible. This accuracy helps a system administrator to better understand the error situation and take appropriate action to further avoid that error.

There might be a situation when the time series data from the device is not persisted in the time series store for your tenant. Instead, an error message is written in the error log with status

`FAILED_AT_TENANT_ONBOARDING`. This status indicates that the tenant was not onboarded successfully. Please raise a support ticket under the component `IOT-BSV-OPS-ONB`.

The following graphic illustrates an example of how the different system layers and components of SAP IoT proceed to narrow down the set of potential error root causes (note how the `<reason>` part of the message changes from step to step as soon as more information is available):



Base URI:

- Formal description: `http://<server address>[:<port number>]/<path>/v1/ErrorMessage`s
- Example for a base URI in a cloud foundry environment: `https://errorreader-dataingestion-sap.cfapps.eu10.hana.ondemand.com/v1/ErrorMessage`s

Methods

This service consists of only one method for a collective GET request call into the set of error messages logged in the database during data ingestion. Since the number of logged errors may be high, the method may only be called for a specified time frame of no more than 24 hours.

HTTP Method	Action	URI	Scopes
GET	Read all Error Messages [page 867]	/v1/ErrorMessage	none

Payload

Only media type JSON is supported. It has the following structure:

```
{
  "tenant"      : { "type" : "string" },
  "year"        : { "type" : "int"   },
  "day_of_year" : { "type" : "int"   },
  "time"        : { "type" : "timestamp" },
  "message_id"  : { "type" : "text"   },
  "status"      : { "type" : "text"   },
  "message"     : { "type" : "text"   },
  "reason"      : { "type" : "text"   }
}
```

Data Protection and Privacy

In order to comply with applicable law regarding data protection and privacy, the system treats error messages according to the following rules:

- Error data that cannot be assigned to a property set clearly, is treated as non-personal data.
- If error data can be assigned to a property set, **and** if the property set is annotated as sensitive personal data (`com.sap.apptot.security:spi`), the actual ingested measured / time series data is masked. That is, you cannot re-ingest the data by reading it from the error log. Or, in other words, you can still see **that** data has been written, but the values cannot be restored.

i Note

For more information on annotations for property sets, see [Annotation \[page 510\]](#) (OData).

Related Information

[Sensors and Things \[page 816\]](#)

13.4.2.1 Read all Error Messages

Retrieves a list of error messages from the database

With this service method, you can retrieve a list of error messages from the system's error log database. In other words, you can find out about the error messages that have been logged during current operation because a service call has failed for some reason (especially due to problems related to sensor/thing mapping, or to the data types involved). This can be helpful in various scenarios:

- Tracking of a particular error that has occurred in the system.
- Providing error statistics.
- Analyzing the system's overall stability.

i Note

Retrieving high numbers of objects from the database with an unlimited collective GET request can lead to high system load and a significant increase of response times. Therefore, this method is limited such that with one call, only messages can be retrieved whose timestamps have the same calendar day in common. In addition, the specified timeframe must fall into the last seven days dating back from the moment the method is called. Error log entries older than that are automatically removed from the log and can no longer be retrieved.

This service method is **not** designed for retrieving a list of all the error messages that exist in the system. Also, there is no other method available serving the purpose of presenting a catalog of all existing error messages.

Request

URI: `/v1/ErrorMessage`s

HTTP Method: [GET](#)

Permissions: none

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>from</code>	No	Datetime	Period start for the messages to be retrieved	Path
<code>to</code>	No	Datetime	Period end for the messages to be retrieved	Path

Parameter	Required	Data Type	Description	Parameter Type
Authorization	Yes	JWT	Authorization for accessing sensor data	Header

Note

According to the above table, the `from` and `to` parameters are qualified as **not** mandatory. However, this qualification has been given from a user perspective in the sense that it is allowed to omit these parameters in a method call.

However, from a **technical** perspective, providing values for these two parameters is still required. To overcome the apparent contradiction of a parameter qualified as mandatory and not mandatory at the same time, a default mechanism has been implemented, which works as follows:

- If none of the `from` and `to` parameters is passed to the system during a method call, the method yields the error messages that have been logged during the last hour before the method was called.
- If the `from` and `to` parameters are passed to the system, the method yields the error messages according to the specified timestamps.

Request Example

```
/v1/ErrorMessage
```

Retrieves all the error messages related to data ingestion that have been logged during the last hour before the method call.

```
/v1/ErrorMessage?from=2017-10-25%2000:00:00Z&to=2017-10-25%2023:59:59Z
```

Retrieves all the error messages related to data ingestion that have been logged on October 25th, 2017. Note that in this example, the timespan defined by the `from` and `to` parameters exhausts the maximum duration allowed for this service method. Also, this code example triggers an error message when executed after November 1st, 2017 because that date would lie beyond the error log retention time of seven days.

Response

Response Status and Error Codes

Code	Description
200	Messages retrieved successfully
400	Bad Request. Request could not be processed due to invalid or missing parameters (for example, start and end date with different calendar days)

Related Information

[Error Messages \[page 864\]](#)

13.5 Grouping of Things

Overview

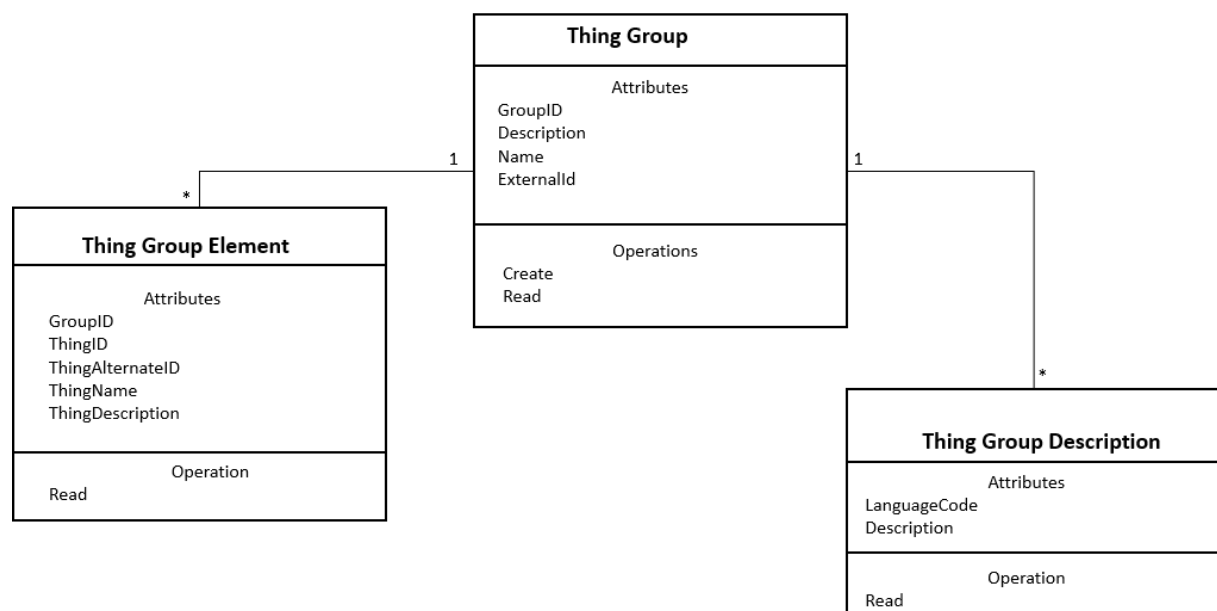
A group of things is similar to a single-level hierarchy. The things are grouped based on logical reason as per the business needs. You can create multiple groups and assign things to the groups. A thing can belong to multiple groups. For example, you can create a thing group with all things from a specific location. A user can maintain and monitor all things belonging to this group based on the business needs.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/ThingGroup`

Example for a Root URI in a cloud foundry environment: `https://appiot-thing-group.cfapps.eu10.hana.ondemand.com/ThingGroup`

Entity Data Model



Service Metadata URI: `http://<server address>[:<port number>]/ThingGroup/v1/$metadata`

Resources

Resource	Description	Path
Thing Group [page 870]	Represents group of things	<code>/v1/ThingGroups</code>

Resource	Description	Path
Thing Group Element [page 888]	Thing group elements	/v1/ThingGroupElements /v1/ThingGroups ('GroupId') ? \$expand=ThingGroupElements
Thing Group Description [page 891]	Thing group description	/v1/ThingGroups ('GroupId') ? \$expand=ThingGroupDescriptions

13.5.1 Thing Group

Represents group of things

Resource Path: `http://<server address>[:<port number>]/ThingGroup/v1/ThingGroups`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
<i>POST</i>	Create Thing Group [page 876]	/ThingGroup/v1/ThingGroup	<tg>.c
<i>GET</i>	Read a Thing Group [page 878]	/ThingGroup/v1/ThingGroups ('<thing group ID>')	<tg>.r
<i>GET</i>	Read all Thing Groups [page 882]	/ThingGroup/v1/ThingGroups	<tg>.r
<i>DELETE</i>	Delete Thing Group [page 885]	/ThingGroup/v1/ThingGroups ('<thing group ID>')	<tg>.d

Thing Group Properties

Parameter	Data Type	Maximum Length	Description
GroupID	String	32	Unique identifier of the thing group generated by the system.

Parameter	Data Type	Maximum Length	Description
Name	String	255	Name of the thing group i Note Only the following characters are supported: - Alphabets a through z and A through Z - Numeric digits 0 through 9 - Punctuation mark underscore (_)
Descriptions	Array of description objects	-	Description of the thing group The descriptive text provided in this field is ignored and is replaced with the descriptive text provided in the <code>Description</code> field of the Thing Group Description entity.
ExternalID	String	255	Thing group identifier (which is not unique) from an external system. You can create multiple thing groups with the same external ID. i Note Only the following characters are supported: - Alphabets a through z and A through Z - Numeric digits 0 through 9 - Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)

Thing Group Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	255	Description of the thing group

Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Grouping of Things \[page 869\]](#)

13.5.1.1 Read Metadata of Thing Group

With this service, you can retrieve the metadata of thing group.

Request

URI: /ThingGroup/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <tg>.r

Request Example

/ThingGroup/v1/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Metadata of thing group retrieved successfully

Payload

Format: [XML](#)

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.apptot" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="Description">
        <Documentation>
          <Summary>Details of Thing Group Description Entity Type</Summary>
        </Documentation>
        <Key>
          <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String" Nullable="false" MaxLength="2">
          <Documentation>
            <Summary>ISO code of the language of the thing hierarchy description</Summary>
          </Documentation>
        </Property>
      </EntityType>
    </Schema>
  </DataServices>
</edmx:Edmx>
```

```

        </Documentation>
    </Property>
    <Property Name="Description" Type="Edm.String" MaxLength="255">
        <Documentation>
            <Summary>Description of the Thing Group</Summary>
        </Documentation>
    </Property>
</EntityType>
<EntityType Name="ThingGroup">
    <Documentation>
        <Summary>Details of Thing Group Entity Type</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="GroupID"></PropertyRef>
    </Key>
    <Property Name="GroupID" Type="Edm.String" Nullable="false"
MaxLength="32">
        <Documentation>
            <Summary>Unique identifier of the Thing Group</Summary>
            <LongDescription>It is automatically generated by the
system when creating Thing Group</LongDescription>
        </Documentation>
    </Property>
    <Property Name="Name" Type="Edm.String" Nullable="true"
MaxLength="255">
        <Documentation>
            <Summary>Name of the Thing Group</Summary>
        </Documentation>
    </Property>
    <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="255" sap:creatable="false" sap:updatable="false">
        <Documentation>
            <Summary>Description of the Thing Group</Summary>
            <LongDescription>When creating a Thing Group, the text
provided in this field is ignored and replaced with the text provided in the
Description field of the Description entity</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ExternalID" Type="Edm.String" Nullable="true"
MaxLength="255">
        <Documentation>
            <Summary>Thing Group identifier (which is not unique)
from an external system </Summary>
        </Documentation>
    </Property>
    <NavigationProperty Name="ThingGroupElements"
Relationship="com.sap.apptot.ThingGroupToElementAssociation"
FromRole="ThingGroup" ToRole="ThingGroupElement"></NavigationProperty>
    <NavigationProperty Name="ThingGroupDescriptions"
Relationship="com.sap.apptot.ThingGroupToDescriptionAssociation"
FromRole="ThingGroup" ToRole="Description"></NavigationProperty>
</EntityType>
<EntityType Name="ThingGroupElement">
    <Documentation>
        <Summary>Details of Thing Group Element Entity Type</Summary>
    </Documentation>
    <Key>
        <PropertyRef Name="GroupID"></PropertyRef>
        <PropertyRef Name="ThingID"></PropertyRef>
    </Key>
    <Property Name="GroupID" Type="Edm.String" Nullable="false"
MaxLength="32">
        <Documentation>
            <Summary>Unique identifier of the Thing Group</Summary>
            <LongDescription>It is automatically generated by the
system when creating Thing Group</LongDescription>
        </Documentation>
    </Property>

```



```

        <Property Name="ThingID" Type="Edm.String" Nullable="false"
MaxLength="32">
            <Documentation>
                <Summary>Unique identifier of the thing</Summary>
            </Documentation>
        </Property>
        <Property Name="ThingAlternateID" Type="Edm.String"
Nullable="true" MaxLength="32">
            <Documentation>
                <Summary>Alternate Id of the Thing</Summary>
            </Documentation>
        </Property>
        <Property Name="ThingName" Type="Edm.String" MaxLength="255"
sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Name of the thing specified when creating a
thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingDescription" Type="Edm.String"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of the thing specified when
creating a thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Operation" Type="Edm.String" MaxLength="6">
            <Documentation>
                <Summary>Operation to be performed on the thing
hierarchy element</Summary>
                <LongDescription>Indicates the add or delete operation
to be performed on the thing hierarchy element during PATCH request.</
LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <Association Name="ThingGroupToDescriptionAssociation">
        <End Type="com.sap.appiot.ThingGroup" Multiplicity="1"
Role="ThingGroup"></End>
        <End Type="com.sap.appiot.Description" Multiplicity="*"
Role="Description"></End>
    </Association>
    <Association Name="ThingGroupToElementAssociation">
        <End Type="com.sap.appiot.ThingGroup" Multiplicity="1"
Role="ThingGroup"></End>
        <End Type="com.sap.appiot.ThingGroupElement" Multiplicity="*"
Role="ThingGroupElement"></End>
    </Association>
    <EntityContainer Name="ThingGroupContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.Description">
            <Documentation>
                <Summary>Details of Thing Group Descriptions Entity Set</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="ThingGroups"
EntityType="com.sap.appiot.ThingGroup">
            <Documentation>
                <Summary>Details of Thing Group Entity Set</Summary>
            </Documentation>
        </EntitySet>

```

```

        <EntitySet Name="ThingGroupElements"
EntityType="com.sap.apiot.ThingGroupElement">
        <Documentation>
        <Summary>Details of Thing Group Elements Entity Set</
Summary>
        </Documentation>
        </EntitySet>
        <AssociationSet Name="ThingGroupToDescriptionAssociation"
Association="com.sap.apiot.ThingGroupToDescriptionAssociation">
        <End EntitySet="ThingGroups" Role="ThingGroup"></End>
        <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
        <AssociationSet Name="ThingGroupToElementAssociation"
Association="com.sap.apiot.ThingGroupToElementAssociation">
        <End EntitySet="ThingGroups" Role="ThingGroup"></End>
        <End EntitySet="ThingGroupElements"
Role="ThingGroupElement"></End>
        </AssociationSet>
    </EntityContainer>
</Schema>
</edmx:DataServices>
</edmx:Edmx>

```

13.5.1.2 Create Thing Group

With this service, you can create thing group for a specific tenant. You can maintain multiple thing groups for a specific tenant. A thing can belong to multiple groups. However, a thing cannot appear multiple times in the same group. The service allows you to create an empty thing group.

Note

Using a single POST method, you can create a thing group with less than 1000 things. You can only add those things for which you have authorized access.

Request

URI: /ThingGroup/v1/ThingGroup

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <tg>.c

Request Example

/ThingGroup/v1/ThingGroup

Payload

Format: *JSON*

Media types supported are [JSON](#) and [XML](#). The [JSON](#) structure for this method has the following structure.

```
{
  "Name": "ABCCarGroup",
  "ExternalID": "ABCCarGroup",
  "ThingGroupElements": [{
    "ThingID": "503B8711B5D0445688E7FF7ACFC2177A"
  },
  {
    "ThingID": "908758D995094A6F9CC72FC9C18BC366"
  }
],
  "ThingGroupDescriptions": [{
    "LanguageCode": "en",
    "Description": "Group of ABC Car Things"
  }, {
    "LanguageCode": "de",
    "Description": "Gruppe von ABC Car Things"
  }]
}
```

Response

Response Status and Error Codes

Code	Description
201	Thing group created successfully

Response Payload Example

```
{
  "d": {
    "__metadata": {
      "id": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "uri": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.appiot.ThingGroup"
    },
    "GroupID": "3E930040F5E3F8021600B10200CB288F"
  }
}
```

Related Information

[Thing Group \[page 870\]](#)

13.5.1.3 Read a Thing Group

Retrieves details of a thing group

With this service, you can retrieve the list of things that are part of the specified thing group. If you retrieve an empty group along with the `$expand` query parameter, the service only retrieves the group details.

Request

URI: `/ThingGroup/v1/ThingGroups('<thing group ID>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<tg>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
GroupId	Yes	String	Unique identifier of the thing group	Path

Request Query Parameters

Parameter	Required	Data Type	Description
\$expand	No	String	Includes the related resources inline while retrieving the requested resources. Supported associations of thing group that can be retrieved using <code>\$expand</code> are thing group elements and thing group description.
\$filter	No	String	Filter condition to be applied; all fields in the result set are valid.
\$format	No	String	Format to be applied on the result set.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.

Request Example

`/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')`

Response

Response Status and Error Codes

Code	Description
200	Thing group details retrieved successfully

Payload

Format: *JSON*

Media type supported are *JSON* and *XML*. The *JSON* for this method has the following structure.

Example 1

```
/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')
```

Retrieves the list of things in the group 3E930040F5E3F8021600B10200CB288F

```
{
  "d": {
    "__metadata": {
      "id": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "uri": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.appiot.ThingGroup"
    },
    "GroupID": "3E930040F5E3F8021600B10200CB288F",
    "Name": "ABCCarGroup",
    "Description": null,
    "ExternalID": "ABCCarGroup",
    "ThingGroupElements": {
      "__deferred": {
        "uri": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')/ThingGroupElements"
      }
    },
    "ThingGroupDescriptions": {
      "__deferred": {
        "uri": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
      }
    }
  }
}
```

Example 2

```
/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')?
```

```
$expand=ThingGroupDescriptions,ThingGroupElements
```

Retrieves the list of things in the group ABCGroup along with the thing group description and thing group elements

```
{
```

```

    "d": {
      "__metadata": {
        "id": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
        "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
        "type": "com.sap.apiot.ThingGroup"
      },
      "GroupID": "3E930040F5E3F8021600B10200CB288F",
      "Name": "ABCCarGroup",
      "Description": "Group of ABC Car Things",
      "ExternalID": "ABCCarGroup",
      "ThingGroupElements": {
        "results": [
          {
            "GroupID": "3E930040F5E3F8021600B10200CB288F",
            "ThingID": "503B8711B5D0445688E7FF7ACFC2177A",
            "ThingAlternateID": null,
            "ThingName": "ABCXSeries",
            "ThingDescription": "ABC X Series",
            "Operation": null
          },
          {
            "GroupID": "3E930040F5E3F8021600B10200CB288F",
            "ThingID": "908758D995094A6F9CC72FC9C18BC366",
            "ThingAlternateID": null,
            "ThingName": "ABCZSeries",
            "ThingDescription": "ABC Z Series",
            "Operation": null
          }
        ]
      },
      "ThingGroupDescriptions": {
        "results": [
          {
            "LanguageCode": "en",
            "Description": "Group of ABC Car Things"
          },
          {
            "LanguageCode": "de",
            "Description": "Gruppe von ABC Car Things"
          }
        ]
      }
    }
  }
}

```

Example 3

```

/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')?
$expand=ThingGroupElements

```

Retrieves the list of things in the group 3E930040F5E3F8021600B10200CB288F along with the thing group elements

```

{
  "d": {
    "__metadata": {
      "id": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.apiot.ThingGroup"
    },
    "GroupID": "3E930040F5E3F8021600B10200CB288F",
    "Name": "ABCCarGroup",

```

```

    "Description": "Group of ABC Car Things",
    "ExternalID": "ABCCarGroup",
    "ThingGroupElements": {
      "results": [
        {
          "GroupID": "3E930040F5E3F8021600B10200CB288F",
          "ThingID": "503B8711B5D0445688E7FF7ACFC2177A",
          "ThingAlternateID": null,
          "ThingName": "ABCXSeries",
          "ThingDescription": "ABC X Series",
          "Operation": null
        },
        {
          "GroupID": "3E930040F5E3F8021600B10200CB288F",
          "ThingID": "908758D995094A6F9CC72FC9C18BC366",
          "ThingAlternateID": null,
          "ThingName": "AB CZSeries",
          "ThingDescription": "ABC Z Series",
          "Operation": null
        }
      ]
    },
    "ThingGroupDescriptions": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('3E930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
      }
    }
  }
}

```

Example 4

```

/ThingGroup/v1/ThingGroups('56930040F5E3F8021600B10200CB288F')?
$expand=ThingGroupElements

```

The group 56930040F5E3F8021600B10200CB288F is an empty group and result is as follows:

```

{
  "d": {
    "__metadata": {
      "id": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:
443/ThingGroup/v1/ThingGroup('56930040F5E3F8021600B10200CB288F')",
      "uri": "https://appiot-thing-group-ci.cfapps.sap.hana.ondemand.com:
443/ThingGroup/v1/ThingGroup('56930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.appiot.ThingGroup"
    },
    "GroupID": "56930040F5E3F8021600B10200CB288F",
    "Name": "EmptyGroup",
    "Description": null,
    "ExternalID": "EmptyGroup",
    "ThingGroupElements": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')/ThingGroupElements"
      }
    },
    "ThingGroupDescriptions": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
      }
    }
  }
}

```

```
}
```

Related Information

[Thing Group \[page 870\]](#)

13.5.1.4 Read all Thing Groups

With this service, you can retrieve all thing groups to which the user has access.

In addition, you can retrieve a subset of all thing groups, according to the filter criteria provided. For a collective request for a set of thing groups, you have these options:

- You can restrict the set of thing groups to be retrieved by filter criteria based on the fields available in the response.
- You can define that the set of matching thing groups shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ThingGroup/v1/ThingGroups`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<tg>.r`

Request Query Parameters

Parameter	Required	Data Type	Description
<code>\$filter</code>	No	String	Filter condition to be applied; all fields in the result set are valid.

Parameter	Required	Data Type	Description
\$inlinecount	No	String	Total number of groups available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of groups available. • If you use this with the \$filter parameter, the result contains the total count of groups based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all fields in the result set are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$skip	No	Integer	Number of records to exclude from the result set.
\$top	No	Integer	Number of records to include in the result set.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.
\$skiptoken	No	Integer	Identifies a starting point in the collection of entities identified by the URI containing the \$skiptoken parameter.
\$format	No	Integer	Format to be applied on the result set. For example, json or xml .

Request Example

/ThingGroup/v1/ThingGroups

Response

Response Status and Error Codes

Code	Description
200	Details of all thing groups retrieved successfully

Payload

Format: *JSON*

Media type supported are *JSON* and *XML*. The *JSON* for this method has the following structure.

Example 1

/ThingGroup/v1/ThingGroups

Retrieves details of all thing groups

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
          "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')",
          "type": "com.sap.appiot.ThingGroup"
        },
        "GroupID": "3E930040F5E3F8021600B10200CB288F",
        "Name": "ABCCarGroup",
        "Description": "Group of ABC Car Things",
        "ExternalID": "ABCCarGroup",
        "ThingGroupElements": {
          "__deferred": {
            "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')/ThingGroupElements"
          }
        },
        "ThingGroupDescriptions": {
          "__deferred": {
            "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('3E930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('45930040F5E3F8021600B10200CB288F')",
          "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroup('45930040F5E3F8021600B10200CB288F')",
          "type": "com.sap.appiot.ThingGroup"
        }
      }
    ]
  }
}
```

```

    },
    "GroupID": "45930040F5E3F8021600B10200CB288F",
    "Name": "ABC2SCarGroup",
    "Description": "Group of ABC2S Car Things",
    "ExternalID": "ABC2SCarGroup",
    "ThingGroupElements": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('45930040F5E3F8021600B10200CB288F')/ThingGroupElements"
      }
    },
    "ThingGroupDescriptions": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('45930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
      }
    }
  }, {
    "__metadata": {
      "id": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')",
      "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.appiot.ThingGroup"
    },
    "GroupID": "56930040F5E3F8021600B10200CB288F",
    "Name": "EmptyGroup",
    "Description": "Group of Empty Car Things",
    "ExternalID": "EmptyGroup",
    "ThingGroupElements": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')/ThingGroupElements"
      }
    },
    "ThingGroupDescriptions": {
      "__deferred": {
        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroup('56930040F5E3F8021600B10200CB288F')/ThingGroupDescriptions"
      }
    }
  }
]
}
}

```

Related Information

[Thing Group \[page 870\]](#)

13.5.1.5 Delete Thing Group

With this service, you can delete a thing group with a specific thing group ID.

The ETag value is mandatory to delete a thing group. You must retrieve the ETag value of the thing group using the GET (/ThingGroup/v1/ThingGroups('<thing group ID>')) service. The ETag value is assigned to the request header parameter If-Match in the DELETE request. If you do not include the ETag value in the request header, the server sends HTTP response code 428. If the ETag value is not correct, the server sends HTTP response code 412 .

Request

URI: /ThingGroup/v1/ThingGroups('<thing group ID>')

Operation Type: CRUD

HTTP Method: [DELETE](#)

Permissions: <tg>.d

Request Header Parameters

Parameter	Required	Values
Accept-Language	No	Language of the thing type description. The default language is en.
If-Match	Yes	Latest ETag value of a specific thing group that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
GroupID	Yes	String	Unique identifier of the thing group	Path

Request Example

/ThingGroup/v1/ThingGroups('50930040F5E3F8021600B10200CB288F')

Response

Response Status and Error Codes

Code	Description
204	Thing group deleted successfully

Related Information

[Thing Group \[page 870\]](#)

13.5.1.6 Update Thing Group

With this service, you can add new things to the specified thing group or delete the existing things from the specified thing group.

The `ETag` value is mandatory to update a thing group. You must retrieve the `ETag` value of the thing group using the `GET (/ThingGroup/v1/ThingGroups ('<thing group ID>'))` service. The `ETag` value is assigned to the request header parameter `If-Match` in the `PATCH` request. If you do not include the `ETag` value in the request header, the server sends HTTP response code 428. If the `ETag` value is not correct, the server sends HTTP response code 412 .

You can update the name of the thing group, add new things or delete the already existing things, add new descriptions in supported languages, and change the existing descriptions. The valid operations are `ADD` and `DELETE`.

Request

URI: `/v1/ThingGroups ('<thing group ID>')`

Operation Type: `CRUD`

HTTP Method: `PATCH`

Permissions: `<tg>.u`

Request Header Parameters

Parameter	Required	Values
<code>Accept-Language</code>	No	Language of the thing type description. The default language is <code>en</code> .
<code>If-Match</code>	Yes	Latest <code>ETag</code> value of a specific thing group that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>thing group ID</code>	Yes	String	Unique identifier of the thing group	Path

Request Example

`/ThingGroup/v1/ThingGroups ('ABCGroup')`

Payload

Format: `JSON`

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "Name": "ABCCarGroup",
  "ExternalID": "ABCCarGroup",
  "ThingGroupElements": [{
    "ThingID": "9FA169A380FC4A959B234D717E9C50A0",
    "Operation": "ADD"
  }, {
    "ThingID": "908758D995094A6F9CC72FC9C18BC366",
    "Operation": "DELETE"
  }],
  "ThingGroupDescriptions": [{
    "LanguageCode": "en",
    "Description": "Group of ABC Car Things"
  }, {
    "LanguageCode": "de",
    "Description": "Gruppe von ABC Car Things"
  }]
}
```

Response

Response Status and Error Codes

Code	Description
204	Thing group updated successfully

Related Information

[Thing Group \[page 870\]](#)

13.5.2 Thing Group Element

Represents one or more elements of an individual thing group

Resource Path: `http://<server address>[:<port number>]/ThingGroup/v1/ThingGroupElements`

Operations

CRUD Operations

HTTP Method	Operation	URI
<i>GET</i>	Read Thing Group Elements [page 889]	/v1/ThingGroupElements

Thing Group Element Properties

Parameter	Data Type	Maximum Length	Description
GroupID	String	32	Unique identifier of the thing group generated by the system
ThingID	String	32	Unique identifier of the thing generated by the system
ThingName	String	255	Name of the thing
ThingDescription	String	255	Description of the thing
ThingAlternateID	String	255	Thing identifier which is unique only within a specific tenant. You cannot change the alternate thing ID.

Related Information

[Grouping of Things \[page 869\]](#)

[Read Thing Group Elements \[page 889\]](#)

13.5.2.1 Read Thing Group Elements

With this service, you can retrieve all thing group elements.

Request

URI: /v1/ThingGroupElements

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <tg>.r

Request Example

```
/v1/ThingGroupElements
```

Response

Response Status and Error Codes

Code	Description
200	Thing group elements retrieved successfully

Payload

Format *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='3E930040F5E3F8021600B10200CB288F',ThingID='503B8711B5
D0445688E7FF7ACFC2177A')",
          "uri": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='3E930040F5E3F8021600B10200CB288F',ThingID='503B8711B5
D0445688E7FF7ACFC2177A')",
          "type": "com.sap.appiot.ThingGroupElement"
        },
        "GroupID": "3E930040F5E3F8021600B10200CB288F",
        "ThingID": "503B8711B5D0445688E7FF7ACFC2177A",
        "ThingAlternateID": null,
        "ThingName": "ABCXSeries",
        "ThingDescription": "ABC X Series",
        "Operation": null
      },
      {
        "__metadata": {
          "id": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='3E930040F5E3F8021600B10200CB288F',ThingID='908758D995
094A6F9CC72FC9C18BC366')",
          "uri": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='3E930040F5E3F8021600B10200CB288F',ThingID='908758D995
094A6F9CC72FC9C18BC366')",
          "type": "com.sap.appiot.ThingGroupElement"
        },
        "GroupID": "3E930040F5E3F8021600B10200CB288F",
        "ThingID": "908758D995094A6F9CC72FC9C18BC366",
        "ThingAlternateID": null,
        "ThingName": "ABCZSeries",
        "ThingDescription": "ABC Z Series",
        "Operation": null
      },
      {
        "__metadata": {
          "id": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='45930040F5E3F8021600B10200CB288F',ThingID='22BCCAFA99
7F4C94BE337962A9FE6FFE')",
          "uri": "https://apiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='45930040F5E3F8021600B10200CB288F',ThingID='22BCCAFA99
7F4C94BE337962A9FE6FFE')",
          "type": "com.sap.appiot.ThingGroupElement"
        },
        "GroupID": "45930040F5E3F8021600B10200CB288F",
        "ThingID": "22BCCAFA997F4C94BE337962A9FE6FFE",
        "ThingAlternateID": null,
        "ThingName": "ABCDSeries",
        "ThingDescription": "ABC D Series",
        "Operation": null
      }
    ]
  }
}
```



```

        "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='45930040F5E3F8021600B10200CB288F',ThingID='22BCCAFA99
7F4C94BE337962A9FE6FFE')",
        "type": "com.sap.appiot.ThingGroupElement"
    },
    {
        "GroupID": "45930040F5E3F8021600B10200CB288F",
        "ThingID": "22BCCAFA997F4C94BE337962A9FE6FFE",
        "ThingAlternateID": null,
        "ThingName": "ABC2Series",
        "ThingDescription": "ABC 2 Series",
        "Operation": null
    },
    {
        "__metadata": {
            "id": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='45930040F5E3F8021600B10200CB288F',ThingID='282BD6F44C
994307A910066FB50203A8')",
            "uri": "https://appiot-thing-group-
ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/
ThingGroupElements(GroupID='45930040F5E3F8021600B10200CB288F',ThingID='282BD6F44C
994307A910066FB50203A8')",
            "type": "com.sap.appiot.ThingGroupElement"
        },
        "GroupID": "45930040F5E3F8021600B10200CB288F",
        "ThingID": "282BD6F44C994307A910066FB50203A8",
        "ThingAlternateID": null,
        "ThingName": "ABC2sSeries",
        "ThingDescription": "ABC 2s Series",
        "Operation": null
    }
]
}
}

```

Related Information

[Thing Group Element \[page 888\]](#)

13.5.3 Thing Group Description

Represents a thing group description

Request

URI: `http://<server address>[:<port number>]/ThingGroup/v1/ThingGroups('<thing ID>')?
$expand=ThingGroupDescriptions`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <tg>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
GroupID	Yes	String	Unique identifier of the thing group	Path

Response

Response Status and Error Codes

Code	Description
200	Thing group description retrieved successfully

Payload

Format *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure

/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')?
\$expand=ThingGroupDescriptions

```
{
  "d": {
    "__metadata": {
      "id": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')",
      "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')",
      "type": "com.sap.apiot.ThingGroup"
    },
    "GroupID": "3E930040F5E3F8021600B10200CB288F",
    "Name": "ABCCarGroup",
    "Description": null,
    "ExternalID": "ABCCarGroup",
    "ThingGroupElements": {
      "__deferred": {
        "uri": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com:443/ThingGroup/v1/ThingGroups('3E930040F5E3F8021600B10200CB288F')/ThingGroupElements"
      }
    },
    "ThingGroupDescriptions": {
      "results": [
        {
          "LanguageCode": "en",
          "Description": "Group of ABC Car Things"
        },
        {
          "LanguageCode": "de",
          "Description": "Gruppe von ABC Car Things"
        }
      ]
    }
  }
}
```

```
}  
  }  
}
```

Related Information

[Thing Group \[page 870\]](#)

13.6 Association of Things

Overview

You can associate one or more thing instances to another thing instance. This is only possible if an association already exists between the thing types of these thing instances. For example, the thing type **Truck** has an association with the thing type **Car** and the relationship is `HAS_A`. Based on this thing type association, you can associate the thing instances of thing types **Truck** and **Car**.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>][/path]/ThingAssociation`

Example for a base URI in a cloud foundry environment: `https://thing-associations-sap.cfapps.eu10.hana.ondemand.com/ThingAssociation`

Service Metadata URI: `https://thing-associations-sap.cfapps.eu10.hana.ondemand.com/ThingAssociation/v1/$metadata`

Operations

HTTP Method	Action	URI	Scopes
GET	Read Metadata of Thing Association [page 895]	<code>/ThingAssociation/v1/\$metadata</code>	<code><thing>.r</code>
POST	Create Thing Association [page 898]	<code>/ThingAssociation/v1/Thing('<thing ID>')/Associations</code>	<code><thing>.c</code>
GET	Read All Associations of a Thing [page 900]	<code>/ThingAssociation/v1/Thing('<thing ID>')/Associations</code>	<code><thing>.r</code>

HTTP Method	Action	URI	Scopes
GET	Read Details of a Thing Association [page 903]	/ThingAssociation/v1/ Associations ('<association ID>')	<thing>.r
DELETE	Delete Association of a Thing [page 905]	/ThingAssociation/v1/ Associations ('<association ID>')	<thing>.d

Thing Association Object Properties

Property	Type	Mandatory	Maximum Length	Description
AssociatedThingId	String	Yes	32	Unique identifier of the associated thing
Description	String	No	60	Description of the thing association for each language with the corresponding ISO language code
Relationship	String	Yes	50	Type of relationship between the primary thing and the associated thing
ExpiryTime	TimeStamp	No	50	Time after which the association between the things becomes invalid
PrimaryThingID	String	No	60	Unique identifier of the primary thing to which other things are associated
CreationTime	TimeStamp	No	60	Time when the association is created, which is the current time
AssociationId	String	No	32	Unique identifier of the thing association

Thing Association Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description

Property	Data Type	Maximum Length	Description
Description	String	60	Description of the object

13.6.1 Read Metadata of Thing Association

With this service, you can retrieve the metadata of thing association.

Request

URI: `/ThingAssociation/v1/$metadata`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Example

`/ThingAssociation/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Metadata of thing association retrieved successfully

Payload

Format: [XML](#)

```
<?xml version="1.0" ?>
<edmx:Edmx Version="1.0" xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Schema Namespace="com.sap.apptot" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
      <EntityType Name="Thing">
        <Documentation>
          <Summary>Things which the user can have access to</Summary>
        </Documentation>
      </EntityType>
    </Schema>
  </DataServices>
</edmx:Edmx>
```

```

        <Key>
          <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String" Nullable="false"
MaxLength="60" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Details of the Thing Id</Summary>
          </Documentation>
        </Property>
        <NavigationProperty Name="Associations"
Relationship="com.sap.apiot.ThingsToThingAssociation" FromRole="Thing"
ToRole="Association"></NavigationProperty>
      </EntityType>
      <EntityType Name="Association">
        <Documentation>
          <Summary>Details of Association type entity</Summary>
        </Documentation>
        <Key>
          <PropertyRef Name="AssociationId"></PropertyRef>
        </Key>
        <Property Name="AssociationId" Type="Edm.String"
Nullable="false" MaxLength="60" sap:creatable="true" sap:updatable="false">
          <Documentation>
            <Summary>Details of the AssociationId</Summary>
          </Documentation>
        </Property>
        <Property Name="PrimaryThingId" Type="Edm.String"
Nullable="true" MaxLength="60" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Primary Thing Id. This is the primary entity in
the association</Summary>
          </Documentation>
        </Property>
        <Property Name="AssociatedThingId" Type="Edm.String"
Nullable="true" MaxLength="60" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Associated Thing Id. This is the secondary
entity in the association</Summary>
          </Documentation>
        </Property>
        <Property Name="Relationship" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="true">
          <Documentation>
            <Summary>Relation type of the things (Ex: IS-A, HAS-A,
USES-A, IS-PART-OF)</Summary>
          </Documentation>
        </Property>
        <Property Name="ExpiryTime" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="true">
          <Documentation>
            <Summary>Expiry time of the association between things</
Summary>
          </Documentation>
        </Property>
        <Property Name="CreationTime" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="false" sap:updatable="true">
          <Documentation>
            <Summary>Creation time of the association</Summary>
          </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="true" sap:updatable="true">
          <Documentation>
            <Summary>Description of package entity</Summary>
          </Documentation>
        </Property>

```

```

        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.ThingAssociationToDescriptionAssociation"
FromRole="ThingAssociation" ToRole="Description"></NavigationProperty>
    </EntityType>
    <EntityType Name="Description">
        <Documentation>
            <Summary>Details of description type entity</Summary>
        </Documentation>
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String" Nullable="false"
MaxLength="2" sap:creatable="true" sap:updatable="false">
            <Documentation>
                <Summary>Language code of description</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="60" sap:creatable="true" sap:updatable="true">
            <Documentation>
                <Summary>Description of package entity</Summary>
                <LongDescription>Long description of description entity</
LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <Association Name="ThingsToThingAssociation">
        <End Type="com.sap.appiot.Thing" Multiplicity="1" Role="Thing"></
End>
        <End Type="com.sap.appiot.Association" Multiplicity="*"
Role="Association"></End>
    </Association>
    <Association Name="ThingAssociationToDescriptionAssociation">
        <End Type="com.sap.appiot.Association" Multiplicity="1"
Role="ThingAssociation"></End>
        <End Type="com.sap.appiot.Description" Multiplicity="*"
Role="Description"></End>
    </Association>
    <EntityContainer Name="ThingAssociationContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Things" EntityType="com.sap.appiot.Thing">
            <Documentation>
                <Summary>Things which the user can have access to</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Associations"
EntityType="com.sap.appiot.Association">
            <Documentation>
                <Summary>Details of association set type</Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.Description">
            <Documentation>
                <Summary>Details of description set type</Summary>
            </Documentation>
        </EntitySet>
        <AssociationSet Name="ThingsToThingAssociation"
Association="com.sap.appiot.ThingsToThingAssociation">
            <End EntitySet="Things" Role="Thing"></End>
            <End EntitySet="Associations" Role="Association"></End>
        </AssociationSet>
        <AssociationSet Name="ThingAssociationToDescriptionAssociation"
Association="com.sap.appiot.ThingAssociationToDescriptionAssociation">
            <End EntitySet="Associations" Role="ThingAssociation"></End>
            <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>

```

```
</EntityContainer>
</Schema>
</edmx:DataServices>
</edmx:Edmx>
```

13.6.2 Create Thing Association

With this service, you can create association between valid thing instances.

The expiry time of the thing association must be greater than the current date and less than the expiry time defined for the corresponding thing type association.

Note

You can associate any number of things to the primary thing, if the corresponding thing types are already associated. However, you can associate only one thing with the primary thing per `POST` request. You can associate more things with the primary thing through multiple `POST` requests.

Request

URI: `/ThingAssociation/v1/Thing('<thing ID>')/Associations`

Operation Type: CRUD

HTTP Method: `POST`

Permissions: `<thing>.c`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingID	Yes	String	Unique identifier of the thing	Path

Request Example

`/ThingAssociation/v1/Thing('B36C9F7192954DA9A46AD50DDA521B13')/Associations`

Payload

Format: `JSON`

```
{
  "AssociatedThingId": "4B90908372BB4648BEA1EFDD56B0819C",
  "Descriptions": [
    {
      "languageCode": "en",
      "description": "association between Truck thing and ABCXSeries thing"
    }
  ]
}
```



```

    }
  ],
  "Relationship": "HAS A",
  "ExpiryTime": "2018-04-16T08:26:56.229Z"
}

```

Response

Response Status and Error Codes

Code	Description
201	Thing association created successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

The following is the response payload after creating the thing type association.

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')",
          "uri": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')",
          "type": "com.sap.apptot.Association"
        },
        "AssociationId": "CF42E985C3104789BD128CBC8A6B996B",
        "PrimaryThingId": "B36C9F7192954DA9A46AD50DDA521B13",
        "AssociatedThingId": "4B90908372BB4648BEA1EFDD56B0819C",
        "Relationship": "HAS A",
        "ExpiryTime": "2018-04-16T08:26:56.229Z",
        "CreationTime": "2017-12-12T10:31:12.581Z",
        "Description": "association between Truck thing and ABCXSeries
thing",
        "Descriptions": {
          "__deferred": {
            "uri": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')/Descriptions"
          }
        }
      }
    ]
  }
}

```

Related Information

[Association of Things \[page 893\]](#)

13.6.3 Read All Associations of a Thing

With this service, you can retrieve all the associated things for the specified thing.

Request

URI: `/ThingAssociation/v1/Thing('<thing ID>')/Associations`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingID	Yes	String	Unique identifier of the thing	Path

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Type	Description
\$inlinecount	No	String	Total number of thing types available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$stop and \$skip parameters, the result contains the total count of thing types available. • If you use this with \$filter parameter, the result contains the total count of thing types based on the defined filter condition.
\$filter	No	String	Filter condition to be applied; the only valid fields are AssociatedThingId, Relationship, and AssociationId. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the <i>AND</i> separator. You can use the string functions such as <i>substringof</i>, <i>startswith</i>, and <i>endswith</i> to search data using \$filter. Valid fields are AssociatedThingId, Relationship, and AssociationId.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are PrimaryThingId, AssociationId, AssociatedThingId, CreationTime, Relationship, and ExpiryTime.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are <code>AssociatedThingId</code> , <code>AssociationId</code> , and <code>Relationship</code> . To sort the result set, use asc for the ascending order and desc for the descending order.

Request Example

```
/ThingAssociation/v1/Thing('B36C9F7192954DA9A46AD50DDA521B13')/Associations
```

Response

Response Status and Error Codes

Code	Description
200	Associated things of the specified thing retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

```
/ThingAssociation/v1/Thing('B36C9F7192954DA9A46AD50DDA521B13')/Associations
```

Retrieves all the associated things of the thing B36C9F7192954DA9A46AD50DDA521B13.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('F31184188A294A2E8BD769564DC4E049')",
          "uri": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('F31184188A294A2E8BD769564DC4E049')",
          "type": "com.sap.apptot.Association"
        },
        "AssociationId": "F31184188A294A2E8BD769564DC4E049",
        "PrimaryThingId": "B36C9F7192954DA9A46AD50DDA521B13",
        "AssociatedThingId": "4B90908372BB4648BEA1EFDD56B0819C",

```

```

        "Relationship": "IS A",
        "ExpiryTime": "2018-10-16T08:26:56.000Z",
        "CreationTime": "2017-12-12T10:23:57.000Z",
        "Description": "association between Truck thing and ABC2Series
thing",
        "Descriptions": {
            "__deferred": {
                "uri": "https://thing-associations-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/
Associations('F31184188A294A2E8BD769564DC4E049')/Descriptions"
            }
        },
        {
            "__metadata": {
                "id": "https://thing-associations-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/
Associations('CF42E985C3104789BD128CBC8A6B996B')",
                "uri": "https://thing-associations-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/
Associations('CF42E985C3104789BD128CBC8A6B996B')",
                "type": "com.sap.apptot.Association"
            },
            "AssociationId": "CF42E985C3104789BD128CBC8A6B996B",
            "PrimaryThingId": "B36C9F7192954DA9A46AD50DDA521B13",
            "AssociatedThingId": "4B90908372BB4648BEA1EFDD56B0819C",
            "Relationship": "HAS A",
            "ExpiryTime": "2018-04-16T08:26:56.229Z",
            "CreationTime": "2017-12-12T10:31:12.581Z",
            "Description": "association between Truck thing and ABCXSeries
thing",
            "Descriptions": {
                "__deferred": {
                    "uri": "https://thing-associations-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/
Associations('CF42E985C3104789BD128CBC8A6B996B')/Descriptions"
                }
            }
        }
    ]
}

```

Related Information

[Association of Things \[page 893\]](#)

13.6.4 Read Details of a Thing Association

With this service, you can retrieve the details of a thing association with a specific association ID.

Request

URI: /ThingAssociation/v1/Associations('<association ID>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thing>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
AssociationId	Yes	String	Unique identifier of the thing association	Path

Request Example

/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')

Response

Response Status and Error Codes

Code	Description
200	Details of a specific thing association retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')

Retrieves the association details with the association ID 'CF42E985C3104789BD128CBC8A6B996B'.

```
{
  "d": {
    "__metadata": {
      "id": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')",
      "uri": "https://thing-associations-sap-ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')",
      "type": "com.sap.apptot.Association"
    },
    "AssociationId": "CF42E985C3104789BD128CBC8A6B996B",
    "PrimaryThingId": "B36C9F7192954DA9A46AD50DDA521B13",
    "AssociatedThingId": "4B90908372BB4648BEA1EFDD56B0819C",
    "Relationship": "HAS A",
    "ExpiryTime": "2018-04-16T08:26:56.229Z",
    "CreationTime": "2017-12-12T10:31:12.581Z",
    "Description": "association between Truck thing and ABCXSeries thing",
    "Descriptions": {
      "__deferred": {
```

```

        "uri": "https://thing-associations-sap-
ci.cfapps.sap.hana.ondemand.com:443/ThingAssociation/v1/
Associations('CF42E985C3104789BD128CBC8A6B996B')/Descriptions"
    }
}
}
}

```

Related Information

[Association of Things \[page 893\]](#)

13.6.5 Delete Association of a Thing

With this service, you can delete a thing association with a specific association ID.

The **ETag** value is mandatory to delete a thing association. You must retrieve the **ETag** value of the thing association using the GET (/ThingAssociation/v1/Associations('<association ID>')) service. The **ETag** value is assigned to the request header parameter **If-Match** in the DELETE request. If you do not include the **ETag** value in the request header, the server sends HTTP response code 428. If the **ETag** value is not correct, the server sends HTTP response code 412.

Request

URI: /ThingAssociation/v1/Associations('<association ID>')

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <thing>.d

Request Headers

Header	Required	Values
If-Match	Yes	Latest ETag value of a specific thing association.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
AssociationId	Yes	String	Unique identifier of the thing association	Path

Request Example

/ThingAssociation/v1/Associations('CF42E985C3104789BD128CBC8A6B996B')

Response

Response Status and Error Codes

Code	Description
204	Association between things with a specific association ID is deleted successfully

Related Information

[Association of Things \[page 893\]](#)

13.7 Read Version Information of Thing Service

This service is used to retrieve the version information of the thing service.

Request

URI: `/Version`

HTTP Method: `GET`

Permissions:

`<thing>.r`

Request Example

```
/Version
```

Response

Format: `JSON`

Response Status and Error Codes

Code	Description
200	Version information retrieved successfully.

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "version" : "1.10"
}
```

13.8 HTTP Status Codes for Thing Services

List of status codes for thing services

In the following table, you find the list of HTTP status codes that are used by the thing services:

Post (Create)	Post (Update)	Put	Delete	Get (single value)	Get (collection)	Description
201	200	200	204	200	200	Success
403	404	404	404	404	200	No capabilities assigned.
201	404	200	404	404	200	Read capability not assigned to read a specific thing. However, the user is assigned with the capabilities to perform operations such as create, update, and delete.

i Note

For the **Delete Time Series Data** service, the system displays 204 as HTTP status code.

Post (Create)	Post (Update)	Put	Delete	Get (single value)	Get (collection)	Description
403	404	404	404	200	200	Read capability assigned to read a specific thing. However, the user is not assigned with capabilities to perform operations such as create, update, and delete.
n/a	404	404	404	404	n/a	Not found The requested thing is not found.
403	403	403	403	403	403	Forbidden (scope(s) not assigned for the user)
400	400	400	400	400	400	Bad request (for example: header field missing, wrong filter, validation failed)
500	500	500	500	500	500	Internal server error

14 Thing: Master Data and Parameters Data

Data specific to a thing

After creating a thing instance of a specific thing type, you can use the thing services to create, retrieve, and delete property data of things. The services explained in this section only support property data of data categories **MasterData** and **Parameters**.

Base URI

- **Formal description:** `http://<server address>[:<port number>][/path]/Things`
- **Example for a base URI in a cloud foundry environment:** `https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things`

Methods

HTTP Method	Action	URI	Scopes
<i>PUT</i>	Create Data for a Thing [page 914]	<code>/Things('<thing ID>')/<thing type name>/<property set ID></code>	<code><thing>.c</code>
<i>GET</i>	Read Data for a Thing [page 918]	<code>/Things('<thing ID>')/<thing type name>/<property set ID></code>	<code><thing>.r</code>
<i>DELETE</i>	Delete Data for a Thing [page 922]	<code>/URL/Things('<thing ID>') /<property set ID>?timerange=<From time>- <To time> (OR) <Thing Application>/URL/Things('<thingID>')/<property set ID>?timerange=<1H, 1D, 1W, 1M></code>	<code><thing>.d</code>
<i>GET</i>	Read Metadata for a Thing [page 909]	<code>/Things('<thing ID>') / Configuration</code>	
<i>GET</i>	Read Property Set Data [page 923]	<code>/Things/ PropertySet/<property set type name></code>	<code><thing>.r</code>

14.1 Read Metadata for a Thing

Retrieves metadata for a thing

With this service, you can retrieve metadata for a specified thing.

Request

URI: `/Things('<ID>')/Configuration`

HTTP Method: [GET](#)

Request Headers

Header	Required	Values
Accept-Language	No	Language of the thing type description. The default language is EN .
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the un-compressed response.

Request Parameter

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.

Request Example

```
/Things('<ID>')/Configuration
```

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
Value	Array of thing type objects	Array of thing type objects returned.
propertySets	Array of property set objects	Array of property set objects (that belong to the property set type) returned.

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "thingTypes": [{
    "name": "core.automobiles:ABC2Series",
    "description": {
      "en": "ABC2Series electric car"
    },
    "propertyTypes": [{
      "id": "engine",
      "description": {
        "en": "Engine Usage"
      },
      "propertySetType": "core.automobiles:Engine"
    }, {
      "id": "drive_fr",
      "description": {
        "en": "Drive Front Right"
      },
      "propertySetType": "core.automobiles:DriveUnit"
    }, {
      "id": "drive_fl",
      "description": {
        "en": "Drive Front Left"
      },
      "propertySetType": "core.automobiles:DriveUnit"
    }, {
      "id": "car",
      "description": {
        "en": "Car Usage"
      },
      "propertySetType": "core.automobiles:Car"
    }, {
      "id": "wheel_fr",
      "description": {
        "en": "Wheel Front Right"
      },
      "propertySetType": "core.automobiles:Wheel"
    }, {
      "id": "wheel_fl",
      "description": {
        "en": "Wheel Front Left"
      },
      "propertySetType": "core.automobiles:Wheel"
    }, {
      "id": "wheel_rr",
      "description": {
        "en": "Wheel Rear Right"
      },
      "propertySetType": "core.automobiles:Wheel"
    }, {
      "id": "wheel_rl",
      "description": {
        "en": "Wheel Rear Left"
      },
      "propertySetType": "core.automobiles:Wheel"
    }
  ]
}, {
  "propertySetTypes": [{
    "name": "core.automobiles:Car",
    "description": {
      "en": "Master Data for car"
    }
  }]
}]
```

```

    },
    "dataCategory": "MasterData",
    "propertyTypes": [{
      "value": {
        "id": "BodyStyle",
        "description": {
          "en": "Car Body Style"
        },
        "type": "String",
        "length": "127"
      }
    }, {
      "value": {
        "id": "Class",
        "description": {
          "en": "Car Class"
        },
        "type": "String",
        "length": "127"
      }
    }, {
      "value": {
        "id": "WheelBase",
        "description": {
          "en": "Car Wheel Base"
        },
        "type": "Numeric",
        "length": ""
      }
    }, {
      "value": {
        "id": "RegistrationNumber",
        "description": {
          "en": "Car Registration Number"
        },
        "type": "String",
        "length": "127"
      }
    }, {
      "value": {
        "id": "Colour",
        "description": {
          "en": "Car Colour"
        },
        "type": "String",
        "length": "127"
      }
    }
  ]
}, {
  "name": "core.automobiles:Wheel",
  "description": {
    "en": "Sensory parameters for wheel"
  },
  "dataCategory": "TimeSeriesData",
  "propertyTypes": [{
    "value": {
      "id": "Pressure",
      "description": {
        "en": "Wheel pressure"
      },
      "type": "Numeric",
      "length": "",
      "unitOfMeasure": "PA"
    }
  }, {
    "value": {
      "id": "Temperature",
      "description": {

```

```

        "en": "Wheel temperature"
      },
      "type": "Numeric",
      "length": ""
    }
  ]
}, {
  "name": "core.automobiles:DriveUnit",
  "description": {
    "en": "Sensory parameters for drive unit"
  },
  "dataCategory": "TimeSeriesData",
  "propertyTypes": [{
    "value": {
      "id": "RotationSpeed",
      "description": {
        "en": "Drive unit rotation speed"
      },
      "type": "Numeric",
      "length": ""
    }
  }, {
    "value": {
      "id": "PowerConsumption",
      "description": {
        "en": "Drive unit power consumption"
      },
      "type": "Numeric",
      "length": ""
    }
  ]
}, {
  "name": "core.automobiles:Engine",
  "description": {
    "en": "Sensory parameters for engine"
  },
  "dataCategory": "MasterData",
  "propertyTypes": [{
    "value": {
      "id": "Type",
      "description": {
        "en": "Engine type"
      },
      "type": "String",
      "length": "127"
    }
  }, {
    "value": {
      "id": "Capacity",
      "description": {
        "en": "Engine capacity"
      },
      "type": "Numeric",
      "length": "",
      "unitOfMeasure": "MM"
    }
  }, {
    "value": {
      "id": "Torque",
      "description": {
        "en": "Engine torque"
      },
      "type": "Numeric",
      "length": "",
      "unitOfMeasure": "NM"
    }
  }, {
    "value": {

```

```

        "id": "Transmission",
        "description": {
            "en": "Engine transmission"
        },
        "type": "String",
        "length": "254",
        "unitOfMeasure": ""
    }
}
}
}
}
}

```

14.2 Create Data for a Thing

With this service, you can create data for the property sets of a thing that belongs to a specific thing type. This service supports data creation for the property sets of data categories **MasterData** and **Parameters**.

Using this service, you can send the request payload in *JSON* format or as a binary file in *zip* or *gzip* format. You can use the binary file format when the request payload is large. The request payload in binary file format saves space and reduces the transfer time as its size is reduced after compression. The complete request payload must be compressed in a single binary file and you cannot split the request payload in multiple files.

Multiple Language Support for Data

You can create data for properties of data type *String* in multiple languages. To achieve this, when you create a property set type, you must define a field `IsMultiLingual=true` in the request payload.

Request

URI: `/Things('<ID>')/<thing type name>/<property set ID>`

Note

- The thing type must be a fully qualified name that is prefixed with the package name.
- The value of the *_time* property must correspond to UTC timestamp. If you do not specify the *_time* property, the system uses `utcnow()` value for the *_time* property, by default. However, if you are creating multiple records of data, the *_time* property is mandatory. Following are the supported formats:
 - `\Date(<ticks>)\<ticks>` = number of milliseconds since midnight Jan 1, 1970"
For example, `"\Date(1546322403148)/"`
 - `"YYYY-MM-DD HH:MM:SS[.fraction]"`
For example, `"2015-08-01T09:00:00.000Z"`

HTTP Method: *PUT*

Permissions: `<thing>.c`

Request Header Parameters

The following request header parameter is applicable only when you want to send the request payload in binary file format.

Header	Required	Values
content-Encoding	No	application/zip or application/gzip

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	String	Name of a thing type.
property set ID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('<thing ID>')/core.automobiles:ABCXSeries/car
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Data of category MasterData or Parameters for the specified thing created successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. In addition, you can encode the request payload in [JSON](#) format to [zip](#) or [gzip](#) file format using the request header parameter `content-Encoding`. The [JSON](#) for this method has the structure as illustrated in the following examples:

Example 1

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/car
```

The following request payload is used to create data for the property set `car`.

```
{
  "value": [
    {
      "_time": "2015-08-01T09:00:00Z",
      "BodyStyle": "Sedan",
      "Class": "1st",
      "WheelBase": "10",
      "RegistrationNumber": "007",
      "Colour": "Red"
    },
    {
      "_time": "2015-08-02T06:00:03Z",
      "BodyStyle": "SUV",
      "Class": "1st",
      "WheelBase": "15",
      "RegistrationNumber": "001",
      "Colour": "Black"
    }
  ]
}
```

Example 2

/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/carstyle

The following request payload is used to create data in multiple languages for the property `Color` of the property set `carstyle`.

Note

- If you do not specify the language code, the system considers the Locale specific language as the default language.
- Only the [JSON](#) format is supported to specify the data in multiple languages. If the data is not in [JSON](#) format, the system saves the data as a string in the [Locale](#) specific language for the property.
- In the following example, the string property `LicenseNumber` supports multiple languages but the data is not in [JSON](#) format. Hence, the data is saved as a string in the [Locale](#) specific language.

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Color": "{\"en\":\"Blue\",\"de\":\"Blau\"}",
    "Model": "ABC X Series Model",
    "ModelNumber": "10",
    "LicenseNumber": "ABC10"
  },
  {
    "_time": "2015-08-02T06:00:03Z",
    "Color": "{\"en\":\"White\",\"de\":\"Weiß\"}",
    "Model": "ABC X Series Model",
    "ModelNumber": "15",
    "LicenseNumber": "ABC15"
  },
  {
    "_time": "2015-09-02T06:00:03Z",
    "Color": "{\"en\":\"White\",\"de\":\"Weiß\"}",
    "Model": "ABC X Series Model",
    "ModelNumber": "25",
    "LicenseNumber": "ABC25"
  }
]
```

14.3 Create Data Using Alternate Thing ID

With this service, you can create data for the property sets of a thing that belongs to a specific thing type. You must provide the alternate thing ID in the request URL. This service supports data creation for the property sets of data categories [MasterData](#) and [Parameters](#).

Request

URI: `/ThingsByAlternateId('<alternate thing ID>')/<thing type name>/<property set ID>`

HTTP Method: [PUT](#)

Permissions: `<thing>.c`

Request Parameters

Parameter	Required	Data Type	Description
alternate thing ID	Yes	String	Alternate thing identifier unique within a specific tenant.
thing type name	Yes	String	Name of a thing type.
property set ID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

`/ThingsByAlternateId('ABCXSeries001-alternateId')/core.automobiles:ABCXSeries/car`

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "value": [
    {
      "time": "2015-08-01T09:00:00Z",
      "BodyStyle": "Sedan",
      "Class": "1st",
      "WheelBase": "10",
      "WheelBase_QC": "8",
      "RegistrationNumber": "007",
      "Colour": "Red"
    },
    {
      "time": "2015-08-02T06:00:03Z",
      "BodyStyle": "SUV",
      "Class": "1st",

```

```

    "WheelBase": "15",
    "WheelBase_QC": "9",
    "RegistrationNumber" : "001",
    "Colour": "Black"
  }
}

```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Data of category MasterData or Parameters for the specified thing created successfully

Related Information

[Create Data for a Thing \[page 914\]](#)

14.4 Read Data for a Thing

Retrieves property set data for the specified thing

With this service, you can read the values of property sets for the specified thing type. You can request the values for a specific time range. The service retrieves the values of property sets of data categories **MasterData** or **Parameters**.

Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

To avoid performance decline, the system in future versions will automatically limit collective GET requests to a maximum of 500 objects that can be retrieved with one single call.

Use of `$count` as well degrades performance. Hence, a use of `$count` must also be judiciously chosen.

Therefore, for use cases where it is crucial for you to ensure that objects more than 500 have to be retrieved, you need to use paging options such as `$top` and `$skip`.

Request

URI: /Things('<ID>')/<thing type name>/<property set ID>

Note

- The thing type has to be a fully qualified name that is prefixed with the package.
- If you do not specify a time range, the data that is available for the latest time value is retrieved.

HTTP Method: [GET](#)

Permissions:

<thing>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameter

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	string	Name of the thing type.
property set ID	Yes	string	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Type	Description
\$count	No	Boolean	Total number of time series objects available based on the current user's authorizations; permissible values are <i>true</i> and <i>false</i>. The following results apply, if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of time series objects available. • If you use this with \$filter parameter, the result contains the total count of time series objects based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are <i>_time</i> and all the property types. i Note Data types <i>JSON</i> and <i>ByteArray</i> are not supported. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are <i>_time</i> and all the property types. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. i Note Data types <i>JSON</i> and <i>ByteArray</i> are not supported.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are <i>_time</i> and all the property types.

Request Example

```
/Things('<ID>')/core.automobiles:ABCXSeries/car?timerange=10M
```

Retrieves the property set type car for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range of 10 months.

```
/Things('<ID>')/core.automobiles:ABCXSeries/car?timerange=10M&
$select=_time,BodyStyle
```

Retrieves the property set type car for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range of 10 months. However, with `$select` query parameter, only the fields `_time` and `BodyStyle` are displayed for the retrieved thing.

```
/Things('<ID>')/core.automobiles:ABCXSeries/car?  
timerange=2015-08-01T09:00:00Z-2015-10-01T09:00:00Z
```

Retrieves the property set type car for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range from August 1, 2015 to October 1, 2015.

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
value	Array of thing data objects	An array of data objects (for example, time series data) for a thing or property set type.

Response Status and Error Codes

Code	Description
200	Data for one or more things retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the structure as illustrated in the following examples:

Example 1

Retrieves data for the specified property set of a thing

```
{  
  "value": [  
    {  
      "BodyStyle": "Sedan",  
      "Class": "1st",  
      "WheelBase": "10",  
      "RegistrationNumber" : "007",  
      "Colour": "Red",  
      "_time": "2015-08-01T09:00:00.000Z"  
    },  
    {  
      "BodyStyle": "SUV",  
      "Class": "1st",  
      "WheelBase": "15",  
    }  
  ]  
}
```

```

        "RegistrationNumber" : "001",
        "Colour": "Black",
        "_time": "2015-08-02T06:00:03.000Z"
    }
}

```

Example 2

Retrieves data for the specified property set of a thing. Some of the string properties in this example supports multiple languages.

```

{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Color": "{ \"en\": \"Blue\", \"de\": \"Blau\" }",
    "Model": "ABC X Series Model",
    "ModelNumber": "10",
    "LicenseNumber": "{ \"en\": \"ABC10\" }"
  },
  {
    "_time": "2015-08-02T06:00:03Z",
    "Color": "{ \"en\": \"White\", \"de\": \"Weiß\" }",
    "Model": "ABC X Series Model",
    "ModelNumber": "15",
    "LicenseNumber": "{ \"en\": \"ABC10\" }"
  },
  {
    "_time": "2015-09-02T06:00:03Z",
    "Color": "{ \"en\": \"White\", \"de\": \"Weiß\" }",
    "Model": "ABC X Series Model",
    "ModelNumber": "25",
    "LicenseNumber": "{ \"en\": \"ABC10\" }"
  }
]
}

```

14.5 Delete Data for a Thing

Deletes master data or parameters data for a thing

With this service, you can delete the master data or parameters data for the specified thing and property set type corresponding to the time range provided.

Request

URI: /Things('<ID>')/<thing type name>/<property set ID>?timerange=<From time>-<To time> (OR) /Things('<ID>')/<thing type name>/<property set ID>? timerange=<1H, 1D, 1W, 1M>

i Note

You must specify a time range to be able to delete the master data or parameters data.

HTTP Method: [DELETE](#)

Permissions: `<thing>.d`

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
property set ID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('<thingID>')/core.automobiles:ABCXSeries/wheel_fl?  
timerange=2015-08-01T06:00:00Z-2015-08-02T09:00:00Z
```

Response

Response Status and Error Codes

Format: [JSON](#)

Code	Description
204	Data deleted successfully

14.6 Read Property Set Data

This service is used to return the things with the most recent property data for the specified property set type. This service only retrieves property set type data of data categories [MasterData](#) and [Parameters](#).

Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

To avoid performance decline, the system in future versions will automatically limit collective GET requests to a maximum of 500 objects that can be retrieved with one single call.

Use of `$count` as well degrades performance. Hence, a use of `$count` must also be judiciously chosen.

Therefore, for use cases where it is crucial for you to ensure that objects more than 500 have to be retrieved, you need to use paging options such as `$top` and `$skip`.

Request

URI: /Things/PropertySet/<property set type name>

HTTP Method: [GET](#)

Permissions:

<thing>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Paramter

Parameter	Required	Data Type	Description
name	Yes	string	Name of the property set type.

Query String Parameters

Parameter	Required	Type	Description
\$count	No	Boolean	Total number of thing objects available for the specified property set type based on the current user's authorizations; permissible values are true and false The following results apply, if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of thing objects available for the specified property set type • If you use this with \$filter parameter, the result contains the total number of thing objects available for the specified property set type based on the defined filter condition.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; the only valid field is _time . This is required only if property set type is time-dependent. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are _thingId , _time and all properties. The filter operators supported are eq , lt , gt , le , ge , and ne .

Request Example

```
/Things/PropertySet/core.automobiles:Car
```

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
value	Array of thing data objects	An array of thing data objects containing the Thing ID and values of properties for the specified property set type.

Response Status and Error Codes

Code	Description
200	Property set type data for a one or more things retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "value": [
    {
      "_id": "<thingID>/car",
      "_thingId": "<thingID>",
      "BodyStyle": "SUV",
      "Class": "1st",
      "WheelBase": "15",
      "RegistrationNumber" : "001",
      "Colour": "Black",

```

```
    "_time": "2015-08-02T06:00:03.000Z"  
  }  
]  
}
```

15 Thing: Reference Property Data

With this service, you can create, read, or delete data for the reference properties of a specific thing.

Base URI

Formal description: `http://<server address>[:<port number>][<path>]`

Example for a base URI in a cloud foundry environment: `https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things`

Methods

HTTP Method	Action	URI	Scopes
<i>PUT</i>	Create Data for Reference Properties [page 928]	For a single thing: <code>/Things('<thingID>') / ReferenceProperties/<thing type name>/<property set ID></code> For multiple things: <code>/Things/ ReferenceProperties/<<thing type name>>/<<property set ID>></code>	<code><thing>.c</code>
<i>GET</i>	Read Data for Reference Properties [page 931]	<code>/Things('<thingID>') / ReferenceProperties/<thing type name>/<property set ID></code>	<code><thing>.r</code>
<i>GET</i>	Read Reference Properties Data for a List of Property Sets [page 933]	<code>/Things('<thingID>')/<thing type name>/ ReferenceProperties/'<property set ID1>,<property type ID1>&<property set ID1>,<property type ID2>&<property set ID2>,<property type ID2>'?timerange=<fromTime>-<toTime></code>	<code><thing>.r</code>
<i>DELETE</i>	Delete Data for Reference Properties [page 937]	<code>/Things('<thingID>') / ReferenceProperties/<thing type name>/<property set ID></code>	<code><thing>.d</code>

i Note

`<thing>` refers to the thing application name.

Related Information

[Reference Property Set Type \[page 337\]](#)

15.1 Create Data for Reference Properties

You can use this service to create data for reference properties of a specific property set that is assigned to a thing type. You can create data for a single thing or multiple things.

Request

URI:

For a single thing: `/Things('<ID>')/ReferenceProperties/<thing type name>/<property set ID>`

For multiple things: `/Things/ReferenceProperties/<thing type name>/<property set ID>`

i Note

- The value for the `_time` property in the request payload must correspond to UTC timestamp and must be less than or equal to `current time + 90 days`.
 - `"/Date(<ticks>)/"` <ticks> = number of milliseconds since midnight Jan 1, 1970
For example, `"/Date(1546322403148)/"`
 - `"YYYY-MM-DD HH:MM:SS[.fraction]"`
For example, `"2015-08-01T09:00:00.000Z"`
- To create data for reference properties of multiple things, you must provide the thing IDs in the request payload.
- A reference property of attribute type `com.sap.iot.core.TargetValue` is used to send desired value to the corresponding device. When you create data for this reference property, the system sends data only with the latest timestamp to the device. For example, assume the following:
 - Create data for the reference property with the timestamp **2015-08-01T09:10:00Z**.
 - In the subsequent call, create data for the same reference property with an earlier timestamp **2015-08-01T09:01:00Z**. The system only sends the data with the latest timestamp **2015-08-01T09:10:00Z** (created in the previous call) to the device.

HTTP Method: *PUT*

Permissions: `<thing>.c`

Request Headers

Header	Required	Values
Accept-Language	No	Language of the reference data. The default language is en.
sap-iot-strong-validations	Yes	Validate the payload. Only if this parameter is set true, the data types <i>String</i> , <i>Numeric</i> , <i>Boolean</i> , <i>ThingID</i> , <i>BPID</i> , <i>Timestamp</i> , <i>DateTime</i> , and <i>Date</i> , along with <i>JSON</i> , <i>ByteArray</i> invalid property names are validated.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: - Unique thing identifier generated by the system while creating a thing. - Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	string	Name of the thing type
property set ID	Yes	string	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl
```

Reference data is created for the property set **wheel_fl** of the thing type **core.automobiles:car**

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

Example 1

```
{  
  "value": [{  
    "time": "2015-08-01T09:00:00Z",  
    "PressureUnitOfMeasure": "P",  
    "RotationUnitOfMeasure": "A",  
    "PressureLowerThreshold": 10,  
    "RotationLowerThreshold": 15  
  }, {  
    "time": "2015-08-01T09:10:00Z",  
    "PressureUnitOfMeasure": "PP",  
    "RotationUnitOfMeasure": "AA",  
    "PressureLowerThreshold": 20,  
    "RotationLowerThreshold": 25  
  }]  
}
```

```
}
```

Example 2

The following request payload creates data for the properties `RotationTargetValue` and `PressureTargetValue` of attribute `com.sap.iot.core.TargetValue`:

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "PressureUnitOfMeasure": "P",
    "RotationUnitOfMeasure": "A",
    "PressureLowerThreshold": 10,
    "RotationLowerThreshold": 15,
    "RotationTargetValue": 200,
    "PressureTargetValue": 100
  }, {
    "_time": "2015-08-01T09:10:00Z",
    "PressureUnitOfMeasure": "PP",
    "RotationUnitOfMeasure": "AA",
    "PressureLowerThreshold": 20,
    "RotationLowerThreshold": 25,
    "RotationTargetValue": 2000,
    "PressureTargetValue": 1000
  }]
}
```

Example 3

The following request payload creates data for the reference properties (`RotationTargetValue` and `PressureTargetValue` of attribute `com.sap.iot.core.TargetValue`) for multiple things:

`/Things/ReferenceProperties/core.automobiles:car/wheel_fl`

```
{
  "things": [{
    "id": "3E930040F5E3F8021600B10200CB288F"
  }, {
    "id": "45930040F5E3F8021600B10200CB288F"
  }],
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "PressureUnitOfMeasure": "P",
    "RotationUnitOfMeasure": "A",
    "PressureLowerThreshold": 10,
    "RotationLowerThreshold": 15,
    "RotationTargetValue": 2000,
    "PressureTargetValue": 1000
  }]
}
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Reference data created successfully.

Related Information

[Thing: Reference Property Data \[page 927\]](#)

15.2 Read Data for Reference Properties

You can use this service to read data of reference properties of a specific property set.

By default, the service retrieves data available for the last one hour. You can use `$filter` on `_time` property to retrieve data for a specific time or for a specific time range. The value for the `_time` property in the request URL must correspond to UTC timestamp.

Request

URI: `/Things('<ID>')/ReferenceProperties/<thing type name>/<property set ID>`

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Header Parameters

Header	Required	Values
Accept-Language	No	Language of the reference data. The default language is en.
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the un-compressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	string	Name of the thing type
property set ID	Yes	string	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Query String Parameters

Parameter	Required	Type	Description
\$orderby	No	string	Field name to be used for sorting the result set in ascending order; valid fields are id (property type ID) and _time . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	No	string	Select condition to be applied; valid fields are id (property type ID) and _time .
\$filter	No	string	Filter condition to be applied; valid fields are id (property type ID) and _time .

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl
```

Retrieves reference data available for the last one hour for the property set **wheel_fl** of the thing type **core.automobiles:car**

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl?$filter = _time eq 2015-08-01T09:00:00Z
```

Retrieves reference data available at "2015-08-01T09:00:00Z" for the property set **wheel_fl** of the thing type **core.automobiles:car**

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl?$filter = _time gt 2015-08-01T09:00:00Z and _time lt  
2015-08-01T09:10:00Z
```

Retrieves reference data available for a time range "2015-08-01T09:00:00Z" and "2015-08-01T09:10:00Z" for the property set **wheel_fl** of the thing type **core.automobiles:car**

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Reference data retrieved successfully.

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the structure as shown in the following example:

Request URL `/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/core.automobiles:car/wheel_fl` retrieves data available for the last one hour as time range is not specified.

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "PressureUnitOfMeasure": "P",
    "RotationUnitOfMeasure": "A",
    "PressureLowerThreshold": 10,
    "RotationLowerThreshold": 15
  }, {
    "_time": "2015-08-01T10:00:00Z",
    "PressureUnitOfMeasure": "PP",
    "RotationUnitOfMeasure": "AA",
    "PressureLowerThreshold": 20,
    "RotationLowerThreshold": 25
  }]
}
```

15.3 Read Reference Properties Data for a List of Property Sets

You can use this service to read reference properties data for a list of property sets.

By default, the service retrieves data available for the last one hour. You can use `timerange` property to retrieve data for a specific time range. The time value for the `timerange` property in the request URL must correspond to UTC timestamp.

Request

URI: /Things('<ID>')/<thing type name>/ReferenceProperties/'<property set ID1>,<property type ID1>&<property set ID1>,<property type ID2>&<property set ID2>,<property type ID2>'?timerange=<fromTime>-<toTime>

HTTP Method: [GET](#)

Permissions: <thing>.r

Request Header Parameters

Parameter	Required	Values
Accept-Language	No	Language of the reference data. The default language is en.
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	string	Name of the thing type
property set ID	Yes	string	Unique identifier of the property type (that belongs to the property set type) defined in a thing type
Property type ID	Yes	string	Name of the property type defined in the property set type

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ core.automobiles:car/  
ReferenceProperties/'wheel_rr,Pressure&wheel_rr,RotationSpeed&wheel_fl,Pressure&  
wheel_fl,RotationSpeed'?timerange=<fromTime> - <toTime>
```

Reference data is retrieved for the following reference properties:

- **Pressure** and **RotationSpeed** of property set **wheel_fl**
- **Pressure** and **RotationSpeed** of property set **wheel_rr**

Both the property set **wheel_fl** and **wheel_rr** are assigned to the thing type **core.automobiles:car**.

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Reference data retrieved successfully.

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "values": {
    "/wheel_rr/Pressure": {
      "com.sap.iot.core.UoM": null,
      "com.sap.iot.core.LowerThreshold": null,
      "com.sap.iot.core.UpperThreshold": null,
      "com.sap.iot.core.LowLowerThreshold": null,
      "com.sap.iot.core.UpperUpperThreshold": null
    },
    "/wheel_rr/RotationSpeed": {
      "com.sap.iot.core.UoM": {
        "id": "RotationUnitOfMeasure",
        "value": [{
          "time": "2016-08-01T09:00:00Z",
          "value": "P"
        }]
      },
      "com.sap.iot.core.LowerThreshold": {
        "id": "PressureLowerThreshold",
        "value": [{
          "time": "2016-08-01T09:00:00Z",
          "value": 10
        }, {
          "time": "2015-08-01T10:00:00Z",
          "value": 15
        }]
      },
      "com.sap.iot.core.UpperThreshold": null,
      "com.sap.iot.core.LowLowerThreshold": null,
      "com.sap.iot.core.UpperUpperThreshold": null
    },
    "/wheel_fl/RotationSpeed": {
      "com.sap.iot.core.UoM": {
        "id": "RotationUnitOfMeasure",
        "value": [{
          "time": "2016-08-01T09:00:00Z",
          "value": "P"
        }, {
          "time": "2015-08-01T10:00:00Z",
          "value": "A"
        }]
      },
      "com.sap.iot.core.LowerThreshold": {
        "id": "RotationLowerThreshold",
```

```

        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 10
        }]
    },
    "com.sap.iot.core.UpperThreshold": {
        "_id": "RotationUpperThreshold",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 20
        }]
    },
    "com.sap.iot.core.LowLowerThreshold": null,
    "com.sap.iot.core.UpperUpperThreshold": null
},
"/wheel_fl/Pressure": {
    "com.sap.iot.core.UoM": {
        "_id": "PressureUnitOfMeasure",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": "P"
        }], {
            "_time": "2015-08-01T10:00:00Z",
            "value": "A"
        }
    ],
    "com.sap.iot.core.LowerThreshold": {
        "_id": "PressureLowerThreshold",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 10
        }], {
            "_time": "2015-08-01T10:00:00Z",
            "value": 15
        }
    ],
    "com.sap.iot.core.UpperThreshold": {
        "_id": "PressureUpperThreshold",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 20
        }], {
            "_time": "2015-08-01T10:00:00Z",
            "value": 25
        }
    ],
    "com.sap.iot.core.LowLowerThreshold": {
        "_id": "PressureLowLowerThreshold",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 5
        }], {
            "_time": "2015-08-01T10:00:00Z",
            "value": 10
        }
    ],
    "com.sap.iot.core.UpperUpperThreshold": {
        "_id": "PressureUpperUpperThreshold",
        "value": [{
            "_time": "2016-08-01T09:00:00Z",
            "value": 30
        }], {
            "_time": "2015-08-01T10:00:00Z",
            "value": 35
        }
    ]
}
}
}

```

```
}
```

15.4 Delete Data for Reference Properties

Deletes reference properties data

You can use this service to delete data for reference properties of a specific property set that is assigned to a thing type. The `_time` property is mandatory for deleting reference properties data. If you do not specify `_time`, the system displays an error message.

Request

URI: `/Things('<ID>')/ReferenceProperties/<thing type name>/<property set ID>?$filter=_time eq <time>`

HTTP Method: [DELETE](#)

Permissions: `<thing>.d`

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: - Unique thing identifier generated by the system while creating a thing. - Alternate thing identifier which is unique only within a specific tenant.
thing type name	Yes	String	Name of the thing type
property set ID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type
_time	Yes	Timestamp	Time stamp for the properties.

Query String Parameters

Parameter	Required	Type	Description
\$filter	Yes	String	Filter condition to be applied; the only valid field is <code>_time</code> . The filter operators supported are eq , lt , and gt . Multiple filters are supported using the AND separator.

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl?$filter=_time eq 2009-05-10T09:00:00.000Z
```

Reference data available at the specified time 2009-05-10T09:00:00.000Z is deleted for the property set wheel_fl of the thing type core.automobiles:car.

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/ReferenceProperties/  
core.automobiles:car/wheel_fl?$filter=_time gt 2016-10-06T09:00:00.000Z and  
_time lt 2016-10-11T09:00:00.000Z
```

Reference data available for the time interval 2016-10-06T09:00:00.000Z and 2016-10-11T09:00:00.000Z is deleted for the property set wheel_fl of the thing type core.automobiles:car.

Response

Response Status and Error Codes

Code	Description
204	Reference data deleted successfully.

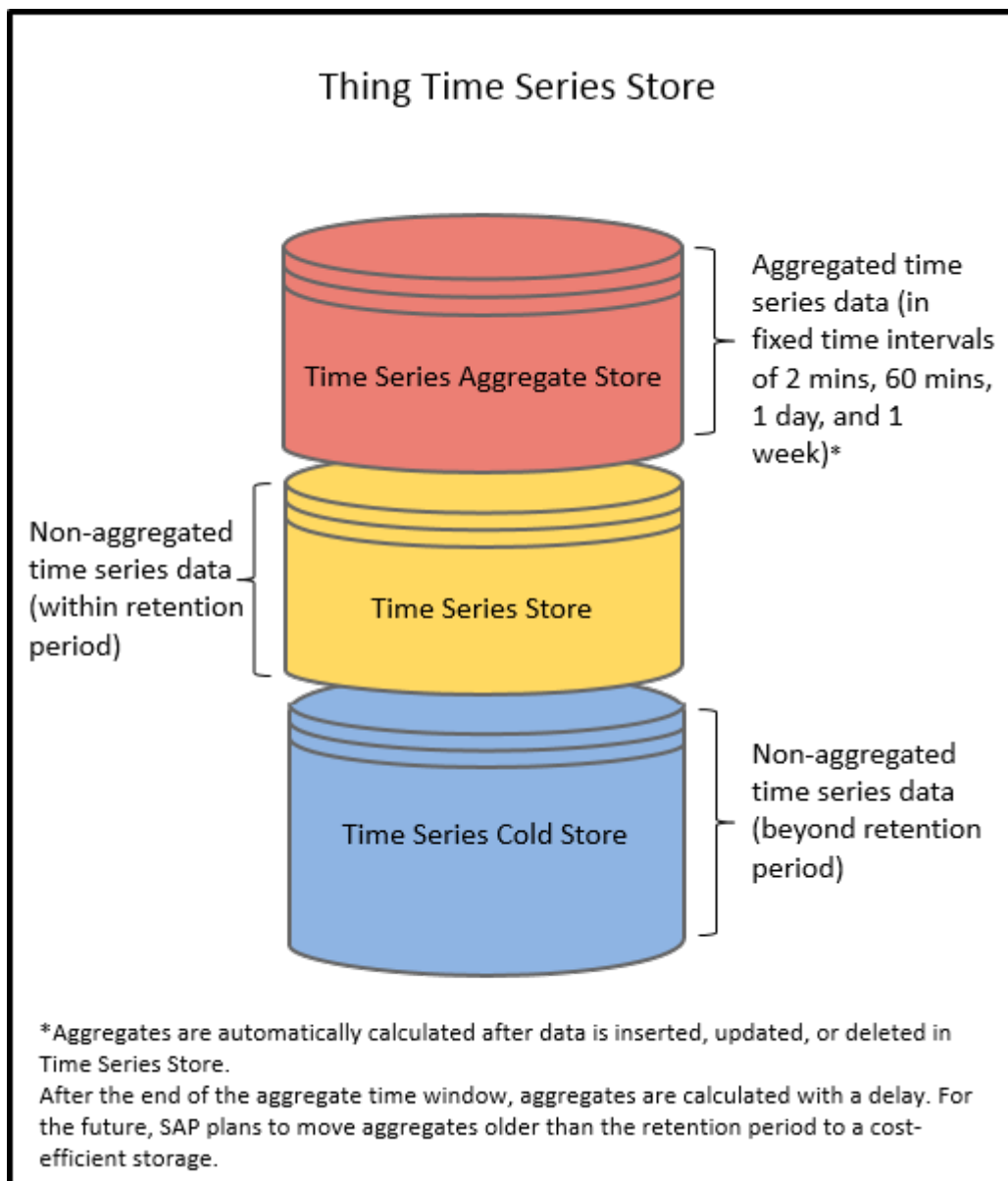
16 Thing: Time Series Data

Thing Time Series Store

The Thing Time Series Store allows you to initialize the time series store for a tenant, manage retention period for a tenant, and manage time series data for Things belonging to a tenant. The time series store uses a tiered storage model containing the following tiers:

- Time Series Store
- Time Series Aggregate Store
- Time Series Cold Store

The following diagram illustrates the Thing Time Series Store:



Related Information

[Time Series Store \[page 941\]](#)

[Time Series Aggregate Store \[page 960\]](#)

[Time Series Cold Store \[page 981\]](#)

16.1 Time Series Store

In an IoT scenario, if the value of a property type changes very frequently, for every second or every hour, you can configure a property set type of data category *TimeSeriesData* or *DerivedData*. For example, you could model the **speed** of a car as *TimeSeriesData* and **velocity** or **acceleration** as *DerivedData*.

The Time Series Store stores non-aggregated time series data for Things of tenant until the retention period configured for the tenant. The non-aggregated time series data beyond the retention period is moved to the Cold Store.

Time series data is always bound to a specific time or time range. You can create time series data for a specific time or retrieve time series data for a specific time range that lies between 1970-01-01T00:00:00Z and current time + 90 days.

The following example describes how the SAP IoT services handles, stores, and retrieves the time series data.

- Tenant T1 with retention period configured as 30 days
- Allowed time range for creating time series data is 1970-01-01T00:00:00Z until current time + 90 days (or) 1970-01-01T00:00:00Z and 2018-11-27T00:00:00Z (assuming, current time = 2018-08-30)

Data creation time	Result
2018-11-28T00:00:00Z	Invalid time value as it is beyond the allowed creation time range
2018-10-01T00:00:00Z	Data created in time series store
2018-07-29T00:00:00Z	Data created in cold store as the time lies within 1970-01-01T00:00:00Z and current time - 30 days of retention period

- Allowed time range for retrieving time series data is 1970-01-01T00:00:00Z until current time + 90 days (or) 1970-01-01T00:00:00Z and 2018-11-27T00:00:00Z (assuming, current time = 2018-08-30)

Time range to retrieve data	Result
2018-11-01T00:00:00Z - 2018-12-02T00:00:00Z	Invalid time value as it is beyond the allowed time range
2018-09-01T00:00:00Z - 2018-09-30T00:00:00Z	Data not available in the time series store for the specified time range
2018-11-01T00:00:00Z - 2018-11-10T00:00:00Z	Data not available in the time series store for the specified time range Inform the user to retrieve the data from cold store

You can create time series data for a thing using the REST-based API [Create Time Series Data or Derived Data for a Thing \[page 946\]](#) or you can use SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service) for importing time series data into SAP IoT by using the data ingestion services provided by the SAP IoT API.

Base URI

- **Formal description:** `http://<server address>[:<port number>]/[path]`

- **Example for a base URI in a cloud foundry environment:** `https://apiot-mds.cfapps.eu10.hana.ondemand.com/`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create Time Series Data Store for Tenant [page 942]	<code>/InitializeTimeseriesStore</code>	<code><thing>.TenantTSS.c</code>
<i>POST</i>	Create Retention Period for Time Series Data Store [page 943]	<code>/TimeseriesRetentionPeriod</code>	<code><thing>.Conf.c</code>
<i>GET</i>	Read Retention Period of Time Series Data [page 945]	<code>/TimeseriesRetentionPeriod</code>	<code><thing>.Conf.r</code>
<i>PUT</i>	Create Time Series Data or Derived Data for a Thing [page 946]	<code>/Things('<thing ID>')/<thing type name>/<property set ID></code>	<code><thing>.c</code>
<i>GET</i>	Read Time Series Data or Derived Data for a Thing [page 953]	<code>/Things('<thing ID>')/<thing type name>/<property set ID></code>	<code><thing>.r</code>
<i>DELETE</i>	Delete Time Series Data or Derived Data [page 959]	<code>/Things('<thing ID>')/<property set ID>?time-range=<From time>-<To time> (OR) <Thing Application>/URL/ Things('<thing ID>')/<property set ID>? time-range=<1H, 1D, 1W, 1M></code>	<code><thing>.d</code>

Note

`<thing>` refers to the thing application name.

16.1.1 Create Time Series Data Store for Tenant

Initialize the time series data store for a specific tenant

With this service, you can initialize the time series data store for a specific tenant. You can call this service when you onboard a tenant. After onboarding the tenant and initializing the corresponding time series data store, you can use the store to save the time series data for that specific tenant.

Request

URI: `/InitializeTimeseriesStore`

HTTP Method: *POST*

Permissions: `<thing>.TenantTSS.c`

Request Parameters

None

Request Example

`/InitializeTimeseriesStore`

Payload

In the payload of the request, you specify the tenant subaccount ID for which you want to initialize the time series data store in the `<_tenant>` field.

```
{
    "_tenant" : "DEFAULT_TENANT"
}
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
201	Time series data store created successfully

16.1.2 Create Retention Period for Time Series Data Store

Describes the retention period

With this service, you can define the retention period (in number of days) of the time series data for a specific tenant. Time series data for that specific tenant gets saved in the Time Series Store for the specified retention period. The retention period is calculated based on the business timestamp. For example, time series data is available at the business time value 2016-08-20 and you have defined the retention period as 30 days. The time series data is saved in the Time Series Store until 2016-09-19 (business time value: 2016-08-20 + 30 days).

Note

If you do not maintain retention period for a specific tenant, a default value of 90 days is saved as retention period.

You can change the retention period for a tenant. However, the changed retention period is applicable only for the time series data ingested after the change in retention period. For the already existing time series data, only the retention period defined at the time the data was written is applicable.

Request

URI: `/TimeseriesRetentionPeriod`

HTTP Method: `POST`

Permissions: `<thing>.Conf.c`

Request Parameters

Parameter	Required	Data Type	Description
<code>_retentionPeriodInDays</code>	Yes	Integer	Number of days to retain time series data in Time Series Store: • Minimum Value: 7 days • Maximum Value: 1825 days (5 years)

Request Example

```
/TimeseriesRetentionPeriod
```

Payload

Format: `JSON`

Only media type `JSON` is supported. The `JSON` for this method has the following structure:

```
{
  "_retentionPeriodInDays" : 60
}
```

Response

Format: `JSON`

Response Status and Error Codes

Code	Description
201	Retention period saved successfully

16.1.3 Read Retention Period of Time Series Data

Retrieves retention period of time series data

With this service, you can retrieve the retention period maintained for the time series data for a specific tenant.

Request

URI: `/TimeseriesRetentionPeriod`

HTTP Method: [GET](#)

Permissions: `<thing>.Conf.r`

Request Parameters

Parameter	Required	Data Type	Description
<code>_retentionPeriodInDays</code>	Yes	Integer	Number of days to retain time series data in Time Series Store

i Note

If you have not defined the retention period, the service retrieves 90 days as the default retention period.

Request Example

```
/TimeseriesRetentionPeriod
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Retention time period retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "_retentionPeriodInDays" : 60
}
```

16.1.4 Create Time Series Data or Derived Data for a Thing

Create time series data or derived data for a thing

With this service, you can create data for the property sets of a thing that belongs to a specific thing type. This service supports data creation for the property sets of data categories [TimeSeriesData](#) and [DerivedData](#).

Using this service, you can send the request payload in [JSON](#) format or as a binary file in [zip](#) or [gzip](#) format. The complete request payload must be compressed in a single binary file and you cannot split the request payload in multiple files when using [zip](#) file format.

This service creates data only for those properties of a property set specified in the request payload for a specific timestamp. In the subsequent call, if you do not provide those properties for which data already exists and provide the same timestamp in the request payload, the service replaces the existing data with latest one. As a consequence, values for those properties not specified in the request payload are deleted. The following table illustrates the sequence of calls to this service and the data stored in the properties:

Action	Request/Response Payload	Description
Create data	<pre>"value": [{ "_time": "2021-09-26T10:10:00Z", "prop1": 11, "prop2": 22, "prop3": 33 }]</pre>	Service creates data only for properties prop1, prop2, and prop3 for the timestamp 2021-09-26T10:10:00Z.

Action	Request/Response Payload	Description
Read data	<pre> "value": [{ "_time": "2021-09-26T10:10:00.000Z", "prop2": 22, "prop1": 11, "prop6": null, "prop5": null, "prop4": null, "prop3": 33 }] </pre>	Service assigns null value for properties prop4, prop5, and prop6 as they were not provided in the request payload in the first call to the service.
Create data	<pre> "value": [{ "_time": "2021-09-26T10:10:00Z", "prop4": "four", "prop5": "five", "prop6": "six" }] </pre>	Service creates data only for properties prop4, prop5, and prop6 for the timestamp 2021-09-26T10:10:00Z.
Read data	<pre> "value": [{ "_time": "2021-09-26T10:10:00.000Z", "prop2": null, "prop1": null, "prop6": "six", "prop5": "five", "prop4": "four", "prop3": null }] </pre>	Service deletes the already existing data for properties prop1, prop2, and prop3 and assigns null value as these properties were not provided in the request payload in the subsequent call to the service.

Time series data ingested via Internet of Things Service

In addition, you can use SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service) for importing time series data into SAP IoT by using the data ingestion services provided by the SAP IoT API.

- When you create a series of time series data for a thing using the data ingestion services, the latest data creation time for the specified thing ID is saved and included in the response payloads of composite APIs.

- When you use the data ingestion pipeline, you can create time series data for a property of data type `GeoJSON`. The `GeoJSON` property type in SAP IoT is mapped to a string property type in Internet of Things Service. The value of the `GeoJSON` property type is retrieved in the [Read Time Series Data or Derived Data for a Thing \[page 953\]](#) and [Read Snapshot Data of a Thing \[page 972\]](#) APIs. The following is an example payload of sensor data sent from Internet of Things Service to SAP IoT via data ingestion pipeline:

```
{
  "measures": [{
    "StringGeoValue": "{\"type\":\"Point\",\"coordinates\":
[78.47444,17.37528]}"
  }]
}
```

Note

- You can only store latitude, longitude, and geometry type values for a property of data type `GeoJSON`. The only supported geometry type is [Point](#).
- In the above example, the property `StringGeoValue` is string data type in Internet of Things Service.

→ Recommendation

You can use this service to create time series data for evaluation purpose. In a real-time scenario or in your production environment, you use the device management system, for example, SAP IoT services for SAP BTP for the Cloud Foundry Environment, to ingest the sensor data into the time series store from the physical device.

Request

URI: `/Things('<ID>')/<thing type name>/<property set ID>`

Note

- The thing type has to be a fully qualified name that is prefixed with the package name.
- The `_time` property is mandatory for the creation of data of categories `TimeSeriesData` and `DerivedData`. The value for the `_time` property must correspond to UTC timestamp and must lie within a time range from 01.01.1970 to current time + 90 days. Following are the supported formats:
 - `"/Date(<ticks>)/"` `<ticks>` = number of milliseconds since midnight Jan 1, 1970
For example, `"/Date(1546322403148)/"`
 - `"YYYY-MM-DD HH:MM:SS[.fraction]"`
For example, `"2015-08-01T09:00:00.000Z"`
- The property name must not contain any special character other than underscore (`_`) and it must not start with a digit.
- You can only create time series data corresponding to a point in time within the retention period specified for the tenant using this service or ingesting via SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things service). When you use this service, if the time stamp is outside retention period, an error occurs. When you ingest data via SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things service), if the time stamp is outside retention

period, data is stored in the error log. You can be read the erroneous using ErrorMessages API service - [Read all Error Messages \[page 867\]](#).

- This method is designed to create real-time data. Therefore, we highly recommend not using this method to create huge amounts of historical data. To create data corresponding to time that is not within the retention period specified for the tenant, use [Time Series Cold Store \[page 981\]](#).
- If you have defined quality codes for a specific property but have not assigned values, the system assigns the default value 0 for the quality code property. Quality codes are only supported for properties of data type [Numeric](#), [NumericFlexible](#), or [String](#).
- For property set type of data categories [TimeSeriesData](#) and [DerivedData](#), you cannot create time series data or derived data for a property of type [GeoJSON](#).

HTTP Method: [PUT](#)

Permissions: <thing>.c

Request Header Parameters

Header	Required	Description
content-Encoding	No	application/zip or application/gzip i Note Indicates the content (request payload) to be processed is in application/zip or application/gzip file format.
Content-Type	No	binary/octet-stream i Note Indicates the content (request payload) to be processed in this service is in the form of a file.
sap-iot-issync	No	Indicates whether the service saves the latest data creation time for the specified thing ID. Permissible values are true or false i Note You can use this header parameter in Thing Detail and Advanced Thing List services.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thingTypeName	Yes	String	Name of a thing type.
propertySetID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('<ID>')/core.automobiles:ABCXSeries/wheel_fl
```

Payload

Format: *JSON*

Only media type *JSON* is supported. In addition, you can encode the request payload in *JSON* format to *zip* or *gzip* file format using the request header parameter `content-Encoding`. The *JSON* for this method has the structure as specified in the following examples.

Example 1

Request URL `/Things('C5D30DAAB52C4F01B14C169199BFE0CF')/core.automobiles:ABCXSeries/wheel_fl` to create data for the property set `wheel_fl` of thing `C5D30DAAB52C4F01B14C169199BFE0CF`. In this example, the header parameter `sap-iot-issync` is not specified in the request header. Hence, the latest timestamp value for the thing ID is not saved.

```
{
  "value": [{
    "time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100"
  }, {
    "time": "2015-08-02T06:00:03Z",
    "Pressure": "34",
    "Temperature": "120"
  }]
}
```

Example 2

Request URL `/Things('0E121F2106A94BCBB1D2413D4575386A')/core.automobiles:ABCXSeries/Engine` to create data for the property set **Engine** of thing `0E121F2106A94BCBB1D2413D4575386A`. In this example, the header parameter `sap-iot-issync` is set true. Hence, the latest timestamp value `2015-08-02T06:00:03z` is saved and can be retrieved in the composite APIs.

```
{
```

```

    "value": [{
      "_time": "2015-08-01T09:00:00Z",
      "pressure": "40",
      "speed": "120"
    }, {
      "_time": "2015-08-02T06:00:03Z",
      "pressure": "28",
      "speed": "108"
    }]
  }

```

Example 3

Request URL `/Things('C5D30DAAB52C4F01B14C169199BFE0CF')/core.automobiles:ABCXSeries/wheel_fl` to create data for the property set `wheel_fl` of thing `C5D30DAAB52C4F01B14C169199BFE0CF`. In this example, quality code `Temperature_QC` with value `5` is attached for the property `Temperature`.

```

{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100",
    "Temperature_QC": 5
  }]
}

```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Data of category <i>TimeSeriesData</i> or <i>DerivedData</i> for the specified thing created successfully

Related Information

[Thing Detail \[page 1385\]](#)

[Advanced Thing List \[page 1400\]](#)

16.1.5 Create Time Series Data or Derived Data Using Alternate Thing ID

With this service, you can create data for the property sets of a thing that belongs to a specific thing type. You must provide the alternate thing ID in the request URL. This service supports data creation for the property sets of data categories *TimeSeriesData* and *DerivedData*.

i Note

- The thing type has to be a fully qualified name that is prefixed with the package name.
- The `_time` property is mandatory for the creation of data of categories [TimeSeriesData](#) and [DerivedData](#). The value for the `_time` property must correspond to UTC timestamp and must be less than or equal to `current time + 90 days`.

Request

URI: `/ThingsByAlternateId('<alternate thing ID>')/<thing type name>/<property set ID>`

HTTP Method: [PUT](#)

Permissions: `<thing>.c`

Request Header Parameters

Header	Required	Description
<code>sap-iot-issync</code>	No	Indicates whether the service saves the latest data creation time for the specified thing ID. Permissible values are true or false

i Note
You can use this header parameter in **Thing Detail** and **Advanced Thing List services**.

Request Parameters

Parameter	Required	Data Type	Description
<code>alternate thing ID</code>	Yes	String	Alternate thing identifier unique within a specific tenant.
<code>thing type name</code>	Yes	String	Name of a thing type.
<code>property set ID</code>	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type.

Request Example

```
/ThingsByAlternateId('ABCXSeries001-alternateID')/core.automobiles:ABCXSeries/  
wheel_fl
```

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100"
  }]
}
```

Response

Response Status and Error Codes

Code	Description
200	Data of category <i>TimeSeriesData</i> or <i>DerivedData</i> for the specified thing created successfully.

Related Information

[Create Time Series Data or Derived Data for a Thing \[page 946\]](#)

16.1.6 Read Time Series Data or Derived Data for a Thing

Retrieves property set data for the specified thing

With this service, you can retrieve the values of property sets of a thing that belongs to a specific thing type. You can request the values for a specific time range or use the filter condition on `_time`. The service retrieves the values of property sets of data categories *TimeSeriesData* or *DerivedData*.

i Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

You cannot specify time range and use `$filter` on `_time` in the request URL to retrieve time series data or derived data. For example, the request URL `/Things('<ID>')/<thing_type name>/<property set ID>?timerange=2017-07-02T00:00:00Z-2017-07-02T10:00:00Z & $filter=_time ge 2017-07-02T00:00:00Z and _time le 2017-07-02T10:00:00Z` is invalid.

The following table illustrates the various combinations of time range and `$filter` on `_time` in the request URL:

Request URL with	Example	Result
Valid time range and <code>\$filter</code> on <code>_time</code>	<code>/Things('<ID>') / <thing_type name> / <property set ID> ? timerange=2017-07-02T00:00:00Z-2017-07-02T10:00:00Z & \$filter=_time ge 2017-07-02T00:00:00Z and _time le 2017-07-02T10:00:00Z</code>	Invalid Response status: 400 Bad Request
Valid time range but no <code>\$filter</code> on <code>_time</code>	<code>/Things('<ID>') / <thing_type name> / <property set ID> ? timerange=2017-07-02T00:00:00Z-2017-07-02T10:00:00Z</code>	Data is fetched for the specified time range 2017-07-02T00:00:00Z to 2017-07-02T10:00:00Z
No valid time range but <code>\$filter</code> on <code>_time</code>	<code>/Things('<ID>') / <thing_type name> / <property set ID> ? \$filter=_time ge 2017-07-02T00:00:00Z and _time le 2017-07-02T10:00:00Z on valid</code>	Data is fetched for the time range 2017-07-02T00:00:00Z to 2017-07-02T10:00:00Z specified in <code>\$filter</code>
No valid time range and no <code>\$filter</code> on <code>_time</code>	<code>/Things('<ID>') / <thing_type name> / <property set ID></code>	Data is fetched for the last one hour

Note

- You cannot use the filter operator `ne` for filter condition on `_time`. For example, `/Things('<ID>') / <thing_type name> / <property set ID> ? $filter=_time ne 2017-07-02T00:00:00Z` is not a valid request.
- You cannot use parenthesis to group filter condition on `_time`. For example, `/Things('<ID>') / <thing_type name> / <property set ID> ? $filter=_ (time ne 2017-07-02T00:00:00Z)` is not a valid request.
- You cannot group the filter conditions on `_time` and any other property. For example, `/Things('<ID>') / <thing_type name> / <property set ID> ? $filter=_property1 gt 10 or time eq 2017-07-02T00:00:00Z` is not a valid request.
- You cannot group filter conditions on `_time` using the filter operator `eq` along with the separator `or`. For example, `/Things('<ID>') / <thing_type name> / <property set ID> ? $filter=_time eq 2017-01-01T00:00:00Z or _time eq 2017-01-05T00:00:00Z` is not a valid request.

Time series data ingested via Internet of Things Service

You can use SAP IoT services for SAP BTP for the Cloud Foundry Environment (Internet of Things Service) for importing time series data into SAP IoT by using the data ingestion services provided by the SAP IoT API. When

sensor data from the physical device is imported into SAP IoT, Internet of Things Service creates the necessary payload that contains information such as `capabilityAlternateId`, `sensorAlternateId`, and `timestamp` along with the message received from the device.

However, in certain scenarios, collection of measured values can be sent from the device along with the actual timestamp at which the data was generated in the JSON message payload.

```
{
  "capabilityAlternateId": 19,
  "sensorAlternateId": "124223",
  "timestamp": "144740714257",      // automatically inserted by SCP IoT Service
  "measures": [{
    "roll": "27.63",
    "pitch": "28.63",
    "yaw": "29.63",
    "_time": 1447407100060
  }]
}
```

To import the actual time at which the sensor data was generated, you must define the `_time` property for the capability in Internet of Things Service. However, it is not mandatory to define this property and import the actual time. In addition, you must not map the `_time` property to a corresponding property in **Thing Modeler app**, unlike other properties. The data ingestion services provided by the SAP IoT API only accepts [Long](#) values or values that are parsable to [Long](#) for the `_time` property. The [Long](#) value contained in the `_time` property is considered as [Epoch Milliseconds](#) (number of milliseconds elapsed since 1970-01-01 00:00:00 GMT). The data ingestion service rejects a record with `_time` value that cannot be parsed as Long.

When you retrieve data for the specified thing, the service retrieves data as follows:

- If `_time` property with value is available along with the measured values sent from the device in the JSON message payload, the service uses `_time` as the business timestamp.
- If the `_time` property is not available along with the measured values sent from the device in the JSON message payload, the service uses `timestamp` as the business timestamp.
- If both `_time` and `timestamp` are not available in the JSON message payload received from the device, the service uses the current time at which the record is being processed as the business timestamp.
- If `_time` contains an invalid value, the service does not process the JSON message payload received from the device.

Request

URI: `/Things('<ID>')/<thing type name>/<property set ID>`

Note

- The thing type has to be a fully qualified name that is prefixed with the package.
- The service only supports the time range value lying between 01.01.1970 and current time + 90 days.
- If you do not specify a time range, the data that is available for the last one hour is retrieved. If the data is not available for the last one hour, no data is retrieved.
- The service only retrieves data corresponding to a time range within the retention period specified for the tenant. An error occurs if the time range is not within the retention period.

HTTP Method: [GET](#)

Permissions: <thing>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thingTypeName	Yes	String	Name of the thing type.
propertySetID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; only valid field is <code>_time</code> . i Note Data types JSON and ByteArray are not supported. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are <code>_time</code> and all the property types.
\$filter	No	String	Filter condition to be applied; all the fields in the result set are valid.

Note

Data types *JSON* and *ByteArray* are not supported.

Multiple filters are supported using the *and* separator.

Request Example

```
/Things('<ID>')/core.automobiles:ABCXSeries/wheel_fl?timerange=10M
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range of 10 months.

```
/Things('<ID>')/core.automobiles:ABCXSeries/wheel_fl?timerange=10M&$select=_time,Pressure
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range of 10 months. However, with *\$select* query parameter, only the fields `_time` and `Pressure` are displayed for the retrieved thing.

```
/Things('<ID>')/core.automobiles:ABCXSeries/wheel_fl?timerange=2015-08-01T09:00:00Z-2015-10-01T09:00:00Z
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range from August 1, 2015 to October 1, 2015.

Response

Response Properties

Property	Type	Description
Value	Array of thing data objects	An array of data objects (for example, time series data) for a thing or property set type.

Response Status and Error Codes

Format: *JSON*

Code	Description
200	Data for one or more things retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

Example 1

Retrieves property set data of the property set `wheel_fl` for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range from August 1, 2015 to August 2, 2015.

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100"
  }, {
    "_time": "2015-08-02T06:00:03Z",
    "Pressure": "34",
    "Temperature": "120"
  }]
}
```

Example 2

Retrieves property set data of the property set `StringGeoValue` for the thing ID `core.automobiles:ABCXSeries`. The property `StringGeoValue` is of data type `GeoJSON`.

```
{
  "value": [{
    "_time": "2019-02-11T13:13:16.967Z",
    "StringGeoValue": {
      "position": {
        "coordinate": [
          78.47444,
          17.37528
        ],
        "dimension": 2
      },
      "geometryType": "Point"
    }
  }]
}
```

Related Information

[Time Series Store \[page 941\]](#)
[Sensors and Things \[page 816\]](#)

16.1.7 Delete Time Series Data or Derived Data

Delete time series data or derived data for a thing

With this service, you can delete the time series data for the specified thing and property set type corresponding to the specified time range.

Request

URI: /Things('<ID>')/<thing type name>/<property set ID>?timerange=<From time>-<To time> (OR) /Things('<ID>')/<thing type name>/<property set ID>? timerange=<1H, 1D, 1W, 1M>

Note

- You must specify a time range to be able to delete the time series data.
- The service only deletes data corresponding to a time range within the specified retention period of the tenant.
- After deleting time series data, the system recalculates the aggregates.

HTTP Method: [DELETE](#)

Permissions: <thing>.d

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
propertySetID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/car?  
timerange=2015-08-01T06:00:00Z-2015-08-02T09:00:00Z
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
204	Data deleted successfully

16.2 Time Series Aggregate Store

The Time Series Aggregate Store stores the precalculated aggregates for the time series data of Things. The following are the precalculated aggregates available for use by the supported thing model APIs:

- Minimum value of a property with the corresponding time value within a specific time duration
- Maximum value of a property with the corresponding time value within a specific time duration
- First occurring value of a property with the corresponding time value within a specific time duration
- Last occurring value of a property with the corresponding time value within a specific time duration

Time Intervals Supported for Aggregation

This store contains precalculated aggregates based on the following time intervals:

- **2 mins:** Aggregates are calculated based on measurement points available for the time interval between each consecutive even minutes. For example, all measurement points with business time `_time >= 2016-09-01T15:02:00Z` and `_time < 2016-09-01T15:04:00Z` are used to compute the aggregate with time as `2016-09-01T15:02:00Z` and duration as 120,000 milliseconds.
- **1 hour:** Aggregates are calculated based on measurement points available for the time interval between each consecutive hours. For example, all measurement points with business time `_time >= 2016-09-01T15:00:00Z` and `_time < 2016-09-01T16:00:00Z` are used to compute the aggregate with time as `2016-09-01T15:00:00Z` and duration as 3,600,000 milliseconds.
- **1 day:** Aggregates are calculated based on measurement points available for the time interval between each consecutive days. For example, all measurement points with business time `_time >= 2016-09-01T00:00:00Z` and `_time < 2016-09-02T00:00:00Z` are used to compute the aggregate with time as `2016-09-01T00:00:00Z` and duration as 86,400,000 milliseconds.
- **1 week:** Aggregates are calculated based on measurement points available for the time interval between each consecutive weeks. For example, all measurement points with business time `_time >= 2016-09-01T00:00:00Z` and `_time < 2016-09-08T00:00:00Z` are used to compute the aggregate with time as `2016-09-01T00:00:00Z` and duration as 604,800,000 milliseconds.

i Note

The start day for the weekly aggregate is calculated by considering `1970-01-01T00:00:00Z` as base and adding seven days to arrive at the start of the next corresponding weeks.

i Note

SAP reserves the right to delete precalculated aggregates after a guaranteed retention time without further notice. The guaranteed retention time effective for the various aggregate types is as follows:

- 2-minutes aggregates: 6 months

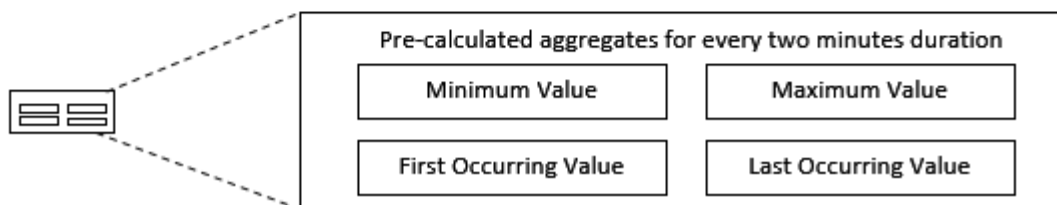
- Hourly aggregates: 12 months
- Daily aggregates: 24 months
- Weekly aggregates: 36 months

The following diagram illustrates the time intervals for calculating aggregates in the Time Series Aggregate Store:

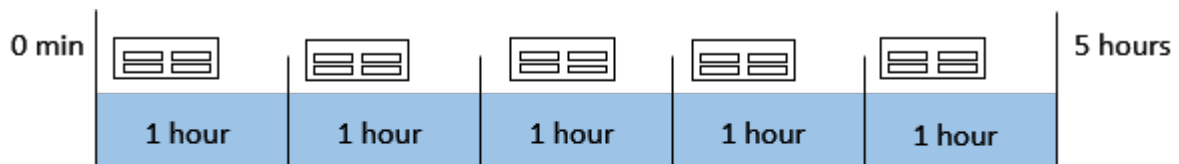
2-mins time interval



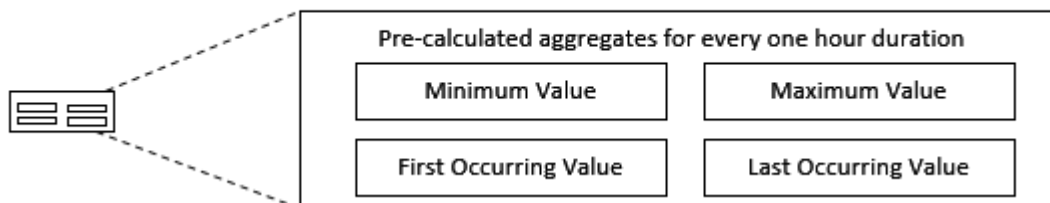
Unique minimum value, maximum value, first occurring value, and last occurring value along with time values are pre-calculated and stored for every consecutive even minutes



1-hour time interval



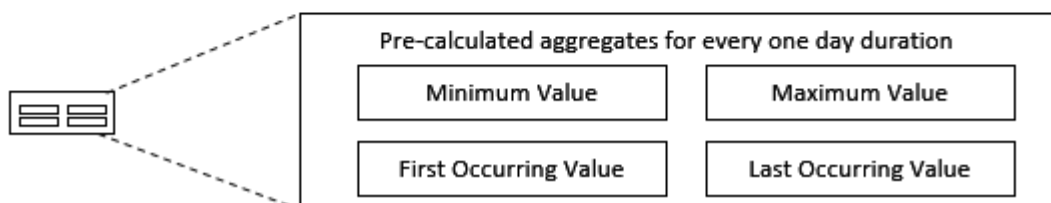
Unique minimum value, maximum value, first occurring value, and last occurring value along with time values are pre-calculated and stored for every consecutive hour



1-day time interval



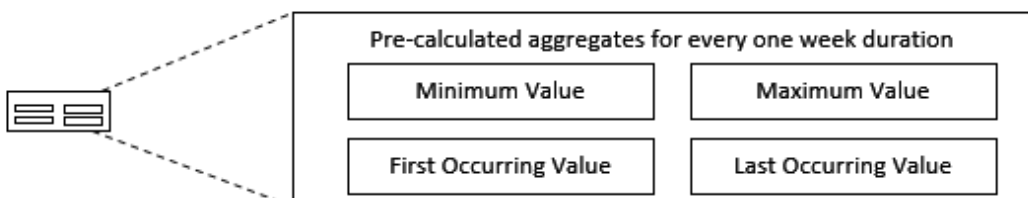
Unique minimum value, maximum value, first occurring value, and last occurring value are pre-calculated and stored for every consecutive day



1-week time interval



Unique minimum value, maximum value, first occurring value, and last occurring value are pre-calculated and stored for every consecutive week



Time Bucket

The time bucket is the time interval that is calculated as follows:

Time Bucket = (toTime - fromTime) / number of divisions

In addition, the time bucket value is rounded down to multiples of time intervals (durations) supported for aggregate calculation in Time Series Aggregate Store. Similarly, based on the time bucket value calculated, the fromTime is rounded down. Hence, calculation of time bucket and rounding off fromTime may lead to retrieval of more measuring points than requested.

Example 1

fromTime: 2016-09-01T15:02:00Z

toTime: 2016-09-02T15:02:00Z

Number of divisions requested: 25

Time Bucket = (2016-09-02T15:02:00Z - 2016-09-01T15:02:00Z) / 25 = 57.6 minutes, which is rounded down to the multiple of nearest duration (2 minutes) supported for aggregate calculation, that is 56 minutes. Note that the time bucket of 56 minutes need not start at 2016-09-01T15:02:00Z but at a multiple of 56 minutes since 1970-01-01T00:00:00Z, that is at 2016-09-01:T14:56:00Z.

Example 2

fromTime: 2016-08-01T15:02:00Z

toTime: 2016-08-03T16:08:00Z

Number of divisions requested: 10

Time Bucket = (2016-08-03T16:08:00Z - 2016-08-01T15:02:00Z) / 10 = 4 hours 9 minutes 36 seconds, which is rounded down to the multiple of nearest duration (1 hour) supported for aggregate calculation, that is 4 hours. Note that the time bucket of 4 hours need not start at 2016-08-01T15:02:00Z but at a multiple of 1 hour since 1970-01-01T00:00:00Z, that is at 2016-08-01T15:00:00Z.

Example 3

fromTime: 2016-08-15T15:02:00Z

toTime: 2016-09-01T15:02:00Z

Number of divisions requested: 10

Time Bucket = (2016-09-01T15:02:00Z - 2016-08-15T15:02:00Z) / 10 = 1.8 days, which is rounded down to the multiple of nearest duration (1 day) supported for aggregate calculation, that is 1 day. Note that the time bucket of 1 day need not start at 2016-08-15T15:02:00Z but at a multiple of 1 day since 1970-01-01T00:00:00Z, that is at 2016-08-15T00:00:00Z.

Example 4

fromTime: 2016-08-10T15:02:00Z

toTime: 2016-09-23T15:02:00Z

Number of divisions requested: 3

Time Bucket = (2016-09-01T15:02:00Z - 2016-08-15T15:02:00Z) / 3 = 14.6 days, which is rounded down to the multiple of nearest duration (1 week) supported for aggregate calculation, that is 2 weeks. Note that the time bucket of 2 weeks need not start at 2016-08-10T15:02:00Z but at a multiple of 1 week since 1970-01-01T00:00:00Z, that is at 2016-08-03T00:00:00Z.

Data Quality

To qualify measurement values for being ingested and stored, SAP IoT supports the "Quality Code" concept as an additional information for each value.

Based on the OPC UA notion of quality codes only "good" values are taken into account for aggregate calculation. As opposed to that, values that have been qualified as "Uncertain" or "bad" values are ignored. The following table gives an overview of the three quality levels and the numeric values by which they are represented (the "XXXXXX" is a placeholder that stands for further numeric refinement of the various levels). For more information, see the complete list of OPC quality codes: <https://docplayer.net/42990565-Iconics-opc-ua-quality-codes.html>.

Quality Level	Value
Good	&0x00XXXXXX
Uncertain	&0x80XXXXXX
Bad	&0x40XXXXXX

Base URI

- **Formal description:** `http://<server address>[:<port number>][<path>]`
- **Example for a base URI in a cloud foundry environment:** `https://apiot-mds.cfapps.eu10.hana.ondemand.com/Things`

Methods

HTTP Method	Action	URI	Scopes
GET	Read Time Series Data for a Property of a Thing Applying M4 Algorithm [page 965]	/Things('<thing ID>')/<thing type name>/<property set ID>?timerange=<from-Time>-<toTime>&\$apply=sap.lineChart(divisions=<number of divisions>, property='<propertyID>')	<thing>.r
GET	Read Time Series Data for Multiple Properties of a Thing Applying M4 Algorithm [page 967]	/Things('<thing ID>')/<thing type name>/M4/'<property set ID1>,<property ID1>&<property set ID1>,<property ID2>&<property set ID2>,<property ID2>'?timerange=<from-Time>-<toTime>&\$apply=sap.lineChart(divisions=<number of divisions>, property='<propertyID>')	<thing>.r
POST	Recalculate M4 Aggregates for Time Series Data [page 970]	/Things('<thing ID>')/<thing type name>/<property set ID>/RecalculateAggregate?timerange=<from-Time>-<toTime>	<thing>.c
GET	Read Snapshot Data of a Thing [page 972]	/Snapshot(thingId='<thingID>', fromTime='<timestamp>', dataCategory='<dataCategory>')	<thing>.r
GET	Read Snapshot Data Within a Time Range for a Thing [page 977]	/v2/Snapshot(thingId='<thingID>', fromTime='<timestamp>', toTime='<timestamp>', dataCategory='<dataCategory>')	<thing>.r

16.2.1 Read Time Series Data for a Property of a Thing Applying M4 Algorithm

Retrieves time series data for a specified property

With this service, you can read the time series data for a specific property of a thing by applying the M4 algorithm. This algorithm is used to aggregate the time series data for n number of divisions. Divisions correspond to the number of intervals into which the given time range needs to be divided. For each interval, the service returns unique minimum value, maximum value, first occurring value, and last occurring value, if they exist. Hence, there would be a maximum of four values per division returned. This service only supports property set types of data categories [TimeSeriesData](#) and [DerivedData](#).

Note

- This service only supports properties of type [Numeric](#), [NumericFlexible](#), and [Boolean](#).
- If, for a specific division, all the four values (combination of timestamp and property values) are identical, only one value is returned.
- If, for a specific division, the maximum and minimum values are equal while the first and last values are equal, only two values are returned.
- The last record in the specified time range is always retrieved.

The service retrieves data from the precalculated aggregates available for every 2 minutes, 60 minutes, 1 day, and 1 week.

As precalculated aggregates are deleted after the retention time is expired (for details, see [Time Series Aggregate Store \[page 960\]](#)), the service only delivers divisions that can be served with the smallest precalculated aggregate that is still available.

❖ Example

A request is posted for a division of 1000 and a time range of 7 days that is outside of the maximum retention time for 2-minutes aggregates, but within the maximum retention time for 60-minutes aggregates.

The service returns an empty result list as 2-minutes aggregates are no longer available (smallest set of precalculated aggregates $7 * 24 = 168$ divisions from hourly aggregates).

Request

URI: `/Things('<ID>')/<thing type name>/<property set ID>?timerange=<fromTime>-<toTime>&$apply=sap.lineChart(divisions=<number of divisions>, property='<propertyID>')`

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip.deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
thingTypeName	Yes	String	Name of the thing type.
propertySetID	Yes	String	Unique identifier of the property (that belongs to the property set type) defined in a thing type.
timerange	Yes	Timestamp	You can provide a "from" time and a "to" time for which the aggregates are calculated for a property. Alternatively, you can provide the duration of time in days, months, or years for calculating the aggregate.
division	Yes	Numeric	Number of intervals into which the given time range needs to be divided.
property	Yes	String	Name of the property.

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/wheel_fl?  
timerange=2015-08-01T06:00:00Z-2015-08-02T09:00:00Z&  
$apply=sap.lineChart(divisions=400,property='Speed')
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `503B8711B5D0445688E7FF7ACFC2177A` corresponding to a time range between `2015-08-01T06:00:00Z` and `2015-08-02T09:00:00Z`.

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/wheel_fl?  
timerange=2D&$apply=sap.lineChart(divisions=400,property='Speed')
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `503B8711B5D0445688E7FF7ACFC2177A` corresponding to a time duration of 2 days.

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00.000Z",
    "WheelBase": "11"
  }, {
    "_time": "2015-08-02T06:00:03.000Z",
    "WheelBase": "10"
  }]
}
```

Related Information

[Time Series Aggregate Store \[page 960\]](#)

16.2.2 Read Time Series Data for Multiple Properties of a Thing Applying M4 Algorithm

Retrieves time series data for multiple properties

With this service, you can read the time series data for multiple properties of the specified thing by applying the M4 algorithm. This algorithm is used to aggregate the time series data for n number of divisions. Divisions correspond to the number of intervals into which the given time range needs to be divided. For each interval, the service returns unique minimum value, maximum value, first occurring value, and last occurring value, if they exist. Hence, there would be a maximum of four values per division returned. This service only supports property set types of data categories [TimeSeriesData](#) and [DerivedData](#).

Note

- This service only supports properties of type [Numeric](#), [NumericFlexible](#), and [Boolean](#).

- If, for a specific division, all the four values (combination of time value and property values) are identical, only one value is returned.
- If, for a specific division, the maximum and minimum values are equal while the first and last values are equal, only two values are returned.
- The service retrieves data from the precalculated aggregates available for every 2 minutes, 60 minutes, 1 day, and 1 week.

As precalculated aggregates are deleted after the retention time is expired (for details, see [Time Series Aggregate Store \[page 960\]](#)), the service only delivers divisions that can be served with the smallest precalculated aggregate that is still available.

❖ Example

A request is posted for a division of 1000 and a time range of 7 days that is outside of the maximum retention time for 2-minutes aggregates, but within the maximum retention time for 60-minutes aggregates.

The service returns an empty result list as 2-minutes aggregates are no longer available (smallest set of precalculated aggregates $7 * 24 = 168$ divisions from hourly aggregates).

Request

URI: `/Things('<ID>')/<thing type name>/M4/'<property set ID1>,<property ID1>&<property set ID1>,<property ID2>&<property set ID2>,<property ID2>'?timerange=<fromTime>-<toTime>&$apply=sap.lineChart(divisions=<number of divisions>)`

HTTP Method: [GET](#)

Permissions: `<thing>.r`

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: - Unique thing identifier generated by the system while creating a thing. - Alternate thing identifier which is unique only within a specific tenant.
thingTypeName	Yes	String	Name of the thing type.
propertySetID	Yes	String	Unique identifier of the property (that belongs to the property set type) defined in a thing type
timerange	Yes	Timestamp	You can provide a "from" time and a "to" time for which the aggregates are calculated for a property. Alternatively, you can provide the duration of time in days, months, or years for calculating the aggregate.

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/M4/'wheel_fl,pressure&wheel_fl,temperature&wheel_rr,pressure&wheel_rr,temperature'?timerange=2015-08-01T06:00:00Z-2015-08-02T09:00:00Z&$apply=sap.lineChart(divisions=400)
```

Retrieves time series data for multiple property types of the specified thing by applying the M4 algorithm. The time range provided is between the "from" time and "to" time.

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/M4/'wheel_fl,pressure&wheel_fl,temperature&wheel_rr,pressure&wheel_rr,temperature'?timerange=2M&$apply=sap.lineChart(divisions=400)
```

Retrieves time series data for multiple properties of the specified thing by applying the M4 algorithm. The time range provided is for a duration of 2 months.

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "value": {
    "/engine/capacity": [{
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "11"
    }, {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "13"
    }],
    "/car/WheelBase": [{
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "23"
    }, {
      "_time": "2015-09-01T09:00:00.000Z",
      "value": "50"
    }],
    "/wheel_rr/pressure": {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "15"
    },
    "/wheel_fl/pressure": {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "21"
    },
    "/wheel_fl /temperature": {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "33"
    },
    "/drive_fl/RotationSpeed": {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "19"
    },
    "/drive_fl/PowerConsumption": {
      "_time": "2015-08-01T09:00:00.000Z",
      "value": "13"
    }
  }
}
```

Related Information

[Time Series Aggregate Store \[page 960\]](#)

16.2.3 Recalculate M4 Aggregates for Time Series Data

Recalculate all M4 aggregates for a specific time range

With this service, you can recalculate all M4 aggregates for a specific time range. The service only supports the following:

- Data categories [TimeSeriesData](#) and [DerivedData](#)
- Time range less than or equal to one day. However, the time range cannot be beyond the retention period.

i Note

You can use this service to re-trigger the aggregate calculation if there are errors in the existing aggregates, if there is a delay in the automatically triggered aggregate calculation process, or when you delete the time series data.

Request

URI: /Things('<ID>')/<thing type name>/<property set ID>/RecalculateAggregate?
timerange=<fromTime>-<toTime>

HTTP Method: *POST*

Permissions: <thing>.c

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value <i>gzip</i> or <i>gzip,deflate</i> for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value <i>gzip</i> . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: - Unique thing identifier generated by the system while creating a thing. - Alternate thing identifier which is unique only within a specific tenant.
thingTypeName	Yes	String	Name of the thing type
propertySetID	Yes	String	Unique identifier of the property (that belongs to the property set type) defined in a thing type
timeange	Yes	timeStamp	You can provide a from time and to time for which the aggregates are calculated for a property. Alternatively, you can provide the duration of time in days, months, or years for calculating the aggregate.

Request Example

```
/Things('503B8711B5D0445688E7FF7ACFC2177A')/core.automobiles:ABCXSeries/wheel_fl/RecalculateAggregate?timerange=2016-10-07T00:00:00.000Z-2016-10-07T00:23:00.000Z
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Recalculation of aggregates successfully completed

16.2.4 Read Snapshot Data of a Thing

Retrieves snapshot data of a thing

With this service, you can retrieve the latest value of properties for the specified thing ID. The service uses *fromTime* to define the time range to retrieve the latest non-null value. If you specify a valid time value for *fromTime*, the service retrieves the latest non-null value for a time range between the current time and the specified *fromTime*. If you do not specify a value or specify an empty value for *fromTime*, the service scans through the data available from the current time until it finds a non-null value. If the data is not available, the service returns null. The service does not support data category *ReferencePropertyData*.

i Note

- The service retrieves the snapshot data for properties that support multiple languages in *Locale* specific language. If data is not available, the service returns null for the property.
- If you have configured a property of type *GeoJSON*, and the time series data for this property was created using the data ingestion pipeline, this service includes the property values in the response payload.

Request

URI: `/Snapshot(thingId='<ID>',fromTime='<timestamp>',dataCategory='<dataCategory>')`

i Note

- Sequence of the parameters within the URI must not be changed. For example, `/Snapshot(dataCategory='<dataCategory>', thingId='<ID>', fromTime='<timestamp>')` is an invalid request.
- The thing ID is mandatory to retrieve the snapshot details.

- With a valid value for *fromTime*, the URI is /
Snapshot(thingID='<ID>', fromTime='<timestamp>', dataCategory='')
- With an empty value for *fromTime*, the URI is /
Snapshot(thingID='<ID>', fromTime='', dataCategory='')

You can retrieve latest value only for specific properties using the query parameter *\$select*. The URI is /
Snapshot(thingID='<ID>', fromTime='<timestamp>', dataCategory='<dataCategory>')?
\$select=<property set ID>/<property ID>

HTTP Method: *GET*

Permissions: <thing>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value <i>gzip</i> or <i>gzip,deflate</i> for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value <i>gzip</i> . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
fromTime	Yes	timestamp	Time from which the snapshot details are retrieved for a non-null value of a property. The value for <i>fromTime</i> must correspond to UTC timestamp. i Note If you do not specify a value or specify an empty value for this parameter, the service scans through the data available from the current time until it finds a non-null value. If the data is not available, the service returns null.
dataCategory	Yes	enum	Filters the snapshot details based on data category enumeration values such as <i>MasterData</i> , <i>DerivedData</i> , <i>TimeSeriesData</i> , and <i>Parameters</i> .

Parameter	Required	Data Type	Description
propertySetID	No	string	Property set ID
i Note In case of thing type created using the REST service, use the property name defined for the thing type.			
propertyID	No	string	Name of the property
i Note In case of thing type created using the REST service, use the property name defined for the property set type.			

Request Example

Read snapshot of time series data for a thing

/

```
Snapshot(thingId='503B8711B5D0445688E7FF7ACFC2177A',fromTime='2015-01-01T06:00:00Z',dataCategory='TimeSeriesData')
```

Read snapshot of time series data for specific properties of a thing

```
/Snapshot(thingId='503B8711B5D0445688E7FF7ACFC2177A',fromTime='',dataCategory='')?
$select=car/BodyStyle,wheel_rr/Temperature
```

Response

Response Properties

Property	Type	Description
_id	string	Internal identifier for a thing
_thingType	Array of thing type objects	Array of thing types
value	Array of property set objects	Array of property sets along with its properties for the corresponding thing type The properties block contains the value of the property and its time-stamp. In addition, the attribute details such as <code>_qualityCode</code>, <code>description</code>, and <code>_unitOfMeasure</code> are included in the properties block. A <code>_qualityCode</code> with value 0, indicates that property has a quality code value attached and a <code>_qualityCode</code> with value null, indicates that the property does not have a quality code value attached.

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

Read snapshot data for a thing

```
{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "value": [{
    "core.automobiles:ABCXSeries": [{
      "/car": [{
        "BodyStyle": {
          "_value": "SUV",
          "_qualityCode": 0,
          "_time": "2015-08-02T06:00:03Z",
          "_unitOfMeasure": ""
        }, {
          "Class": {
            "_value": "1st",
            "_qualityCode": 0,
            "_time": "2015-08-02T06:00:03Z",
            "_unitOfMeasure": ""
          }, {
            "WheelBase": {
              "_value": "15",
              "_qualityCode": 9,
              "_time": "2015-08-02T06:00:03Z",
              "_unitOfMeasure": ""
            }, {
              "RegistrationNumber": {
                "_value": "001",
                "_qualityCode": 0,
                "_time": "2015-08-02T06:00:03Z",
                "_unitOfMeasure": ""
              }, {
                "Colour": {
                  "_value": "Black",
                  "_qualityCode": 0,
                  "_time": "2015-08-02T06:00:03Z",
                  "_unitOfMeasure": ""
                }
              }
            }
          }
        ],
        "_propertySetType": {
          "name": "core.automobiles:Car",
          "description": "Sensory parameters for car"
        }
      }
    ], {
    }
  ], {
  }
```

```

        "/wheel_rr": [{
            "Pressure": {
                "_value": null,
                "_qualityCode": 0,
                "_time": null,
                "_unitOfMeasure": "PA"
            }
        }, {
            "Temperature": {
                "_value": null,
                "_qualityCode": 0,
                "_time": null,
                "_unitOfMeasure": ""
            }
        }],
        "_propertySetType": {
            "name": "core.automobiles:Wheel",
            "description": "Sensory parameters for wheel"
        }
    }
}

```

Read snapshot data for specific properties of a thing

```

{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "value": [{
    "core.automobiles:ABCXSeries": [{
      "/car": [{
        "BodyStyle": {
          "_value": "SUV",
          "_qualityCode": 0,
          "_time": "2015-08-02T06:00:03Z",
          "_unitOfMeasure": ""
        }
      }],
      "_propertySetType": {
        "name": "core.automobiles:Car",
        "description": "Sensory parameters for car"
      }
    }, {
      "/wheel_rr": [{
        "Temperature": {
          "_value": null,
          "_qualityCode": 0,
          "_time": null,
          "_unitOfMeasure": ""
        }
      }],
      "_propertySetType": {
        "name": "core.automobiles:Wheel",
        "description": "Sensory parameters for wheel"
      }
    }
  ]
}

```

Read snapshot data for specific properties of a thing - property `StringGeoValue` is of data type `GeoJSON`

```

{

```

```

    "_id": "5A93B204ADCC4E8191FC3629541B2C48",
    "_thingType": [
      "core.automobiles:ABCXSeries"
    ],
    "value": [{
      "core.automobiles:ABCXSeries": [{
        "/StringCapability_T13_13": [{
          "StringGeoValue": {
            "_unitOfMeasure": "",
            "description": "",
            "_value": [78.47444, 17.37528],
            "qualityCode": null,
            "_time": "2018-08-01T09:00:00.000Z"
          }
        }
      ]
    },
    "description": "",
    "_propertySetType": {
      "name": "core.automobiles:Wheel",
      "description": ""
    }
  }
]}
}

```

16.2.5 Read Snapshot Data Within a Time Range for a Thing

Retrieves snapshot data of a thing within the specified time range

With this service, you can retrieve the latest value of properties for the specified thing ID. The service uses *fromTime* and *toTime*, to define the time range to retrieve the latest non-null value. The difference between the *fromTime* and *toTime* must be less than or equal to 30 days. In addition, the service retrieves the reference properties data of the specified thing ID. Based on the value you specify for the *fromTime* and *toTime*, the service responds as described below:

- The difference between the *fromTime* and *toTime* is beyond 30 days, for example, `fromTime='2018-01-01T06:00:00Z', toTime='2020-01-01T06:00:00Z'`.
 - The service does not retrieve any value and displays an error message.
- You do not specify both *fromTime* and *toTime*, for example, `fromTime='', toTime=''`.
 - In case of time series data, the service scans through the data available from the current time until 30 days in the past and returns the data in the response payload. If the data is not available, the service returns null.
 - In case of master data, the service scans through the data available from the current time until it finds a non-null value. If the data is not available, the service returns null.
- You do not specify the *toTime*, for example, `fromTime='2018-01-01T06:00:00Z', toTime=''`.
 - In case of time series data, the service does not retrieve any value and displays an error message.
 - In case of master data, the service scans through the data available from the time you specified in the *fromTime* until the current time and retrieves the data, if available.
- You do not specify the *fromTime*, for example, `fromTime='', toTime='2020-01-01T06:00:00Z'`.
 - In case of time series data, the service scans through the data available from the *toTime* time until 30 days (2019-12-01T06:00:00Z) in the past. If data is available, the service returns the data in the response payload. If the data is not available, the service returns null.
 - In case of master data, the service scans through the data available until the time you specified in the *toTime* and retrieves the data, if available.

i Note

The service retrieves the snapshot data for properties that support multiple languages in [Locale](#) specific language. If data is not available, the service returns null for the property.

Request

URI: /v2/

Snapshot(thingId='<ID>',fromTime='<timestamp>',toTime='<timestamp>',dataCategory='<dataCategory>')

i Note

The thing ID is mandatory to retrieve the snapshot details.

HTTP Method: [GET](#)

Permissions: <thing>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip.deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
ID	Yes	string	You can specify one of the following values: • Unique thing identifier generated by the system while creating a thing. • Alternate thing identifier which is unique only within a specific tenant.
fromTime	Yes	timestamp	Time from which the snapshot details are retrieved for a non-null value of a property. The value for <code>fromTime</code> must correspond to UTC timestamp.

Parameter	Required	Data Type	Description
toTime	Yes	timestamp	Time up to which the snapshot details are retrieved for a non-null value of a property. The value for toTime must correspond to UTC timestamp.
dataCategory	Yes	enum	Filters the snapshot details based on data category enumeration values such as MasterData , DerivedData , TimeSeriesData , Parameters , and ReferencePropertyData .
propertySetType Name	No	string	Property set type name
propertySetID	No	string	Property identifier

Request Example

Read snapshot data of a thing within a specific time range

/v2/

```
Snapshot(thingId='503B8711B5D0445688E7FF7ACFC2177A',fromTime='2015-01-01T06:00:00Z',toTime='2015-01-05T06:00:00Z',dataCategory='TimeSeriesData')
```

Retrieves snapshot data for the specified thing ID within the time range: January 1, 2015 to January 5, 2015. The service retrieves data only for those properties that belong to the data category [TimeSeriesData](#).

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
_id	string	Internal identifier for a thing
_thingType	Array of thing type objects	Array of thing types
value	Array of property set objects	Array of property sets along with its properties for the corresponding thing type The properties block contains the value of the property and its time-stamp. In addition, the attribute details such as <code>_qualityCode</code>, <code>description</code>, and <code>_unitOfMeasure</code> are included in the properties block. A <code>_qualityCode</code> with value 0, indicates that property has a quality code value attached and a <code>_qualityCode</code> with value null, indicates that the property does not have a quality code value attached.

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
{
  "_id": "503B8711B5D0445688E7FF7ACFC2177A",
  "_thingType": [
    "core.automobiles:ABCXSeries"
  ],
  "_referenceProperty": [{
    "path": "/wheel_rr",
    "property": "Pressure",
    "_time": "2015-08-02T07:00:03Z",
    "com.sap.iot.core.UoM": "P",
    "com.sap.iot.core.LowerThreshold": 10,
    "com.sap.iot.core.UpperThreshold": 15,
    "com.sap.iot.core.LowLowerThreshold": 5,
    "com.sap.iot.core.UpperUpperThreshold": 20
  }, {
    "path": "/wheel_rr",
    "property": "Temperature",
    "_time": "2015-08-02T09:00:03Z",
    "com.sap.iot.core.UoM": "PA",
    "com.sap.iot.core.LowerThreshold": 10,
    "com.sap.iot.core.UpperThreshold": 20,
    "com.sap.iot.core.LowLowerThreshold": null,
    "com.sap.iot.core.UpperUpperThreshold": null
  }],
  "value": [{
    "core.automobiles:ABCXSeries": [{
      "/car": [{
        "BodyStyle": {
          "_value": "SUV",
          "_qualityCode": null,
          "_time": "2015-08-02T06:00:03Z",
          "_unitOfMeasure": ""
        }
      }, {
        "Class": {
          "_value": "1st",
          "_qualityCode": null,
          "_time": "2015-08-02T06:00:03Z",
          "_unitOfMeasure": ""
        }
      }, {
        "WheelBase": {
          "_value": "15",
          "_qualityCode": 9,
          "_time": "2015-08-02T06:00:03Z",
          "_unitOfMeasure": ""
        }
      }, {
        "RegistrationNumber": {
          "_value": "001",
          "_qualityCode": null,

```

```

        "_time": "2015-08-02T06:00:03Z",
        "_unitOfMeasure": ""
    }, {
        "Colour": {
            "_value": "Black",
            "_qualityCode": null,
            "_time": "2015-08-02T06:00:03Z",
            "_unitOfMeasure": ""
        }
    }],
    "_propertySetType": {
        "name": "core.automobiles:Car",
        "description": "Sensory parameters for car"
    }
}, {
    "/wheel_rr": [{
        "Pressure": {
            "_value": null,
            "_qualityCode": null,
            "_time": null,
            "_unitOfMeasure": "PA"
        }
    }, {
        "Temperature": {
            "_value": null,
            "_qualityCode": null,
            "_time": null,
            "_unitOfMeasure": ""
        }
    }],
    "_propertySetType": {
        "name": "core.automobiles:Wheel",
        "description": "Sensory parameters for wheel"
    }
}
}]]
}

```

16.3 Time Series Cold Store

The Time Series Cold Store stores non-aggregated time series data for Things of tenant beyond the specified retention period of the tenant.

Base URI

- **Formal description:** `http://<server address>[:<port number>][<path>]`
- **Example for a base URI in a cloud foundry environment:** `https://apiiot-coldstore.cfapps.eu10.hana.ondemand.com/Things`

Methods

HTTP Method	Action	URI	Scopes
<i>PUT</i>	Create Time Series Data or Derived Data for a Thing [page 982]	/Things('<thing ID>')/<thing type name>/<property set ID>	<coldstore>.c
<i>GET</i>	Read Time Series Data or Derived Data for a Thing [page 984]	/Things('<thing ID>')/<thing type name>/<property set ID>?timerange=<fromTime – toTime>	<coldstore>.r
<i>DELETE</i>	Delete Time Series Data or Derived Data [page 986]	/Things('<thing ID>')/<property set ID>?timerange=<From time>-<To time> (OR) / Things('<thingID>')/<property set ID>? timerange=<fromTime – toTime>	<coldstore>.d

16.3.1 Create Time Series Data or Derived Data for a Thing

Create time series data or derived data for a thing

With this service, you can create data for the property sets of a thing that belongs to a specific thing type. This service supports data creation for the property sets of data categories [TimeSeriesData](#) and [DerivedData](#).

Using this service, you can send the request payload in *JSON* format or as a binary file in *zip* or *gzip* format. The complete request payload must be compressed in a single binary file and you cannot split the request payload in multiple files when using *zip* file format.

Request

URI: /Things('<thing ID>')/<thing type name>/<property set ID>

Note

- The thing type has to be a fully qualified name that is prefixed with the package name.
- The *_time* property is mandatory for the creation of data categories [TimeSeriesData](#) and [DerivedData](#). Following are the supported formats:
 - "/Date(<ticks>)/"<ticks> = number of milliseconds since midnight Jan 1, 1970
For example, "/Date(1546322403148)/"
 - "YYYY-MM-DD HH:MM:SS[.fraction]"
For example, "2015-08-01T09:00:00.000Z"
- You can only create time series data corresponding to a point in time that is outside the retention period specified for the tenant using this service or ingesting via SAP IoT services for SAP BTP for the

Cloud Foundry Environment (Internet of Things service). When you use this service, if the time stamp is within the retention period, an error occurs.

- Though the data creation time is not within the retention period, you cannot update existing data using this service for the properties of the property set type that are marked as personal data or sensitive data using the predefined annotations `com.sap.apptot.security:pii` and `com.sap.apptot.security:spi`.
- This service only supports request with business time value on or after `1970-01-01T00:00:00.000Z`.
- Aggregates are not calculated for the time series data created using this service. Also, for data you created earlier, when you update it outside the retention period using this service, the aggregates are not updated.

HTTP Method: *PUT*

Permissions: `<coldstore>.c`

Request Header Parameters

Header	Required	Description
content-encoding	No	application/zip or application/gzip

i Note
Indicates the content (request payload) to be processed is in application/zip or application/gzip file format.

Request Parameters

Parameter	Required	Data Type	Description
thingID	Yes	String	Internal identifier for a thing.
thingTypeName	Yes	String	Name of a thing type.
propertySetID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/Things('<thing ID>')/core.automobiles:ABCXSeries/wheel_fl
```

Response

Response Status and Error Codes

Code	Description
200	Data of category <i>TimeSeriesData</i> or <i>DerivedData</i> for the specified thing created successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. In addition, you can encode the request payload in *JSON* format to *zip* or *gzip* file format using the request header parameter `content-Encoding`. The *JSON* for this method has the structure as specified in the following example.

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100"
  }, {
    "_time": "2015-08-02T06:00:03Z",
    "Pressure": "34",
    "Temperature": "120"
  }]
}
```

16.3.2 Read Time Series Data or Derived Data for a Thing

Retrieves property set data for the specified thing

With this service, you can retrieve the values of property sets of a thing that belongs to a specific thing type. You can request the values for a specific time range. The service retrieves the values of property sets of data categories *TimeSeriesData* or *DerivedData*.

Request

URI: `/Things('<thing ID>')/<thing type name>/<property set ID>?timerange=<fromTime - toTime>`

i Note

- The thing type has to be a fully qualified name that is prefixed with the package.
- The service only retrieves data corresponding to a time range that is not within the retention period specified for the tenant. An error occurs if the time range is within the retention period.

- The time range you specify should not be greater than 48 hours.
- This service only supports request with business time value on or after 1970-01-01T00:00:00.000Z.

HTTP Method: [GET](#)

Permissions: <coldstore>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

Parameter	Required	Data Type	Description
thingID	Yes	String	Internal identifier for a thing.
thingTypeName	Yes	String	Name of the thing type.
propertySetID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type
fromTime	Yes	timeStamp	Corresponds to the time value from which the time series data is retrieved for a non-null value of a property
toTime	Yes	timeStamp	Corresponds to the time value until which the time series data is retrieved for a non-null value of a property

Request Example

```
/Things('<thing ID>')/core.automobiles:ABCXSeries/ wheel_fl?
timerange=2015-08-01T09:00:00Z-2015-08-01T11:00:00Z
```

Retrieves property set data of the property set `wheel_fl` for the thing ID `core.automobiles:ABCXSeries` corresponding to a time range of two hours on August 1, 2015.

Response

Response Properties

Property	Type	Description
value	Array of thing data objects	An array of data objects (for example, time series data) for a thing or property set type.

Response Status and Error Codes

Code	Description
200	Data for one or more things retrieved successfully

Payload

```
{
  "value": [{
    "_time": "2015-08-01T09:00:00Z",
    "Pressure": "36",
    "Temperature": "100"
  }, {
    "_time": "2015-08-02T06:00:03Z",
    "Pressure": "34",
    "Temperature": "120"
  }]
}
```

16.3.3 Delete Time Series Data or Derived Data

Delete time series data or derived data for a thing

With this service, you can delete the time series data for the specified thing and property set type corresponding to the time range provided.

Request

URI: /Things('<thing ID>')/<property set ID>?timerange=<From time>-<To time>

i Note

- You must specify a time range to be able to delete the time series data.
- The time range you specify should not be greater than 48 hours.
- The service only deletes data corresponding to a time range that is not within the retention period specified for the tenant.

- This service only supports request with business time value on or after 1970-01-01T00:00:00.000Z.

HTTP Method: *DELETE*

Permissions: <coldstore>.d

Request Parameters

Parameter	Required	Data Type	Description
thingID	Yes	String	Internal identifier for a thing.
propertySetID	Yes	String	Identifier of the property set.

Request Example

```
/Things('<thingID>')/core.automobiles:ABCXSeries/car?  
timerange=2015-08-01T06:00:00Z-2015-08-01T08:00:00Z
```

Response

Response Status and Error Codes

Code	Description
200	Time series data beyond retention period deleted successfully.

16.3.4 Export Time Series Data

Overview

The time series data for the things of a tenant is stored in compressed format. For data analytics or machine learning scenarios, there is a need to extract time series data for a longer duration spanning across multiple months or years. In addition, before you offboard a tenant, you might want to read and export the entire available time series data. The service explained in this section enables you to export all time series data and derived data to a file format GZIP, so that the data can be used as is without any need for de-serialization logic. Using this service, you can export data up to 7GB in a single request. If the data is beyond 7GB, you must export the data in multiple requests by splitting the date range. The export of time series data is supported only for those tenants onboarded in and after 2010b release. For the already existing tenants or onboarded tenants, the feature will be supported in one of the future releases.

Base URI:

- To initiate the data export and read the data export status: <https://coldstore-export-sap.cfapps.eu10.hana.ondemand.com/>
- To download the exported data: <https://coldstore-downloader-sap.cfapps.eu10.hana.ondemand.com/>

Methods

HTTP Method	Action	URI
POST	Initiate Time Series Data Export [page 988]	/v1/InitiateDataExport/<<property set type name>>?timerange=<<from_timedate>>-<<to_timedate>>
GET	Read Time Series Data Export Status [page 990]	/v1/DataExportStatus?requestId=<<guid>>
GET	Download Time Series Data [page 991]	/v1/DownloadData('<<requestId>>')

Common Headers

Common Request Headers

Header	Required	Description
Authorization	Yes	Bearer <access-token>
Content-Type	Yes	application-json

Tutorial

[Export Time Series Data](#) 

16.3.4.1 Initiate Time Series Data Export

Initiate export of time series data

Usage

With this method, you can initiate the export of time series data. You can specify a date range for which you can export the data. The date range should be greater than 48 hours and less than 365 days. You cannot export latest data immediately after the data ingestion. A minimum delay of one day is expected. The date range corresponds to UTC date and time. For example, assume the data is ingested with timestamp 2020-09-04T09:10:00.000Z IST. The data will be available for export only after 2020-09-05T14:40:00.000Z IST.

If you want data until current time (for n number of days until current time) for analysis, it is advisable to retrieve data using the method [Read Time Series Data or Derived Data for a Thing \[page 953\]](#).

The method validates if the request for initiating the data export is a duplicate of an already initiated request.

- If it is a duplicate request and if the earlier request is expired, the method generates a new request ID and initiates the data export.
- If it is a duplicate request and if the earlier request is not expired, the method returns the HTTPS status code 208 and displays the details of the earlier request.
 - For the next seven days, the request with the same property set type name and the same time range is a duplicate request and the method will always fetch the same request ID generated in the initial request.
 - The exported data will not contain new/latest values, if any, added during the seven days.
 - Only after seven days, when you initiate the request for export of data for the same property set type name and the same time range, the method will treat it as a new request and includes the new/latest values in the exported data.
- If it is not a duplicate request, the method continues with the next step of verifying if the data is available.

The method verifies if data is available for the specified date range.

- If data is available, the method returns the HTTPS status code 202 and displays the request ID in the response payload and in the response header. You can check the status of the data export using this request ID.
- If the data to be exported is larger than 7GB, the method returns an error message with HTTP status code 400 and suggests different date ranges using which you can export data of size smaller than 7GB.

Request

URI: `/v1/InitiateDataExport/<<property set type name>>?timerange=<<yyyy-mm-dd>>-<<yyyy-mm-dd>>`

HTTP Method: `POST`

Permissions: `<export>.r`

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Property set type name	Yes	String	Unique identifier of the property set type	Path
FromDate	Yes	Date	The date from when you want to export the data.	Path
ToDate	Yes	Date	The date until when you want to export the data.	Path

Request Example

`/v1/InitiateDataExport/<<property set type name>>?timerange=2018-01-01-2018-12-31`

The service exports data available from January 1, 2018 until December 31, 2018.

Response

Response Headers

Header	Description
RequestId	Unique identifier of the request using which you can retrieve the status of the data export request

Response Status and Error Codes

Code	Description
200	Data export is initiated successfully

Response Example

```
{
  "RequestId": "<<RequestId>>"
}
```

16.3.4.2 Read Time Series Data Export Status

Read status of the request for time series data export

Usage

With this method, you can retrieve the status of the request initiated for the export of time series data. The following are the possible statuses:

- Initiated: The request is placed successfully.
- Submitted: The request for data export is initiated and the method is retrieving the data and preparing for the export process.
- Failed: The request for data export failed due to various reasons. The reasons are listed in the response payload.
- Exception: The system retried to initiate the data export but failed.
- Ready for Download: The request for data export succeeded and the data is available in a file format for download.
- Expired: The data that is ready for download is available only for seven days, beyond which the exported data is not available for download. You should re-initiate the request for data export.

Request

URI: /v1/DataExportStatus?requestId=<request ID>

HTTP Method: *GET*

Permissions: <export>.r

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
requestId	Yes	String	Unique identifier of the request	Path

Request Example

/v1/DataExportStatus?requestId=aaaa1111dddd1111gggg44445555tttt

Response

Response Status and Error Codes

Code	Description
200	Status of the data export request is retrieved successfully

Response Example

```
{
  "requestId": "aaaa1111dddd1111gggg44445555tttt",
  "Status": "Initiated"
}
```

16.3.4.3 Download Time Series Data

Download the exported time series data

Usage

With this method, you can download the file that contains the exported time series data for the specified date range and for a particular property set type. You should provide the request ID generated for the data export initiation request. Based on the request ID, the service retrieves the files with exported data and allows you to

download the file. The downloaded zip file contains .CSV files that correspond to the respective epoch days for which the data for the requested property set type is available. You should download the file with exported data within seven days after initiating the request for data export. Beyond seven days, the file will be deleted, and you must re-initiate the data export request.

Request

URI: `/v1/DownloadData('<requestId>')`

HTTP Method: [GET](#)

Permissions: `<export>.r`

Request Headers

Header	Required	Description
Range	No	Specify the number of bytes to be downloaded. The supported format to specify the byte range are as follows: - bytes=1000-2000 Method downloads 1000 bytes of data starting from the 1000th byte until 2000th byte - bytes=2000 The method downloads 2000 bytes of data starting from the end of the file) - bytes=100- The method downloads data starting from 100th byte until the end of the file i Note If you specify this parameter, then the <code>If-Match</code> parameter is also mandatory.
If-Match	No	Latest ETag value i Note If you request for data download based on a range of bytes, then this parameter is mandatory.
If-Modified-Since	No	Data that is modified since the time specified in this parameter. Valid format: <code>EEE, dd MMM yyyy HH:mm:ss zzz</code>. For example, <code>Thu, 30 Apr 2020 12:00:00 GMT</code>.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
requestId	Yes	String	Unique identifier of the request	Path

Request Example

```
/v1/DownloadData('aaaa1111dddd1111gggg44445555tttt')
```

Example 1: The following is an example of downloaded CSV file for a property set type
`core.automobiles:Engine.`

_TIME	THING_ID	_NPST	engine-Type	serial-Number	pressure	tempera- ture	oilTemp	speed	_Thing- Type	_NPST
1578249 000012	88GHHJ H764827 HGGJ43 544	V_engine	InlineEn- gine	2386476 0748566 64698L	205	47.61	75.254	520.7361 142	core.a utomob iles:A BCXSer ies	V_engi ne

Example 2: The following is an example of downloaded CSV file for a property set type
`core.automobiles:vehicleInfo`

_TIME	THING_ID	NPST	Temperature	Engine-Presure	Power	Audio	Weight	Central-Locking	Height	Card	EngineID	Last Service-Time	Last Service-Date	Manufacture-Date	Other-Features	_ThingType	_NPST
1580050462000	BAAE79B4180B40D3B59CFCF98DB2F0B2	Car-Prop s	203 de-gree s Fah-re-nheit	85	{"value": 86, "quality-Cod e": 8}	{"value": "BOS E pre-miu m soun d sys-tem with 2 spea kers", "quality-Cod e": 0}	19.5 2	FALSE	1211	BAAE79B4180B40D3B59CFCF98DB2F0B2	24E2FA06093C414089CB3FD58BD925E4	1573052062000	1573052062000	1483282462000	{"Keyless-En-try": "mo-pres ent", "Col-our": "Cle ar Whit e, Steel Sil-ver", "Audio-Spea kers": "4", "Whe el-base": "26 10m m", "Boot spac e": "4 33l", "Fro nt USB char ging port": false, "Re ar USB char ging port": true}	core. au-to-mo-biles: ABC XSer ies	ar-Prop s

Response

Response Status and Error Codes

Code	Description
200	File containing the exported data is downloaded successfully

17 Thing Time Series Data: OData Service

Retrieves time series data

Overview

You can use this service to retrieve time series data of the property set type for the specified thing. You can request for the following information using this service:

- Single measurements for specific things for the specified timestamp
- Multiple measurements for specific things (or all things the user is allowed to access) for the specified time range
- Aggregated measurements for specific things (or all things the user is allowed to access) for the specified time range

Note

You can use the property thing ID to retrieve multiple measurements or aggregates for the specified list of things. The number of thing IDs in the request URL must not exceed 256. If you specify more than 256 thing IDs, the method returns the 413 HTTPS status code. If you do not specify the thing IDs, the service retrieves multiple measurements or aggregates for all things you have authorized access but limited to 256 things.

OData Version: 2.0

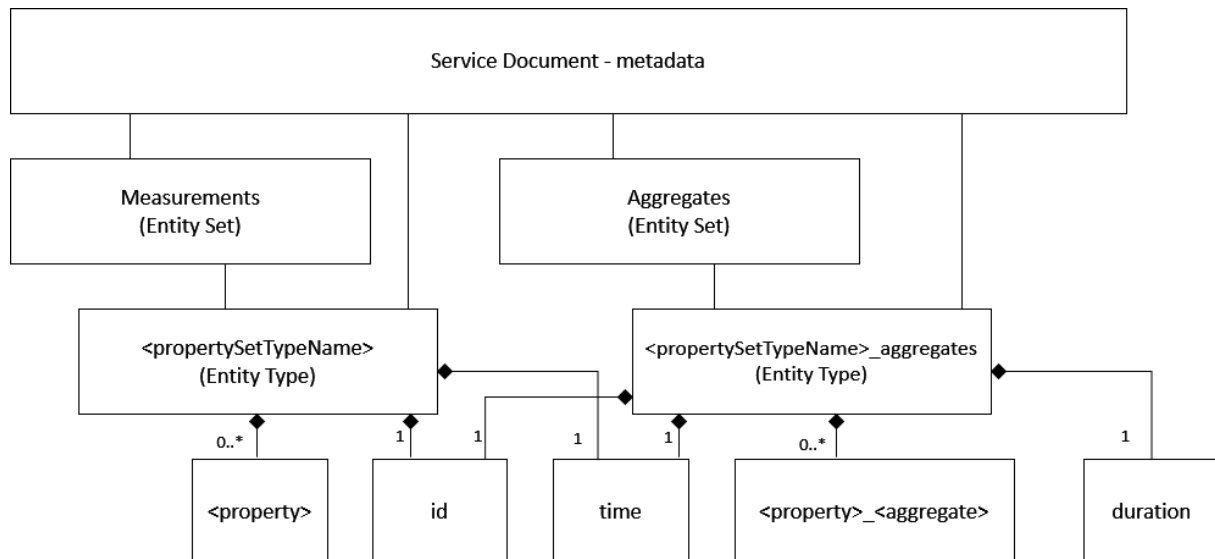
Root URI: `http://<server address>[:<port number>]/<property set type name>`

Example for a Root URI in a cloud foundry environment: `https://analytics-thing-sap.cfapps.eu10.hana.ondemand.com/<property set type name>`

Permissions: All scopes that already exist for the Thing Modeler apps are applicable to use this service. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Entity Data Model

The following diagram shows the EDM of Time Series OData service:



Service Metadata URI: `http://<server address>[:<port number>]/<property set type name>/$metadata`

Resources

Resource	Description	Path
Aggregates [page 1001]	Provides (read) access to aggregated thing time series data	/aggregates
Measurements [page 1010]	Provides (read) access to thing time series data	/measurements

17.1 Read Metadata

Retrieves metadata of time series OData service

i Note

You cannot specify multiple property set types in the request URL.

Request

URI: `/<property set type name>/$metadata`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Request Example

`/<property set type name>/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

The request URL `/core.automobiles.aggrePST/$metadata` retrieves the following response:

```
<EntityType Name="aggrePST">
  <Key>
    <PropertyRef Name="id"></PropertyRef>
    <PropertyRef Name="time"></PropertyRef>
  </Key>
  <Property Name="id" Type="Edm.String" sap:aggregation-
role="dimension" xmlns:sap="http://www.sap.com/Protocols/SAPData"></Property>
  <Property Name="time" Type="Edm.DateTime" sap:aggregation-
role="dimension" xmlns:sap="http://www.sap.com/Protocols/SAPData"></Property>
  <Property Name="pressure" Type="Edm.Int32" Nullable="true"></
Property>
  <Property Name="temperature" Type="Edm.Int32" Nullable="true"></
Property>
  <Property Name="_ThingType" Type="Edm.String" Nullable="true"></
Property>
  <Property Name="_NPST" Type="Edm.String" Nullable="true"></
Property>
  <Property Name="thingType" Type="Edm.String" Nullable="true"></
Property>
  <Property Name="path" Type="Edm.String" Nullable="true"></
Property>
</EntityType>
```

```

        <EntityType Name="aggrePST_aggregates" sap:semantics="aggregate"
xmlns:sap="http://www.sap.com/Protocols/SAPData">
    <Key>
        <PropertyRef Name="_row_id"></PropertyRef>
    </Key>
    <Property Name="_row_id" Type="Edm.String"></Property>
    <Property Name="id" Type="Edm.String" sap:aggregation-
role="dimension" xmlns:sap="http://www.sap.com/Protocols/SAPData"></Property>
    <Property Name="time" Type="Edm.DateTime" sap:aggregation-
role="dimension" xmlns:sap="http://www.sap.com/Protocols/SAPData"></Property>
    <Property Name="duration" Type="Edm.String" Nullable="true"
sap:aggregation-role="dimension" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="_ThingType" Type="Edm.String" Nullable="true"
sap:aggregation-role="dimension" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="_NPST" Type="Edm.String" Nullable="true"
sap:aggregation-role="dimension" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="thingType" Type="Edm.String" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="path" Type="Edm.String" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_MIN" Type="Edm.Int32" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_MAX" Type="Edm.Int32" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_AVG" Type="Edm.Double" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_SUM" Type="Edm.Double" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_COUNT" Type="Edm.Int64" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_STDDEV" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="pressure_FIRST" Type="Edm.Int32" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_LAST" Type="Edm.Int32" Nullable="true"
sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/Protocols/
SAPData"></Property>
    <Property Name="pressure_TFIRST" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="pressure_TLAST" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="pressure_TMIN" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="pressure_TMAX" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="pressure_PERCENT_GOOD" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    <Property Name="temperature_MIN" Type="Edm.Int32"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>

```

```

        <Property Name="temperature_MAX" Type="Edm.Int32"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_AVG" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_SUM" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_COUNT" Type="Edm.Int64"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_STDDEV" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_FIRST" Type="Edm.Int32"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_LAST" Type="Edm.Int32"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_TFIRST" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_TLAST" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_TMIN" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_TMAX" Type="Edm.DateTime"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
        <Property Name="temperature_PERCENT_GOOD" Type="Edm.Double"
Nullable="true" sap:aggregation-role="measure" xmlns:sap="http://www.sap.com/
Protocols/SAPData"></Property>
    </EntityType>
    <ComplexType Name="GeoLocation">
        <Property Name="latitude" Type="Edm.Single"></Property>
        <Property Name="longitude" Type="Edm.Single"></Property>
    </ComplexType>
    <EntityContainer Name="aggrePST_Container"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="measurements"
EntityType="core.automobiles.aggrePST"></EntitySet>
        <EntitySet Name="aggregates"
EntityType="core.automobiles.aggrePST_aggregates"></EntitySet>
    </EntityContainer>
</Schema>
<Schema Namespace="com.sap.apptot.timeseries" xmlns="http://
schemas.microsoft.com/ado/2008/09/edm">
    <ComplexType Name="GeoLocation">
        <Property Name="latitude" Type="Edm.Single"></Property>
        <Property Name="longitude" Type="Edm.Single"></Property>
    </ComplexType>
</Schema>
</edmx:DataServices>
</edmx:Edmx>

```

Related Information

[Thing Time Series Data: OData Service \[page 996\]](#)

17.2 Aggregates

Overview

The Aggregates resource provides access to aggregates of the time series data of things. The aggregates are calculated based on the following time intervals:

- Aggregates with granularity of less than 2 minutes are calculated precisely (on raw data)
- Aggregates with granularity between 2 minutes and 1 hour size are calculated based on 2-minute pre-calculated aggregates
- Aggregates with granularity between 1 hour and 1 day (24 hours) are calculated based on 1-hour pre-calculated aggregates
- Aggregates with granularity between 1 day (24 hours) and 1 week (7 days) are calculated on 1-day pre-calculated aggregates
- Aggregates with granularity of more than 1 week (7 days) are calculated on 7-days pre-calculated aggregates

For example, if you request for aggregates for 7 minutes, the service returns the multiple of 2-minute pre-calculated aggregates which is 6 minutes.

Resource Path: `http://<server address>[:<port number>]/<property set type name>/aggregates`

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Aggregates of Measurements [page 1002]	<code>/<property set type name>/aggregates?\$filter=<></code>

Related Information

[Thing Time Series Data: OData Service \[page 996\]](#)

17.2.1 Read Aggregates of Measurements

Retrieves aggregates of measurements

With this method, you can retrieve aggregates of measurements for specified things or for all things (you have authorization to access). You can retrieve data for a specific time range. The method retrieves a maximum of 1000 result entries per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload.

You must use the `$filter` query parameter on the `time` property to define the time range to filter data. You can use the property `thing ID` to retrieve aggregates for the specified list of things. If you do not specify the thing IDs, the service retrieves aggregates for all things (you have authorization to access). The number of thing IDs in the request URL must not exceed 256. If you specify more than 256 thing IDs, the method returns the 413 HTTPS status code. If you do not specify the thing IDs, the service retrieves multiple aggregates for all things you have authorized access but limited to 256 things.

i Note

The system only supports a maximum storage capacity of 10GB to store aggregates per property set type.

Properties

Dimension Property

The service does not allow you to aggregate the dimension properties and the service retains the original names without additional suffix for the dimension properties.

The aggregate entity type in the `$metadata` document contains multiple properties for each non-dimensional property of a property set type, one for each supported aggregate type. The resulting property names have suffix like `_COUNT` that corresponds to the following aggregate type:

- `COUNT, FIRST, LAST, TFIRST, TLAST` - supported for all base-types
- `MIN, MAX, TMIN, TMAX` - supported for all comparable base-types
- `SUM, AVG, STDDEV` (sum, average, and standard deviation) - supported for numeric base-types

i Note

For more information about how to define a property of type *Dimension*, see [Create a Property Set](#).

Duration Property

In addition to the standard properties `id` (thing ID) and `time`, the entity types contain the duration property that defines the "size" of the aggregates. This property only accepts data of type *String* and supports one of the following formats:

- `[#D][T[#H][#M][#[.#]S]]` for concrete time periods in Days (24h), Hours, Minutes and (Sub-)Seconds.
- `[#Y][#M]` for logical time periods Years and Months.

The query parameter `$filter` only supports filter operator `eq` for the duration property.

Examples

The following are few examples to explain how aggregates are retrieved based on the duration.

- `duration=T0.5S`, retrieves 500 milliseconds aggregates (based on single measurements)

- `duration=T10S`, retrieves 10 seconds aggregates (based on single measurements)
- `duration=T10M`, retrieves 10 minutes aggregates (based on 2-minute preaggregates)
- `duration=T12H`, retrieves 12 hours aggregates (based on hourly preaggregates)
- `duration=2D`, retrieves 2 days or 48 hours aggregates (based on hourly aggregates)
- `duration=14D`, retrieves 14 days aggregates (based on weekly preaggregates)
- `duration=3M`, retrieves 3 months aggregates (based on daily preaggregates)
- `duration=1Y`, retrieves 1 year aggregates (based on daily preaggregates)

Due to limited granularities, the following durations might yield deviating results:

- `duration=T15M`, retrieves 14 minutes aggregates (based on 2-minute preaggregates)
- `duration=T1H30M`, retrieves 1 hour aggregates (based on hourly preaggregates)
- `duration=4DT12H10M30S`, retrieves 4 days aggregates (based on daily preaggregates)
- `duration=15D`, retrieves 14 days or 2 weeks aggregates (based on weekly preaggregates)

Grouping of Aggregates

You can group the aggregates based on the following properties:

- Dimension property
- `id` property
- time (duration) property

You can group the aggregates based on the `id` and dimension properties, by specifying the properties in the `$select` query parameter.

You can group the aggregates based on the `time` property, by specifying the duration property in `$filter` query parameter. You use the duration property to define the granularity.

If you do not specify `$select`, the service retrieves all supported aggregates for all available structure fields. The service groups the aggregates based on the properties `id` and dimension fields.

Single Aggregates or Snapshot

If you do not specify the duration in `$filter` query parameter, the service retrieves single result per group. The service calculates the aggregates for the entire time range specified in the query.

If you specify the `LAST` aggregate type along with a time range until the current time, the service retrieves the latest values of the selected properties.

Request

URI: `/<property set type name>/aggregates?$filter=id eq '<thing ID>' and time ge datetime'<date time>' and time lt datetime'<date time>' and duration eq 'T60M'`

Note

`$filter` on time property is mandatory in the request URL. `$filter` on other supported properties are optional.

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Query Request Parameters

Parameter	Required	Data Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are <code>id</code> , <code>time</code> , <code>duration</code> , dimension properties, <code>_row_id</code> , and each aggregate of fields of the property set type assigned to the thing (for example, <code><field>_<aggregate></code>). For productive use and better results, we recommended you to always include all the valid fields in the <code>\$select</code> query.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; <code>time</code> is the only field supported. To sort the result set, use asc for the ascending order and desc for the descending order.
\$top	No	Integer	Number of records to include in the result set

Parameter	Required	Data Type	Description
\$filter	Yes	String	Filter condition to be applied; valid fields are <code>id</code> , <code>time</code> , <code>duration</code> , and each aggregate of fields of the property set type assigned to the thing. The filter operators supported are eq , lt , gt , le , ge , and ne . However, you can only use the filter operator eq to compare the field <code>id</code> .

Request Example

```
/<property set type name>/aggregates?$filter=id eq 'id1' and time ge
datetime'2017-01-01T00:00:00' and time lt datetime'2017-03-01T00:00:00'
```

Retrieves aggregates of measurements for the thing `id1` between the time range `2017-01-01T00:00:00` and `2017-03-01T00:00:00`.

```
/<property set type name>/aggregates?
$select=id,time,duration,dimension1,dimension2,sensordata_MAX&$filter=id eq 'id1'
and time ge datetime'2017-01-01T00:00:00' and time lt datetime'2017-01-01T01:00:00'
and duration eq 'T60M'&$orderby=time desc&$top=10
```

Retrieves aggregates of measurements for the thing `id1` between the time range `2017-01-01T00:00:00` and `2017-01-01T01:00:00` and for a duration of 60 minutes, grouped by dimension properties `dimension1` and `dimension2`. The result set contains the selected fields `id`, `time`, `duration`, and the dimension properties `dimension1`, `dimension2`, and the aggregate `sensordata_MAX`. The retrieved entries are sorted by `time` in descending order.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully (includes empty result set)

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as illustrated in the following examples.

Example 1

The request `/core.automobiles:aggrePST/aggregates?$filter=time ge datetime'2018-01-20T00:00:00' and time lt datetime'2019-01-25T00:00:00'` retrieves the following result:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z%2Cduration%3DALL%28T8880H%29%2Cid%3DA2E9050BAFD7476B97AC4CCA0E309A35%2CthingType%3Dcore.automobiles%3AaggreTT%2Cpath%3Daggrepropset')",
        "uri": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z%2Cduration%3DALL%28T8880H%29%2Cid%3DA2E9050BAFD7476B97AC4CCA0E309A35%2CthingType%3Dcore.automobiles%3AaggreTT%2Cpath%3Daggrepropset')",
        "type": "core.automobiles.aggrePST_aggregates"
      },
      "row_id": "time=2018-01-20T00:00:00Z,duration=ALL(T8880H),id=A2E9050BAFD7476B97AC4CCA0E309A35,thingType=core.automobiles:aggreTT,path=aggrepropset",
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1516406400000)/",
      "duration": "ALL(T8880H)",
      "ThingType": "core.automobiles:aggreTT",
      "NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
      "path": "aggrepropset",
      "pressure_MIN": 20,
      "pressure_MAX": 274,
      "pressure_AVG": "132.0",
      "pressure_SUM": "792.0",
      "pressure_COUNT": "6",
      "pressure_STDDEV": "111.21750461745368",
      "pressure_FIRST": 20,
      "pressure_LAST": 274,
      "pressure_TFIRST": "/Date(1539993600000)/",
      "pressure_TLAST": "/Date(1548115200000)/",
      "pressure_TMIN": "/Date(1539993600000)/",
      "pressure_TMAX": "/Date(1548115200000)/",
      "pressure_PERCENT_GOOD": "100.0",
      "temperature_MIN": 32,
      "temperature_MAX": 368,
      "temperature_AVG": "187.66666666666666",
      "temperature_SUM": "1126.0",
      "temperature_COUNT": "6",
      "temperature_STDDEV": "154.45999122390526",
      "temperature_FIRST": 34,
      "temperature_LAST": 368,
      "temperature_TFIRST": "/Date(1539993600000)/",
      "temperature_TLAST": "/Date(1548115200000)/",
      "temperature_TMIN": "/Date(1540166400000)/",
      "temperature_TMAX": "/Date(1548115200000)/",
      "temperature_PERCENT_GOOD": "100.0"
    }],
    {
      "__metadata": {
        "id": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z%2Cduration%3DALL%28T8880H%29%2Cid%3D39F18733B0734903A67F7A1D9B9791A4%2CthingType%3Dcore.automobiles%3AaggreTT2%2Cpath%3Daggrepropset2')",
        "uri": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z%2Cduration%3DALL%28T8880H%29%2Cid%3D39F18733B0734903A67F7A1D9B9791A4%2CthingType%3Dcore.automobiles%3AaggreTT2%2Cpath%3Daggrepropset2')",
        "type": "core.automobiles.aggrePST_aggregates"
      },
    }
  ]
}
```

```

        "_row_id":
"time=2018-01-20T00:00:00Z,duration=ALL(T8880H),id=39F18733B0734903A67F7A1D9B9791
A4,thingType=core.automobiles:aggreTT2,path=aggrepropset2",
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1516406400000)/",
        "duration": "ALL(T8880H)",
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2",
        "pressure_MIN": 20,
        "pressure_MAX": 874,
        "pressure_AVG": "238.66666666666666",
        "pressure_SUM": "1432.0",
        "pressure_COUNT": "6",
        "pressure_STDDEV": "294.8302713238396",
        "pressure_FIRST": 120,
        "pressure_LAST": 74,
        "pressure_TFIRST": "/Date(1546560000000)/",
        "pressure_TLAST": "/Date(1548028800000)/",
        "pressure_TMIN": "/Date(1547856000000)/",
        "pressure_TMAX": "/Date(1547769600000)/",
        "pressure_PERCENT_GOOD": "100.0",
        "temperature_MIN": 8,
        "temperature_MAX": 214,
        "temperature_AVG": "81.33333333333333",
        "temperature_SUM": "488.0",
        "temperature_COUNT": "6",
        "temperature_STDDEV": "74.06903686576614",
        "temperature_FIRST": 214,
        "temperature_LAST": 8,
        "temperature_TFIRST": "/Date(1546560000000)/",
        "temperature_TLAST": "/Date(1548028800000)/",
        "temperature_TMIN": "/Date(1548028800000)/",
        "temperature_TMAX": "/Date(1546560000000)/",
        "temperature_PERCENT_GOOD": "100.0"
    }
}
]
}
}

```

Example 2

The request `/core.automobiles:aggrePST/aggregates?$filter=id eq '39F18733B0734903A67F7A1D9B9791A4' and time ge datetime'2018-01-20T00:00:00' and time lt datetime'2019-01-25T00:00:00' and duration eq 'T60M'&$select=id,time,duration,pressure_MIN,pressure_MAX,thingType,path&$orderby=time desc&$top=5` retrieves the following result:

```

{
  "d": {
    "results": [{
      "_metadata": {
        "id": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-21T00%3A00%3A00Z%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
        "uri": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-21T00%3A00%3A00Z%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
        "type": "core.automobiles:aggrePST_aggregates"
      },
      "id": "39F18733B0734903A67F7A1D9B9791A4",
      "time": "/Date(1548028800000)/",
      "duration": "T1H",
      "_ThingType": "core.automobiles:aggreTT2",
      "_NPST": "aggrepropset2",

```

```

        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2",
        "pressure_MIN": 74,
        "pressure_MAX": 74
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-20T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-20T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "type": "core.automobiles:aggrePST_aggregates"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1547942400000)/",
        "duration": "T1H",
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2",
        "pressure_MIN": 72,
        "pressure_MAX": 72
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-19T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-19T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "type": "core.automobiles:aggrePST_aggregates"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1547856000000)/",
        "duration": "T1H",
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2",
        "pressure_MIN": 20,
        "pressure_MAX": 20
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-18T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-18T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
            "type": "core.automobiles:aggrePST_aggregates"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1547769600000)/",
        "duration": "T1H",
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2",
        "pressure_MIN": 874,
        "pressure_MAX": 874
    },
    {
        "__metadata": {

```

```

        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-06T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2019-01-06T00%3A00%3A00Z
%2Cduration%3DT1H%2Cid%3D39F18733B0734903A67F7A1D9B9791A4')",
        "type": "core.automobiles.aggrePST_aggregates"
    },
    "id": "39F18733B0734903A67F7A1D9B9791A4",
    "time": "/Date(1546732800000)/",
    "duration": "T1H",
    "_ThingType": "core.automobiles:aggreTT2",
    "_NPST": "aggrepropset2",
    "thingType": "core.automobiles:aggreTT2",
    "path": "aggrepropset2",
    "pressure_MIN": 272,
    "pressure_MAX": 272
}
]
}
}

```

Example 3

The request `/core.automobiles:aggrePST/aggregates?$filter=id eq 'A2E9050BAFD7476B97AC4CCA0E309A35' and time ge datetime'2018-01-20T00:00:00' and time lt datetime'2019-01-25T00:00:00'` retrieves the following result:

```

{
  "d": {
    "results": [{
      "metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z
%2Cduration%3DALL%28T8880H%29%2Cid%3DA2E9050BAFD7476B97AC4CCA0E309A35%2CthingType
%3Dcore.automobiles%3AaggreTT%2Cpath%3Daggrepropset')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/aggregates('time%3D2018-01-20T00%3A00%3A00Z
%2Cduration%3DALL%28T8880H%29%2Cid%3DA2E9050BAFD7476B97AC4CCA0E309A35%2CthingType
%3Dcore.automobiles%3AaggreTT%2Cpath%3Daggrepropset')",
        "type": "iotae.citestl.core.taggregates.aggrePST_aggregates"
      },
      "_row id":
      "time=2018-01-20T00:00:00Z,duration=ALL(T8880H),id=A2E9050BAFD7476B97AC4CCA0E309A
35,thingType=core.automobiles:aggreTT,path=aggrepropset",
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1516406400000)/",
      "duration": "ALL(T8880H)",
      "_ThingType": "core.automobiles:aggreTT",
      "_NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
      "path": "aggrepropset",
      "pressure_MIN": 20,
      "pressure_MAX": 274,
      "pressure_AVG": "132.0",
      "pressure_SUM": "792.0",
      "pressure_COUNT": "6",
      "pressure_STDDEV": "111.21750461745368",
      "pressure_FIRST": 20,
      "pressure_LAST": 274,
      "pressure_TFIRST": "/Date(1539993600000)/",
      "pressure_TLAST": "/Date(1548115200000)/",
      "pressure_TMIN": "/Date(1539993600000)/",
      "pressure_TMAX": "/Date(1548115200000)/",
      "pressure_PERCENT_GOOD": "100.0",
      "temperature_MIN": 32,
    }
  ]
}

```

```

    "temperature_MAX": 368,
    "temperature_AVG": "187.66666666666666",
    "temperature_SUM": "1126.0",
    "temperature_COUNT": "6",
    "temperature_STDDEV": "154.45999122390526",
    "temperature_FIRST": 34,
    "temperature_LAST": 368,
    "temperature_TFIRST": "/Date(1539993600000)/",
    "temperature_TLAST": "/Date(1548115200000)/",
    "temperature_TMIN": "/Date(1540166400000)/",
    "temperature_TMAX": "/Date(1548115200000)/",
    "temperature_PERCENT_GOOD": "100.0"
  }
}
}

```

Related Information

[Aggregates \[page 1001\]](#)

17.3 Measurements

Retrieves measurements

With this service, you can retrieve single measurements for specific things for the specified timestamp. You can also retrieve multiple measurements for specific things (or all things the user is allowed to access) for the specified time range.

Resource Path: `http://<server address>[:<port number>]/<property set type name>/measurements`

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Single Measurement [page 1011]	<code>/<property set type name>/measurements(id='<thing ID>',time=datetime'<date time>')</code>

HTTP Method	Operation	URI
<i>GET</i>	Read Multiple Measurements [page 1013]	<code>/<property set type name>/measurements?\$filter=id eq '<thing ID1>' or id eq '<thing ID 2>' and time ge datetime'<date time>' and time lt datetime'<date time>'</code>

Related Information

[Thing Time Series Data: OData Service \[page 996\]](#)

17.3.1 Read Single Measurement

Retrieves single measurement

With this service, you can retrieve single measurement for a property set type used by the specified thing for a specific timestamp.

You can use the standard properties `id` (thing ID) and `time` to retrieve the single measurement value.

Request

URI: `/<property set type name>/measurements(id='<thing ID>', time=datetime'<date time>')`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Request Parameters

Parameter	Required	Data Type	Description
<code>id</code>	Yes	String	Unique identifier of the thing
<code>time</code>	Yes	DateTime	Corresponds to UTC date and time (with seconds precision)
<code>property set type name</code>	Yes	String	Name of the property set type

Request Example

```
<property set type name>/measurements(id='id1',time=datetime'2017-01-01T00:00:00')
```

Retrieves single measurement for the thing `id1` for the timestamp `2017-01-01T00:00:00`.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully (includes empty result set)
404	No data found for the specified property set type, thing ID, and time range

Payload

Format: *JSON*

```
/core.automobiles:aggrePST/  
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00:00:00')
```

```
{  
  "d": {  
    "__metadata": {  
      "id": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:  
443/  
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A  
00%3A00')",  
      "uri": "https://analytics-thing-sap-ci.cfapps.sap.hana.ondemand.com:  
443/  
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A  
00%3A00')",  
      "type": "core.automobiles.aggrePST"  
    },  
    "id": "A2E9050BAFD7476B97AC4CCA0E309A35",  
    "time": "/Date(1539993600000)/",  
    "pressure": 20,  
    "temperature": 34,  
    "_ThingType": "core.automobiles:aggreTT",  
    "_NPST": "aggrepropset",  
    "thingType": "core.automobiles:aggreTT",  
    "path": "aggrepropset"  
  }  
}
```

Related Information

[Measurements \[page 1010\]](#)

17.3.2 Read Multiple Measurements

Retrieves multiple measurements

With this method, you can retrieve multiple measurements for specific things (or all things the user is allowed to access) for the specified time range. The method retrieves a maximum of 1000 result entries per response. You can use the `__next` link to access subsequent results, if available.

You must use the `$filter` query parameter on the `time` property to define the time range to filter data. You can use the property `thing ID` to retrieve multiple measurements for the specified list of things. The number of thing IDs in the request URL must not exceed 256. If you specify more than 256 thing IDs, the method returns the 413 HTTPS status code. If you do not specify the thing IDs, the service retrieves multiple measurements for all things you have authorized access but limited to 256 things.

Request

URI: `/<property set type name>/measurements?$filter=id eq '<thing ID1>' or id eq '<thing ID 2>' and time ge datetime'<date time>' and time lt datetime'<date time>'`

i Note

`$filter` on time property is mandatory in the request URL. `$filter` on other supported properties is optional.

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: All scopes that already exist for the Thing Modeler apps are applicable. If you already have access to time series data in the thing model, you also have the rights to read analytical data. The same is applicable for administration rights.

Request Parameters

Parameter	Required	Data Type	Description
<code>property set type name</code>	Yes	String	Name of the property set type

Query Request Parameters

Parameter	Required	Data Type	Description
<code>\$select</code>	No	String	Select condition for the data fields to be included in the result set; valid fields are <code>id</code> , <code>time</code> , and all fields of the property set type assigned to the thing.

Parameter	Required	Data Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; <code>time</code> is the only field supported. To sort the result set, use asc for the ascending order and desc for the descending order.
\$top	No	Integer	Number of records to include in the result set.
\$filter	Yes	String	Filter condition to be applied; valid fields are <code>id</code> , <code>time</code> , and all fields of the property set type assigned to the thing. The filter operators supported are eq , lt , gt , le , ge , and ne . However, you can only use the filter operator eq to compare the field <code>id</code> .

Request Example

```
/<property set type name>/measurements?$filter=id eq 'id1' or id eq 'id2' and time ge datetime'<2017-01-01T00:00:00>' and time lt datetime'<2018-01-01T00:00:00>'
```

Retrieves multiple measurements for the specified things `id1` and `id2` between the time range 2017-01-01T00:00:00 and 2018-01-01T00:00:00.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully (includes empty result set)

Payload

Format: [JSON](#)

Media type supported are [JSON](#) and [XML](#). The [JSON](#) format for this method has the structure as illustrated in the following examples.

Example 1

The request `/core.automobiles:aggrePST/measurements?$filter=id eq 'A2E9050BAFD7476B97AC4CCA0E309A35' and time ge datetime'2018-01-20T00:00:00' and time lt datetime'2019-01-25T00:00:00'` retrieves the following result:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-22T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-22T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1548115200000)/",
      "pressure": 274,
      "temperature": 368,
      "_ThingType": "core.automobiles:aggreTT",
      "_NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
      "path": "aggrepropset"
    },
    {
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-05T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-05T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1546646400000)/",
      "pressure": 232,
      "temperature": 342,
      "_ThingType": "core.automobiles:aggreTT",
      "_NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
      "path": "aggrepropset"
    },
    {
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-02T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-02T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1546387200000)/",
      "pressure": 220,
      "temperature": 314,
      "_ThingType": "core.automobiles:aggreTT",
      "_NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
    }
  ]
}
```

```

        "path": "aggrepropset"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-24T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-24T00%3A
00%3A00')",
            "type": "core.automobiles.aggrePST"
        },
        "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
        "time": "/Date(1540339200000)/",
        "pressure": 24,
        "temperature": 36,
        "_ThingType": "core.automobiles:aggreTT",
        "_NPST": "aggrepropset",
        "thingType": "core.automobiles:aggreTT",
        "path": "aggrepropset"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-22T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-22T00%3A
00%3A00')",
            "type": "core.automobiles.aggrePST"
        },
        "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
        "time": "/Date(1540166400000)/",
        "pressure": 22,
        "temperature": 32,
        "_ThingType": "core.automobiles:aggreTT",
        "_NPST": "aggrepropset",
        "thingType": "core.automobiles:aggreTT",
        "path": "aggrepropset"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A
00%3A00')",
            "type": "core.automobiles.aggrePST"
        },
        "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
        "time": "/Date(1539993600000)/",
        "pressure": 20,
        "temperature": 34,
        "_ThingType": "core.automobiles:aggreTT",
        "_NPST": "aggrepropset",
        "thingType": "core.automobiles:aggreTT",
        "path": "aggrepropset"
    }
}
]
}

```

Example 2

The request `/core.automobiles:aggrePST/measurements?$filter=time ge datetime'2018-01-20T00:00:00' and time lt datetime'2019-01-25T00:00:00'` retrieves the following result:

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-22T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-22T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
      "time": "/Date(1548115200000)/",
      "pressure": 274,
      "temperature": 368,
      "_ThingType": "core.automobiles:aggreTT",
      "_NPST": "aggrepropset",
      "thingType": "core.automobiles:aggreTT",
      "path": "aggrepropset"
    },
    {
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-21T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-21T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "39F18733B0734903A67F7A1D9B9791A4",
      "time": "/Date(1548028800000)/",
      "pressure": 74,
      "temperature": 8,
      "_ThingType": "core.automobiles:aggreTT2",
      "_NPST": "aggrepropset2",
      "thingType": "core.automobiles:aggreTT2",
      "path": "aggrepropset2"
    },
    {
      "__metadata": {
        "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-20T00%3A
00%3A00')",
        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-20T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
      },
      "id": "39F18733B0734903A67F7A1D9B9791A4",
      "time": "/Date(1547942400000)/",
      "pressure": 72,
      "temperature": 42,
      "_ThingType": "core.automobiles:aggreTT2",
```

```

        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-19T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-19T00%3A
00%3A00')",
            "type": "core.automobiles:aggrePST"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1547856000000)/",
        "pressure": 20,
        "temperature": 14,
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-18T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-18T00%3A
00%3A00')",
            "type": "core.automobiles:aggrePST"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1547769600000)/",
        "pressure": 874,
        "temperature": 68,
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-06T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-06T00%3A
00%3A00')",
            "type": "core.automobiles:aggrePST"
        },
        "id": "39F18733B0734903A67F7A1D9B9791A4",
        "time": "/Date(1546732800000)/",
        "pressure": 272,
        "temperature": 142,
        "_ThingType": "core.automobiles:aggreTT2",
        "_NPST": "aggrepropset2",
        "thingType": "core.automobiles:aggreTT2",
        "path": "aggrepropset2"
    },
    {

```



```

        "__metadata": {
          "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-05T00%3A
00%3A00')",
          "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-05T00%3A
00%3A00')",
          "type": "core.automobiles.aggrePST"
        },
        {
          "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
          "time": "/Date(1546646400000)/",
          "pressure": 232,
          "temperature": 342,
          "_ThingType": "core.automobiles:aggreTT",
          "_NPST": "aggrepropset",
          "thingType": "core.automobiles:aggreTT",
          "path": "aggrepropset"
        },
        {
          "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-04T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='39F18733B0734903A67F7A1D9B9791A4',time=datetime'2019-01-04T00%3A
00%3A00')",
            "type": "core.automobiles.aggrePST"
          },
          {
            "id": "39F18733B0734903A67F7A1D9B9791A4",
            "time": "/Date(1546560000000)/",
            "pressure": 120,
            "temperature": 214,
            "_ThingType": "core.automobiles:aggreTT2",
            "_NPST": "aggrepropset2",
            "thingType": "core.automobiles:aggreTT2",
            "path": "aggrepropset2"
          },
          {
            "__metadata": {
              "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-02T00%3A
00%3A00')",
              "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2019-01-02T00%3A
00%3A00')",
              "type": "core.automobiles.aggrePST"
            },
            {
              "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
              "time": "/Date(1546387200000)/",
              "pressure": 220,
              "temperature": 314,
              "_ThingType": "core.automobiles:aggreTT",
              "_NPST": "aggrepropset",
              "thingType": "core.automobiles:aggreTT",
              "path": "aggrepropset"
            },
            {
              "__metadata": {
                "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-24T00%3A
00%3A00')",

```

```

        "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-24T00%3A
00%3A00')",
        "type": "core.automobiles.aggrePST"
    },
    {
        "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
        "time": "/Date(1540339200000)/",
        "pressure": 24,
        "temperature": 36,
        "_ThingType": "core.automobiles:aggreTT",
        "_NPST": "aggrepropset",
        "thingType": "core.automobiles:aggreTT",
        "path": "aggrepropset"
    },
    {
        "__metadata": {
            "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-22T00%3A
00%3A00')",
            "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-22T00%3A
00%3A00')",
            "type": "core.automobiles.aggrePST"
        },
        {
            "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
            "time": "/Date(1540166400000)/",
            "pressure": 22,
            "temperature": 32,
            "_ThingType": "core.automobiles:aggreTT",
            "_NPST": "aggrepropset",
            "thingType": "core.automobiles:aggreTT",
            "path": "aggrepropset"
        },
        {
            "__metadata": {
                "id": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A
00%3A00')",
                "uri": "https://analytics-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/
measurements(id='A2E9050BAFD7476B97AC4CCA0E309A35',time=datetime'2018-10-20T00%3A
00%3A00')",
                "type": "core.automobiles.aggrePST"
            },
            {
                "id": "A2E9050BAFD7476B97AC4CCA0E309A35",
                "time": "/Date(1539993600000)/",
                "pressure": 20,
                "temperature": 34,
                "_ThingType": "core.automobiles:aggreTT",
                "_NPST": "aggrepropset",
                "thingType": "core.automobiles:aggreTT",
                "path": "aggrepropset"
            }
        }
    ]
}

```

Related Information

[Measurements \[page 1010\]](#)

18 Rule Services

Overview of rule processing.

Overview

Speaking of the Internet of Things (IoT) is closely related to Big Data, that is, the handling of very large amounts of data generated by devices that are equipped with all kinds of sensors. However, while the large amounts of data can be used to open new perspectives on things and to gain completely new insights, they can, at the same time, also be seen as a problem. This is because the sheer amount of data can make it difficult to find the needle in the haystack (for example, the one or two outliers in a huge pile of data that indicate a technical problem that has either already occurred or is likely to happen in the near future).

At this point, rules for processing time series data come in handy. With rules, you can leave it up to the system to permanently keep an eye on each and every sensor data point coming in. You start with a virtual thing that you want to monitor, pick the properties to be observed, and associate both with a rule. In the Rule Modeler, you define the values for each property and what shall happen if that particular value is observed in the stream of incoming data.

i Note

Defining a rule-based system reaction to a particular value that has been observed is a two-stage process:

- In the Rule Modeler, you set up the rules to be applied to incoming values. If a value matches the rule condition, the system triggers an event.
- The event triggered by the rule is then used as input for the Action Modeler where you define what the system reaction to the observed value shall look like (e.g., send an HTTP request, send a notification mail, or trigger another action).

With these preparations done, you can rest assured that none of the critical values that you might think of goes unnoticed, thus making sure that all necessary action can be taken without delay.

Rule-based processing of time series data has been introduced with the first release of SAP IoT by providing a set of different apps aiming at a target audience of business users. As a next step, APIs are provided for programmatic access to rules.

Limitations

To ensure fluent rule processing as well as keeping the system load at a reasonable level, make sure that you don't exceed the following thresholds:

- Maximum number of draft rules: 1000
- Maximum number of active rules: 1000

- Maximum number of projects: 100
- Maximum number of custom data objects per project: 100

i Note

You can determine the number of rules per project by simply starting the [Rule Projects](#) app and opening the details screen for a rule project. The number of rules is displayed in the title area on top of the list of available rules. Note that the displayed number depends on the current filter settings. So, to find out the total number of rules, make sure that there is **no** filter defined.

The given maximum numbers are in effect per tenant. Here, the idea is that - within the maximum number of draft rules - you're free to activate any number of draft rules from zero to maximum.

If you have a use case in mind that can't be handled within the given limits, feel free to get in touch with SAP. We'll then investigate the use case and try to find a satisfying solution.

Rate Limits

In addition to the limits described above, which are maximum total numbers, some time-based limits are in effect. These time-based limits are aiming at limiting the number of newly created objects within a certain timespan. The purpose of this kind of limits is to prevent the system from being flooded with new objects, which is typically caused by poorly defined batch processes. The following limits apply:

Rate Limits

Action	Limit (# objects/minute)
Create a rule (all rule types)	30
Activate a rule	30
Deactivate a rule	30
Create a project	20
Update a project	20

i Note

All numbers given in the *Rate Limits* table above refer to the number of objects within each tenant.

Related Information

[Rule Project \[page 1024\]](#)

[Batch Rule \[page 1042\]](#)

[Streaming Rule \[page 1075\]](#)

[Rule Data Management and Rules Service \[page 1112\]](#)

[Actions \[page 753\]](#)

[Segment Service \[page 1121\]](#)

[Event Services \[page 1194\]](#)

18.1 Rule Project

Rule projects serve as container objects for rules and data objects.

Rule projects are the starting point for setting up rules in SAP IoT. They serve as a container for one or many rules, along with data objects that can be accessed by all the rules that are living in the same rule project. Therefore, bundling a set of rules within a project is a typical approach to follow when you have a scenario where different monitoring tasks represented by different rules are operating on a common data basis.

A rule project can contain rules of different types (such as batch rules or streaming rules), but you can also decide to group different projects by uniform rule types, which they contain.

Base URI:

- Formal Description: `https://<server address>[:<port number>][<path>]/v1/projects`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-noah-live-rules-designtime.cfapps.us10.hana.ondemand.com/v1/projects`

Permissions:

<vocabulary>.c

<vocabulary>.r

<vocabulary>.u

<vocabulary>.d

<vocabulary>.a

Methods

HTTP Method	Action	URI	Scopes
POST	Create a Rule Project [page 1025]	/v1/projects	<vocabulary>.c
GET	Read a Rule Project [page 1029]	/v1/projects/<projectId>	<vocabulary>.r
GET	Read all Rule Projects [page 1031]	/v1/projects	<vocabulary>.r
PUT	Update a Rule Project [page 1033]	/v1/projects/<projectId>	<vocabulary>.u
DELETE	Delete a Rule Project [page 1035]	/v1/projects/<projectId>	<vocabulary>.d
GET	Read BRM Details [page 1036]	/v1/projects/<projectId>/br-details	<vocabulary>.r

HTTP Method	Action	URI	Scopes
GET	Read Data Object Details [page 1039]	/v1/projects/<projectId>/data-objects	<vocabulary>.r

Related Information

[Batch Rule \[page 1042\]](#)

[Streaming Rule \[page 1075\]](#)

18.1.1 Create a Rule Project

Creates a new rule project.

Creating a rule project is the starting point for each scenario where rule-based processing of time series data is involved. Also, it's totally simple: All you need is to provide a technical name for the project via the payload. Later on, you can add data objects and of course the rules operating on this data.

Request

URI: /v1/projects

HTTP Method: *POST*

Permissions: <vocabulary>.c

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectPayload	Yes	string	Project data.	Request body

Request Example

```
{
  "name": "YourProjectName",
  "thingModel": {
    "thingTypes": [
      {
        "thingType": "noah.sbrules02.rules:ruleTestTT",
        "name": "Car",
        "allPropertySets": true,
        "propertySets": [
          {
            "dataObjectName": "MyDataObjectName",
            "propertySet": "propertySetName",
            "useThresholds": false,
```

```

        "useAggregates": false,
        "usePreviousValues": false
    }
  ],
  },
  ],
  "propertySetTypes": [
    {
      "dataObjectName": "MyDataObjectName2",
      "propertySetType": "yourPackage:yourPropertySetTypeName"
    }
  ],
  },
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for Project",
      "description": "Description for Project"
    }
  ]
}

```

Field Explanation

Name	Mandatory	Description
<name>	yes	Technical name of the rule project. Must be unique within a tenant.
<thingModel>	no	Top-level structure containing all data definitions of a rule project.
Note Currently,<thingModel> is the only supported data model for rule projects. There may be additional models in future releases.		
<thingTypes>	no	Array of thing types to be used in a rule project.
<thingType>	yes	Fully qualified ID of a thing type to be used in a rule project.
<thingType.name>	no	Name of a thing type to be used in a rule.
<allPropertySets>	no	Indicates whether data objects shall be generated for all property sets of the enclosing thing type. Default: <i>false</i> .
<propertySets>	no	Array of property sets of the enclosing thing type to be used in a rule project.
<dataObjectName>	yes	Name of the data object that corresponds to the following property set.
<propertySet>	yes	Name of the property set that corresponds to the preceding data object.
<useThresholds>	no	Indicates whether threshold values defined for the property set shall be available in the rule project. Default: <i>false</i> .
<useAggregates>	no	Indicates whether aggregate values defined for the property set shall be available in the rule project. Default: <i>false</i> .

Name	Mandatory	Description
<code><usePreviousValues></code>	no	Indicates whether not only current values, but also the value preceding the current value of the properties in the property set shall be available in the rule project. Default: <code>false</code> .
i Note This field is only supported for property sets containing measured values (<code>propertySets.dataCategory = 'TimeSeriesData'</code>).		
<code><propertySetTypes></code>	no	Array of property set types to be used in a rule project.
<code><dataObjectName></code>	yes	Name of the data object that corresponds to the following property set type.
<code><propertySetType></code>	yes	Name of the property set type that corresponds to the preceding data object.
<code><texts></code>	yes	Array of texts in different natural languages describing the rule project.
<code><language></code>	yes	Simplified language key (for example, <code>en</code> for English, <code>de</code> for German).
<code><shortText></code>	yes	Non-technical name of the rule project.
<code><description></code>	no	Short description of the rule project's purpose.

Response

Response Status and Error Codes

Code	Description
200	Rule project created successfully.
400	Bad request. For example, the payload may have caused a validation error.
401	Unauthorized. Rule project couldn't be created due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid server path has been provided.

Response Example

```
{
  "id": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "name": "YourProjectName",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "thingModel": {
    "thingTypes": [
      {
        "thingType": "noah.sbrules02.rules:ruleTestTT",
        "name": "Car",
        "allPropertySets": true,
        "propertySets": [
```

```

    {
      "dataObjectName": "MyDataObjectName",
      "dataCategory": "TimeSeriesData",
      "propertySet": "propertySetName",
      "useThresholds": false,
      "useAggregates": false,
      "usePreviousValues": false
    }
  ]
},
"propertySetTypes": [
  {
    "dataObjectName": "MyDataObjectName2",
    "propertySetType": "yourPackage:yourPropertySetTypeName"
  }
]
},
"texts": [
  {
    "language": "en",
    "shortText": "Short text for Project",
    "description": "Description for Project"
  }
],
"createdOn": "2020-10-20T14:24:01.158Z",
"lastChangedOn": "2020-10-20T14:24:01.158Z"
}

```

The following table provides explanations for those fields that are only present in the response payload, but not in the request. The returned field values are automatically determined by the system.

Additional Field Explanations

Name	Description
<code><id></code>	Unique ID of the newly created rule project. The ID is a 36 characters hex code, grouped into sections by hyphens.
<code><brProjectId></code>	Unique ID of the generated rule project managed by SAP Business Rules that corresponds to the newly created rule project.
<code><propertySets.dataCategory></code>	Type of data provided by a property set. Possible values: - TimeSeriesData - DerivedData - MasterData
<code><propertySets.sensitivityLevel></code>	Data sensitivity from a data protection perspective. Possible values: - None - Personal Identifiable Information: <code>com.sap.apptot.security:pii</code> - Personal Sensitive Information: <code>com.sap.apptot.security:sii</code>
<code><propertySetTypes.dataCategory></code>	Type of data provided by a property set type. Possible values: - TimeSeriesData - DerivedData - MasterData

Name	Description
<code><propertySetTypes.sensitivityLevel></code>	Data sensitivity from a data protection perspective. Possible values: • None • Personal Identifiable Information: <code>com.sap.appiot.security:pii</code> • Personal Sensitive Information: <code>com.sap.appiot.security:sii</code>
<code><createdOn></code>	ISO timestamp of creation time. Example: <code>2020-12-02T10:43:56.467Z</code>
<code><lastChangedOn></code>	ISO timestamp of last change. Example: <code>2020-12-05T10:43:56.467Z</code>

Note

For the `<sensitivityLevel>` field, the following applies:

- The value determined as `<sensitivityLevel>` of a property set or property set type is calculated in these steps:
 - For each property in a property set or property set type, the system checks the sensitivity level of the property.
 - The highest value found (that is, the most sensitive data) is then assigned to the entire property set or property set type.
- The system prevents rule execution based on property sets or property set types with a sensitivity level higher than `None`.
- However, you can configure rules in draft mode based on sensitive data. This could be useful in cases where you expect a reclassification of the data as insensitive at a later point in time.

Related Information

[Rule Project \[page 1024\]](#)

18.1.2 Read a Rule Project

Retrieves the specified rule project.

With this service method, you retrieve the rule project specified by its ID from the database.

Request

URI: `/v1/projects/<projectId>`

HTTP Method: `GET`

Permissions: `<vocabulary>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectID	Yes	string	Unique ID of the project.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072

Response

Response Status and Error Codes

Code	Description
200	Rule project retrieved successfully.
401	Unauthorized. Rule project couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "id": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "name": "YourProjectName",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "thingModel": {
    "thingTypes": [
      {
        "thingType": "noah.sbrules02.rules:ruleTestTT",
        "name": "Car",
        "allPropertySets": true,
        "propertySets": [
          {
            "dataObjectName": "MyDataObjectName",
            "propertySet": "propertySetName",
            "dataCategory": "TimeSeriesData",
            "useThresholds": false,
            "sensitivityLevel": "None|Personal Indentifiable Information|
Personal Sensitive Information"
          }
        ]
      }
    ],
    "propertySetTypes": [
      {
        "dataObjectName": "MyDataObjectName2",
        "propertySetType": "yourPackage:yourPropertySetTypeName",
        "dataCategory": "TimeSeriesData",
        "sensitivityLevel": "None|Personal Indentifiable Information|Personal
Sensitive Information"
      }
    ]
  },
  "texts": [
    {
      "language": "en",
```

```
    "shortText": "Short text for Project",  
    "description": "Description for Project"  
  },  
  ],  
  "createdOn": "2020-10-21T09:41:46.185Z",  
  "lastChangedOn": "2020-10-21T09:41:46.185Z"  
}
```

Related Information

[Rule Project \[page 1024\]](#)

18.1.3 Read all Rule Projects

Retrieves all rule projects.

With this service method, you retrieve all the rule projects that exist in your tenant from the database. You can use the optional query parameters to keep the number of returned entries low.

Note

The maximum number of entries to be retrieved with this method is 500 entries per method call.

Request

URI: /v1/projects

HTTP Method: *GET*

Permissions: <vocabulary>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
\$count	No	boolean	Indicates whether the total number of rule projects shall be returned. Default: <i>false</i> .	Query string
\$filter	No	string	Filter condition to be applied.	Query string
\$skip	No	integer	Number of the first n records to be excluded from the result set.	Query string
\$top	No	integer	Number of records to include in the result set. Maximum allowed value: 500	Query string

Parameter	Required	Data Type	Description	Parameter Type
\$orderby	No	string	Field name to be used for sorting the result set.	Query string

Request Example

```
/v1/projects?$count=true&$skip=20
```

With this request, the service returns all rule projects except for the first 20. The returned payload starts with the number of retrieved entries.

Response

Response Status and Error Codes

Code	Description
200	Rule projects retrieved successfully.
401	Unauthorized. Rule projects couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid server path has been provided.

Response Example

```
{
  "count": 543,
  "previous": "http://localhost:8080/v1/vocabulary?$skip=500",
  "next": "http://localhost:8080/v1/vocabulary?$skip=500",
  "values": [
    {
      "id": "185d9a72-a629-4b94-b421-a2f0301bb072",
      "ETag": 1234143531234253600,
      "name": "YourProjectName",
      "brProjectId": "4f5697d3240d4f258b900c181e35a835",
      "thingModel": {
        "thingTypes": [
          {
            "thingType": "noah.sbrules02.rules:ruleTestTT",
            "name": "Car",
            "allPropertySets": true,
            "propertySets": [
              {
                "dataObjectName": "MyDataObjectName",
                "propertySet": "propertySetName",
                "dataCategory": "TimeSeriesData",
                "useThresholds": false,
                "sensitivityLevel": "None|Personal Indentifiable Information|
Personal Sensitive Information"
              }
            ]
          }
        ],
        "propertySetTypes": [
          {
            "dataObjectName": "MyDataObjectName2",
```

```

        "propertySetType": "yourPackage:yourPropertySetTypeName",
        "dataCategory": "TimeSeriesData",
        "sensitivityLevel": "None|Personal Identifiable Information|
Personal Sensitive Information"
    }
  ]
},
"texts": [
  {
    "language": "en",
    "shortText": "Short text for Project",
    "description": "Description for Project"
  }
],
"createdOn": "2020-10-21T09:58:03.993Z",
"lastChangedOn": "2020-10-21T09:58:03.993Z"
}
]
}

```

Related Information

[Rule Project \[page 1024\]](#)

18.1.4 Update a Rule Project

Updates a rule project.

With this service method, you can modify the attribute values of a rule project specified by its ID. The modified values are provided via the request payload, which contains the modified values along with all the values that shall remain unchanged.

Request

URI: /v1/projects/<projectId>

HTTP Method: *PUT*

Permissions: <vocabulary>.u

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the rule project.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to be modified.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072

With this request, you modify the project with the specified ID.

Response

Response Status and Error Codes

Code	Description
200	Rule project updated successfully.
401	Unauthorized. Rule project couldn't be updated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "name": "YourProjectName",
  "thingModel": {
    "thingTypes": [
      {
        "thingType": "noah.sbrules02.rules:ruleTestTT",
        "name": "Car",
        "allPropertySets": true,
        "propertySets": [
          {
            "dataObjectName": "MyDataObjectName",
            "propertySet": "propertySetName",
            "useThresholds": false
          }
        ]
      }
    ]
  },
  "propertySetTypes": [
    {
      "dataObjectName": "MyDataObjectName2",
      "propertySetType": "yourPackage:yourPropertySetTypeName"
    }
  ]
},
"texts": [
  {
    "language": "en",
    "shortText": "Short text for Project",
    "description": "Description for Project"
  }
],
}
```


Related Information

[Rule Project \[page 1024\]](#)

18.1.5 Delete a Rule Project

Deletes a rule project from the database.

With this service method, you can delete a rule project.

Note

The system takes care that other areas of SAP IoT where rules can be referenced are protected against any potential negative impact of a deletion. Therefore, deleting a rule project is possible only if there are no rules in the project.

Request

URI: `/v1/projects/<projectId>`

HTTP Method: `DELETE`

Permissions: `<vocabulary>.d`

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the batch rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the project to be deleted.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072
```

With this request, you delete the rule project with the specified ID.

Response

Response Status and Error Codes

Code	Description
204	Rule project deleted successfully.
401	Unauthorized. Rule project couldn't be deleted due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Related Information

[Rule Project \[page 1024\]](#)

18.1.6 Read BRM Details

Retrieves information about related rule engine objects.

With this service method, you retrieve information about objects that are related to the current rule project, but are managed by the underlying rule engine provided by SAP Business Rules.

The rule service that is part of SAP IoT internally uses the functionality offered by SAP Business Rules, which is the central, generic rule processing engine in SAP BTP. The connection between the SAP IoT rule service and SAP Business Rules is fully transparent. That means that you normally don't have to pay any attention to this aspect of the internal architecture. Whenever you interact with the SAP IoT rule service, that service takes care of communicating with the underlying rule engine when need be. This holds for the [Rule Project](#) Fiori app as well as for accessing the rule service via the API.

However, under certain circumstances, a situation may occur where you feel the need for a deeper understanding of the relationship between these two architecture layers. For this purpose, you can use this service method, which provides you with all the relevant information about the rule engine counterpart that corresponds with the specified rule project.

Request

URI: `/v1/projects/<projectId>/br-details`

HTTP Method: [GET](#)

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectID	Yes	string	Unique ID of the rule project for which you want to retrieve details about its rule engine counterpart.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/br-details

With this request, you retrieve the BRM details for the specified rule project.

Response

Response Status and Error Codes

Code	Description
200	Rule engine details retrieved successfully.
401	Unauthorized. Rule engine details couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule project ID has been provided.

Response Example

```
{
  "id": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "project": {
    "Id": "c7daab9d1e214bbcb2c7055920bcfa32",
    "Name": "ProjectName_20200825142635268",
    "Annotations": [
      {
        "Key": "com.sap.rules.expression.language",
        "Value": "2.0"
      }
    ],
    "Description": [
      {
        "Language": "en",
        "Text": "-"
      }
    ]
  },
  "dataObjects": [
    {
      "Id": "77d422e394f74dd5a4134a94cbae6b52",
      "Name": "MyDataObjectName",
      "Project": "c7daab9d1e214bbcb2c7055920bcfa32",
      "Type": "S",
      "Extensible": false,
      "Table": null,
      "Structure": {
        "Component": [
          {
            "Annotations": [
```

```

        {
            "Key": "com.sap.iot.property.unitOfMeasure",
            "Value": "C"
        }
    ],
    "Description": [
        {
            "Language": "en",
            "Text": "-"
        }
    ],
    "Element": {
        "BusinessDataType": "N"
    },
    "Id": "9e606398a79b40b5810d93f1b6ed242c",
    "Name": "Temperature",
    "Type": "I"
}
]
},
"Annotations": [
    {
        "Key": "com.sap.iot.dataobject.type",
        "Value": "TimeSeriesData"
    }
],
"Description": [
    {
        "Language": "en",
        "Text": "-"
    }
]
}
]
}
}

```

Note

In the following table, only those fields are mentioned that play a role in the communication between corresponding on the two involved software layers, SAP IoT and SAP Business Rules. All other fields are used internally by SAP Business Rules. For details on these fields, see the SAP Business Rules area on [SAP API Business Hub](#).

Field Explanation

Name	Mandatory	Description
<id>	yes	Unique ID of the SAP IoT rule project to which the BRM rule project corresponds.
<project.Id>	yes	Unique ID of the BRM rule project.
<dataObjects>	yes	Array of generated data objects that correspond to the property sets and property set types defined in the SAP IoT thing model.

Related Information

[Rule Project \[page 1024\]](#)

[Read Data Object Details \[page 1039\]](#)

[SAP Business Rules](#)

18.1.7 Read Data Object Details

Retrieves information about rule engine objects that are related to the data objects in a rule project.

With this service method, you retrieve information about objects that are related to the data objects in the specified rule project, but are managed by the underlying rule engine provided by SAP Business Rules (for further information on the architecture, see the introductory section of [Read BRM Details \[page 1036\]](#)).

Request

URI: /v1/projects/<projectId>/data-objects

HTTP Method: [GET](#)

Permissions: <rule>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project for which you want to retrieve details about the rule engine counterparts of its data objects.	Path
dataObject Name	No	string	Return only the data object with the specified name.	Query
supportedR uleType	No	string	Return all data objects that support the specified rule type.	Query
supportedR uleSubType	No	string	Return all data objects that support the specified rule subtype.	Query

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/data-objects

With this service request, you can retrieve information about all data objects related to the specified rule project.

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/data-objects?
supportedRuleType=Batch

With this service request, you can retrieve information about those data objects related to the specified rule project that do support batch rules (also known as scheduled rules).

Response

Response Status and Error Codes

Code	Description
200	Data object details retrieved successfully.
401	Unauthorized. Data object details couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, a project ID has been provided.

Response Example

```
[
  {
    "name": "MyDataObjectName",
    "parentName": "MyThingTypeName",
    "type": "TIME_SERIES_DATA",
    "brId": "77d422e394f74dd5a4134a94cbae6b52",
    "brProjectId": "c7daab9d1e214bbcb2c7055920bcfa32",
    "properties": [
      {
        "brId": "ed784d622f1f48f895c790d61c2f6b73",
        "name": "ExecutionTimestamp",
        "unitOfMeasure": null,
        "description": "ExecutionTimestamp",
        "type": "DateTime"
      },
      {
        "brId": "9e606398a79b40b5810d93f1b6ed242c",
        "name": "Pressure",
        "unitOfMeasure": "BA",
        "description": "Pressure",
        "type": "Numeric"
      },
      {
        "brId": "caa36402ea414ab98faa831b2ea47508",
        "name": "Temperature",
        "unitOfMeasure": "C",
        "description": "Temperature",
        "type": "Numeric"
      },
      {
        "brId": "ffae387736fa49d1ad0de650a86e9764",
        "name": "Text",
        "unitOfMeasure": null,
        "description": "Text",
        "type": "String"
      }
    ],
    "sensitivityLevel": "",
    "supportedRuleTypes": [
      {
        "ruleType": "STREAM_HYBRID"
      },
      {
        "ruleType": "STREAM",
        "ruleSubtype": "DERIVATION"
      },
      {
        "ruleType": "STREAM",

```

```

        "ruleSubtype": "EVENT"
      }
    ],
    "origin": "SAP_ROOT"
  }
]

```

Field Explanation

Name	Mandatory	Description
<name>	yes	Name of the SAP IoT data object.
<parentName>	no	Name of the superordinate data object. If no such object exists, the field contains a null value.
<type>	yes	Type or category of the data object. Possible values: TIME_SERIES_DATA, TIME_SERIES_DATA_PROPERTY_SET_TYPE, TIME_SERIES_DATA_AGGREGATE, TIME_SERIES_DATA_PREVIOUS_VALUE, BASIC_DATA, DERIVED_DATA, DERIVED_DATA_PROPERTY_SET_TYPE, DERIVED_DATA_AGGREGATE, THRESHOLD, GEOLOCATION_DATA, STREAM_RESULT_DEFAULT, BATCH_RESULT_DEFAULT, SAP_DATAOBJECT_TYPE, GEOFENCE_DATA, IOT_EVENT_DATA.
<brId>	yes	Unique ID of the BRM rule.
<brProjectId>	yes	Unique ID of the BRM rule project containing the data object.
<supportedRuleTypes>	yes	Array of rule types that can make use of the data object. If a rule type has subtypes, the subtype must be provided as well. Possible values: - BATCH - STREAM - EVENT - STREAM - DERIVATION
<origin>	yes	Indicates the origin of a data object. Possible values: - SAP - SAP_ROOT <data object name>

Related Information

[Rule Project \[page 1024\]](#)

[Read BRM Details \[page 1036\]](#)

[SAP Business Rules](#)

18.2 Batch Rule

A service for applying rules to aggregated time series data recorded in an IoT scenario.

You use batch rules for processing aggregated time series data that has been recorded in an IoT scenario. Each rule contains a rule expression, which is used to test whether the data matches a certain condition or not. In case the condition is met, further actions can be taken, such as triggering actions, sending an alert message, and so on.

Each rule is part of a so-called rule project, which serves as a container for one or many rules, as well as for a data vocabulary, which is shared by all the rules within the project.

Looking at the list of methods supported by a rule, you realize that there's a number of specialized methods going beyond the usual set of CRUD (create, retrieve, update, delete) methods. You can activate and deactivate a rule as well as provide test data that you can use to simulate the rule behavior prior to activating it in a productive environment. Last, but not least, you can call a method that returns a list of activations and deactivations for a specified rule, which can be required for auditing reasons.

Note

In the *Rule Projects* Fiori app, batch rules are referred to as *Scheduled Rules*. This is to better underline the usage aspect, meaning that this kind of rules is **not** processing live data streams provided by sensors.

Base URI:

- Formal Description: `https://<server address>[:<port number>][<path>]/v1/projects/<projectId>/batch-rules`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-noah-live-rules-designtime.cfapps.us10.hana.ondemand.com/v1/projects/<projectId>/batch-rules/`

Permissions:

`<rule>.c`
`<rule>.r`
`<rule>.u`
`<rule>.d`
`<rule>.a`

Methods

HTTP Method	Action	URI	Scopes
<code>POST</code>	Create a Batch Rule [page 1043]	<code>/v1/projects/<projectId>/batch-rules</code>	<code><rule>.c</code>
<code>GET</code>	Read a Batch Rule [page 1051]	<code>/v1/projects/<projectId>/batch-rules/<ID></code>	<code><rule>.r</code>

HTTP Method	Action	URI	Scopes
GET	Read all Batch Rules [page 1053]	/v1/projects/<projectId>/batch-rules	<rule>.r
PUT	Update a Batch Rule [page 1055]	/v1/projects/<projectId>/batch-rules/<ID>	<rule>.u
DELETE	Delete a Batch Rule [page 1059]	/v1/projects/<projectId>/batch-rules/<ID>	<rule>.d
POST	Activate a Batch Rule [page 1060]	/v1/projects/<projectId>/batch-rules/<ID>/activation	<rule>.a
DELETE	Deactivate a Batch Rule [page 1063]	/v1/projects/<projectId>/batch-rules/<ID>/activation	<rule>.a
POST	Simulate a Batch Rule [page 1066]	/v1/projects/<projectId>/batch-rules/<ID>/simulation	<rule>.a
GET	Read Simulation Data [page 1065]	/v1/projects/<projectId>/batch-rules/<ID>/simulation-input-template	<rule>.a
GET	Read Activation Details [page 1068]	/v1/projects/<projectId>/batch-rules/<ID>/activation/details	<rule>.r
POST	Execute a Batch Rule [page 1070]	v1/projects/<projectId>/batch-rules/<ruleId>/executions	<rule>.a
GET	Read a Batch Rule Execution [page 1071]	v1/projects/<projectId>/batch-rules/<ruleId>/executions/<executionId>	<rule>.r
GET	Read all Batch Rule Executions [page 1074]	v1/projects/<projectId>/batch-rules/<ruleId>/executions	<rule>.r

Related Information

[Streaming Rule \[page 1075\]](#)

[Rule Project \[page 1024\]](#)

18.2.1 Create a Batch Rule

With this method, you create a new batch rule object.

As with all rule service methods in SAP IoT, you have to provide the ID of the rule project to which the new rule shall be assigned. This ensures that the new rule can access all elements of the data vocabulary defined in the rule project.

i Note

Once you've successfully created a new rule, start the [Rule Projects](#) app from the SAP IoT Fiori launchpad to assign one or more data objects that are available in the rule project. Also, for the rule to actually process data, you have to activate it. You can accomplish this either in the app or with the help of the API service method that is provided for this purpose.

Request

URI: /v1/projects/<projectId>/batch-rules

HTTP Method: *POST*

Permissions: <rule>.c

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the new rule shall be assigned.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules

With this service request, a new batch rule is created and assigned to the rule project specified by its ID. The detailed settings for the new rule are all contained in the following request payload.

Payload

```
{
  "name": "MyBatchRuleName",
  "timeFrame": "PT1H",
  "scheduling": {
    "startTime": "2019-03-18T13:26:58.756",
    "endTime": "2019-03-20T13:26:58.756",
    "value": "*/5 * * * * *"
  },
  "toggle": false,
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
```

```

    {
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "name": "timeSeriesDOName_aggregate"
    }
  ],
  "brRuleData": {
    "Branches": [
      {
        "Id": "f44194e3a0714e1cb90f6bb7ae194f18",
        "SequenceNumber": 1,
        "Condition": {
          "Expression": "",
          "AST": [
            {
              "Id": "2e0319e60e9b497d80a85e34f06cc047",
              "Root": false,
              "Value": "100",
              "Parentheses": false,
              "Children": [],
              "Output": {
                "DataObjectType": "E",
                "BusinessDataType": "N"
              }
            }
          ],
          {
            "Id": "969dafe70373439fbb93022a011577e4",
            "Root": true,
            "Value": null,
            "Function": "IsGreater",
            "Parentheses": false,
            "Children": [
              {
                "Id": "663da75ee4484d7d99e76589683283d4",
                "SequenceNumber": 1
              },
              {
                "Id": "2e0319e60e9b497d80a85e34f06cc047",
                "SequenceNumber": 2
              }
            ],
            "Output": {
              "DataObjectType": null,
              "BusinessDataType": null
            }
          }
        ],
        {
          "Id": "663da75ee4484d7d99e76589683283d4",
          "Root": false,
          "Value": null,
          "Reference": "/77d422e394f74dd5a4134a94cbae6b52/
caa36402ea414ab98faa831b2ea47508",
          "Parentheses": false,
          "Children": [],
          "Output": null
        }
      ]
    },
    "Operation": [
      {
        "Id": "b044d0873e5b4568888a6de2970ecbce",
        "SequenceNumber": 3,
        "Segment": "77c813a220384e52abcb7cb2a28cc06f",
        "Expression": null,
        "AST": [

```

```

        {
            "Id": "EEE4B2AF97474F349D31E4A6A611ECB2",
            "Root": true,
            "Value": "high",
            "Parentheses": false,
            "Children": [],
            "Output": {
                "DataObjectType": "E",
                "BusinessDataType": "S"
            }
        }
    ],
    {
        "Id": "7770379f26274734a1618360bafceb43",
        "SequenceNumber": 2,
        "Segment": "85a70a28841044bba3d75091f168b4ed",
        "Expression": null,
        "AST": [
            {
                "Id": "375FD781637C4E10A2790D065568EEA7",
                "Root": true,
                "Value": "NewEvent",
                "Parentheses": false,
                "Children": [],
                "Output": {
                    "DataObjectType": "E",
                    "BusinessDataType": "S"
                }
            }
        ]
    }
],
    {
        "Id": "544f71f2d399455fal1a9d84949cc0f",
        "Operation": [
            {
                "Id": "0b717244129c4970818c7abd211d1f74",
                "SequenceNumber": 4,
                "Segment": "39c694c2044047f496459abb16a6a0ce",
                "Expression": null,
                "AST": [
                    {
                        "Id": "94B18535FF2748DD984048C5426F84A4",
                        "Root": true,
                        "Value": "",
                        "Parentheses": false,
                        "Children": [],
                        "Output": {
                            "DataObjectType": "E",
                            "BusinessDataType": "S"
                        }
                    }
                ]
            }
        ]
    }
]
}

```

Field Explanation

Name	Mandatory	Description
<name>	yes	Technical name of the rule.

Name	Mandatory	Description
<code><timeFrame></code>	yes	Specifies a period of time, for which recorded sensor data are aggregated. Values must be formatted according to ISO 8601 (for example, "PT10H").
<code><startTime></code>	yes	Start time of rule execution.
<code><endTime></code>	yes	End time of rule execution.
<code><value></code>	yes	Cron-formatted string indicating the iteration pattern for rule execution (for example: " <code>*/5 * * * *</code> " = every 5 minutes).
<code><toggle></code>	no	Controls how the rule behaves if the rule condition is fulfilled over a longer period: <code>true</code>: Only one event is triggered. <code>false</code> (= default): Events are triggered as long as the condition is fulfilled.
<code><inputDataObjectNames></code>	no	Array of technical names of data objects used as rule input.

Response

Response Headers

Header	Description
Location	Path to the newly created rule, for example: <code>/v1/projects/3c814fbf-1a6f-4063-8e25-38ae144dc43c/batch-rules/d1c005f8-7b61-4263-8eb5-76bbc14d57be</code>
Etag	Identifier of the rule instance version, for example: <code>2dadd04e709323c68ac3d65065208e05</code>

Response Status and Error Codes

Code	Description
200	Rule created successfully.
400	Bad request. For example, the payload may have caused a validation error.
401	Unauthorized. Rule couldn't be created due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "name": "MyBatchRuleName",
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
    }
  ]
}
```

```

        "description": "Long description for my rule"
    },
    {
        "language": "de",
        "shortText": "Kurztext für die Regel",
        "description": "Lange Beschreibung für die erstellte Regel"
    }
],
"tags": [
    {
        "tag": "MyRule"
    }
],
"inputDataObjectNames": [
    {
        "name": "timeSeriesDOName_aggregate"
    }
],
"draftDetails": {
    "timeFrame": "PT1H",
    "scheduling": {
        "startTime": "2019-03-18T13:26:58.756",
        "endTime": "2019-03-20T13:26:58.756",
        "value": "*/5 * * * * *"
    },
    "toggle": false,
    "brRuleData": {
        "Branches": [
            {
                "Id": "f44194e3a0714e1cb90f6bb7ae194f18",
                "SequenceNumber": 1,
                "Condition": {
                    "Expression": "",
                    "AST": [
                        {
                            "Id": "2e0319e60e9b497d80a85e34f06cc047",
                            "Root": false,
                            "Value": "100",
                            "Parentheses": false,
                            "Children": [],
                            "Output": {
                                "DataObjectType": "E",
                                "BusinessDataType": "N"
                            }
                        }
                    ],
                },
                {
                    "Id": "969dafa70373439fbb93022a011577e4",
                    "Root": true,
                    "Value": null,
                    "Function": "IsGreater",
                    "Parentheses": false,
                    "Children": [
                        {
                            "Id": "663da75ee4484d7d99e76589683283d4",
                            "SequenceNumber": 1
                        },
                        {
                            "Id": "2e0319e60e9b497d80a85e34f06cc047",
                            "SequenceNumber": 2
                        }
                    ],
                    "Output": {
                        "DataObjectType": null,
                        "BusinessDataType": null
                    }
                }
            ],
            {
                "Id": "663da75ee4484d7d99e76589683283d4",

```

```

        "Root": false,
        "Value": null,
        "Reference": "/77d422e394f74dd5a4134a94cbae6b52/
caa36402ea414ab98faa831b2ea47508",
        "Parentheses": false,
        "Children": [],
        "Output": null
    }
}
],
},
"Operation": [
{
    "Id": "b044d0873e5b4568888a6de2970ecbce",
    "SequenceNumber": 3,
    "Segment": "77c813a220384e52abcb7cb2a28cc06f",
    "Expression": null,
    "AST": [
        {
            "Id": "EEE4B2AF97474F349D31E4A6A611ECB2",
            "Root": true,
            "Value": "high",
            "Parentheses": false,
            "Children": [],
            "Output": {
                "DataObjectType": "E",
                "BusinessDataType": "S"
            }
        }
    ]
},
{
    "Id": "7770379f26274734a1618360bafceb43",
    "SequenceNumber": 2,
    "Segment": "85a70a28841044bba3d75091f168b4ed",
    "Expression": null,
    "AST": [
        {
            "Id": "375FD781637C4E10A2790D065568EEA7",
            "Root": true,
            "Value": "NewEvent",
            "Parentheses": false,
            "Children": [],
            "Output": {
                "DataObjectType": "E",
                "BusinessDataType": "S"
            }
        }
    ]
}
]
},
}
],
},
"Default": {
    "Id": "544f71f2d399455fa1d1a9d84949cc0f",
    "Operation": [
        {
            "Id": "0b717244129c4970818c7abd211d1f74",
            "SequenceNumber": 4,
            "Segment": "39c694c2044047f496459abb16a6a0ce",
            "Expression": null,
            "AST": [
                {
                    "Id": "94B18535FF2748DD984048C5426F84A4",
                    "Root": true,
                    "Value": "",
                    "Parentheses": false,
                    "Children": [],
                    "Output": {

```

```

    "DataObjectType": "E",
    "BusinessDataType": "S"
  }
}
]
}
}
},
"activeDetails": {}
}

```

The following table provides explanations for those fields that are only present in the response payload, but not in the creation request. The returned field values are automatically determined by the system.

Additional Field Explanations

Name	Description
<id>	Unique ID of the newly created rule. The ID is a 36 characters hex code, grouped into sections by hyphens.
<projectId>	Unique ID of the rule project to which the rule belongs.
<activationDetails.status>	Activation status of the rule. Possible values: - INACTIVE - ACTIVATION_TRIGGERED - ACTIVATION_COMPLETED - ACTIVATION_FAILED - DEACTIVATION_TRIGGERED - DEACTIVATION_COMPLETED - DEACTIVATION_FAILED Note Only rules in status ACTIVATION_COMPLETED can be executed.
<outputDataObjectName>	Technical name of the predefined output data object for batch rules. The value is always set to Result_batch.
<createdOn>	ISO timestamp of creation time. Example: 2020-12-02T10:43:56.467Z
<lastChangedOn>	ISO timestamp of last change. Example: 2020-12-05T10:43:56.467Z
<draftDetails>	A field array containing all the settings for the rule in draft version (= inactive). These settings take effect once the rule has been successfully activated.
<activeDetails>	A field array containing all the settings for the rule in active version. These settings are currently in effect when the rule is executed.

Related Information

[Batch Rule \[page 1042\]](#)
[Activate a Batch Rule \[page 1060\]](#)

18.2.2 Read a Batch Rule

Retrieves a batch rule from the database.

With this method, you send a request to the server to retrieve a particular batch rule object specified by its ID and the ID of the rule project to which it belongs.

Request

URI: /v1/projects/<projectId>/batch-rules/<ID>

HTTP Method: *GET*

Permissions: <rule>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be retrieved.	Path
includeBrRuleData	No	boolean	Indicates whether the associated BRM rule object data shall be returned (default: false).	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you retrieve the rule with ID "79ded171..." that is contained in rule project "185d9a72..."

Response

Response Status and Error Codes

Code	Description
200	Rule retrieved successfully.
401	Unauthorized. Rule couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
```

```

"name": "MyBatchRuleName",
"activationDetails": [
  {
    "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "createdBy": "ACTIVATION_ENDPOINT",
    "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "status":
"INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
VATION_COMPLETED",
    "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
  }
],
"texts": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "language": "en",
    "shortText": "Short text for my rule",
    "description": "Long description for my rule"
  }
],
"tags": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "tag": "MyRuleTag"
  }
],
"inputDataObjectNames": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "name": "timeSeriesDOName_aggregate"
  }
],
"createdOn": "2020-10-15T07:37:04.980Z",
"lastChangedOn": "2020-10-15T07:37:04.980Z",
"brProjectId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"draftDetails": {
  "scheduling": {
    "startTime": "2019-03-18T13:26:58.756Z",
    "endTime": "2019-03-20T13:26:58.756Z",
    "value": "*/5 * * * * *"
  },
  "timeFrame": "PT1H",
  "isToggle": true
},
"projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
"activeDetails": {
  "scheduling": {
    "startTime": "2019-03-18T13:26:58.756Z",
    "endTime": "2019-03-20T13:26:58.756Z",
    "value": "*/5 * * * * *"
  },
  "timeFrame": "PT1H",
  "isToggle": true,
}
}

```

Related Information

[Batch Rule \[page 1042\]](#)

18.2.3 Read all Batch Rules

Retrieves all batch rules for the specified project from the database.

With this service method, you can retrieve all the batch rules contained in the specified rule project. You can use the optional query parameters to keep the number of returned entries low.

i Note

The maximum number of entries to be retrieved with this method is 500 entries per method call.

Request

URI: `/v1/projects/<projectId>/batch-rules`

HTTP Method: `GET`

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>projectId</code>	Yes	string	Unique ID of the rule project.	Path
<code>\$count</code>	No	boolean	Indicates whether the total number of rules in the specified project shall be returned. Default: <code>false</code> .	Query string
<code>\$filter</code>	No	string	Filter condition to be applied;	Query string
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set.	Query string
<code>\$top</code>	No	integer	Number of records to include in the result set. Maximum allowed value: 500	Query string
<code>\$orderby</code>	No	string	Field name to be used for sorting the result set.	Query string

Request Example

`/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules`

With this request, you retrieve all the batch rules that are contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
200	Rules retrieved successfully.
401	Unauthorized. Rules couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "count": 543,
  "previous": "http://localhost:8080/v1/vocabulary?$skip=500",
  "next": "http://localhost:8080/v1/vocabulary?$skip=500",
  "values": [
    {
      "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "ETag": 1234143531234253600,
      "name": "MyBatchRuleName",
      "activationDetails": [
        {
          "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "createdBy": "ACTIVATION_ENDPOINT",
          "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "status":
            "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
            VATION_COMPLETED",
          "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
        }
      ],
      "texts": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "language": "en",
          "shortText": "Short text for my rule",
          "description": "Long description for my rule"
        }
      ],
      "tags": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "tag": "MyRuleTag"
        }
      ],
      "inputDataObjectNames": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "name": "timeSeriesDOName_aggregate"
        }
      ],
      "createdOn": "2020-10-15T12:25:14.435Z",
      "lastChangedOn": "2020-10-15T12:25:14.435Z",
      "brProjectId": "4f5697d3240d4f258b900c181e35a835",
      "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
      "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
      "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
      "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
      "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
      "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
      "draftDetails": {
```

```

    "scheduling": {
      "startTime": "2019-03-18T13:26:58.756Z",
      "endTime": "2019-03-20T13:26:58.756Z",
      "value": "**/5 * * * * *",
      "recurrence": "string"
    },
    "timeFrame": "PT1H",
    "isToggle": true
  },
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "activeDetails": {
    "scheduling": {
      "startTime": "2019-03-18T13:26:58.756Z",
      "endTime": "2019-03-20T13:26:58.756Z",
      "value": "**/5 * * * * *",
    },
    "timeFrame": "PT1H",
    "isToggle": true,
  }
}
]
}

```

Related Information

[Batch Rule \[page 1042\]](#)

18.2.4 Update a Batch Rule

Updates a batch rule.

With this service method, you can modify the attribute values of a batch rule specified by its ID and rule project ID. The modified values are provided via the request payload, which contains the modified values along with all the values that shall remain unchanged.

Request

URI: /v1/projects/<projectId>/batch-rules/<ID>

HTTP Method: *PUT*

Permissions: <rule>.u

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the batch rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be modified.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100

With this request, you update the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
200	Rule updated successfully.
401	Unauthorized. Rule couldn't be updated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "name": "MyBatchRuleName",
  "timeFrame": "PT1H",
  "scheduling": {
    "startTime": "2019-03-18T13:26:58.756",
    "endTime": "2019-03-20T13:26:58.756",
    "recurrence": "Daily",
    "value": "*/5 * * * * *"
  },
  "toggle": false,
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
```

```

        "name": "timeSeriesDOName_aggregate"
    }
},
"brRuleData": {
    "Branches": [
        {
            "Id": "f44194e3a0714e1cb90f6bb7ae194f18",
            "SequenceNumber": 1,
            "Condition": {
                "Expression": "",
                "AST": [
                    {
                        "Id": "2e0319e60e9b497d80a85e34f06cc047",
                        "Root": false,
                        "Value": "100",
                        "Parentheses": false,
                        "Children": [],
                        "Output": {
                            "DataObjectType": "E",
                            "BusinessDataType": "N"
                        }
                    }
                ],
            },
            {
                "Id": "969dafe70373439fbb93022a011577e4",
                "Root": true,
                "Value": null,
                "Function": "IsGreater",
                "Parentheses": false,
                "Children": [
                    {
                        "Id": "663da75ee4484d7d99e76589683283d4",
                        "SequenceNumber": 1
                    },
                    {
                        "Id": "2e0319e60e9b497d80a85e34f06cc047",
                        "SequenceNumber": 2
                    }
                ],
                "Output": {
                    "DataObjectType": null,
                    "BusinessDataType": null
                }
            },
            {
                "Id": "663da75ee4484d7d99e76589683283d4",
                "Root": false,
                "Value": null,
                "Reference": "/77d422e394f74dd5a4134a94cbae6b52/
caa36402ea414ab98faa831b2ea47508",
                "Parentheses": false,
                "Children": [],
                "Output": null
            }
        ]
    },
    "Operation": [
        {
            "Id": "b044d0873e5b4568888a6de2970ecbce",
            "SequenceNumber": 3,
            "Segment": "77c813a220384e52abcb7cb2a28cc06f",
            "Expression": null,
            "AST": [
                {
                    "Id": "EEE4B2AF97474F349D31E4A6A611ECB2",
                    "Root": true,
                    "Value": "high",
                    "Parentheses": false,
                    "Children": [],

```

```

        "Output": {
            "DataObjectType": "E",
            "BusinessDataType": "S"
        }
    },
    {
        "Id": "7770379f26274734a1618360bafceb43",
        "SequenceNumber": 2,
        "Segment": "85a70a28841044bba3d75091f168b4ed",
        "Expression": null,
        "AST": [
            {
                "Id": "375FD781637C4E10A2790D065568EEA7",
                "Root": true,
                "Value": "NewEvent",
                "Parentheses": false,
                "Children": [],
                "Output": {
                    "DataObjectType": "E",
                    "BusinessDataType": "S"
                }
            }
        ]
    }
],
    {
        "Default": {
            "Id": "544f71f2d399455fa1d1a9d84949cc0f",
            "Operation": [
                {
                    "Id": "0b717244129c4970818c7abd211d1f74",
                    "SequenceNumber": 4,
                    "Segment": "39c694c2044047f496459abb16a6a0ce",
                    "Expression": null,
                    "AST": [
                        {
                            "Id": "94B18535FF2748DD984048C5426F84A4",
                            "Root": true,
                            "Value": "",
                            "Parentheses": false,
                            "Children": [],
                            "Output": {
                                "DataObjectType": "E",
                                "BusinessDataType": "S"
                            }
                        }
                    ]
                }
            ]
        }
    }
]
}

```

Related Information

[Batch Rule \[page 1042\]](#)

18.2.5 Delete a Batch Rule

Deletes a batch rule from the database.

With this service method, you can delete a batch rule.

Note

When deleting a batch rule, keep the following in mind:

- Deleting a rule may lead to inconsistencies in other areas of SAP IoT where the rule may be used (for example, actions or segment service). The rule service component is unaware of such potential usages. Therefore, it's up to you to manually check in advance whether a rule can be deleted without causing damage.
- The data object associated with a rule is a separate entity that belongs to the rule project and is **not** affected by deleting a rule. Therefore, it's safe to delete a rule even if other rules in the same rule project are using the same data object.

Request

URI: /v1/projects/<projectId>/batch-rules/<ID>

HTTP Method: *DELETE*

Permissions: <rule>.d

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the batch rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be modified.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you delete the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
204	Rule deleted successfully.
401	Unauthorized. Rule couldn't be deleted due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Related Information

[Batch Rule \[page 1042\]](#)

18.2.6 Activate a Batch Rule

Activates a batch rule so that data can be processed.

After creating a new rule, the rule cannot start immediately with processing time series data. Instead, you have to activate the rule first.

The SAP IoT rule service features a detailed activation concept for rules so that you have a precise overview of the activation history of a given rule. The following activation status values exist:

Rule Status Values

Status	Description
Inactive	Inactive. This is the initial status for every rule, indicating that there has never been any attempt to activate it.
Activation Triggered	Activation message has been sent to the respective runtime component waiting for confirmation.
Active	Activation has been confirmed by the respective runtime component.
Deactivation Triggered	Deactivation message has been sent to the respective runtime component waiting for confirmation.
Deactivated	Deactivation has been confirmed by the respective runtime component.

Should you feel the need to stop an active rule from processing time series data, you can deactivate it at any time. To accomplish this, use either the [Rule Projects](#) app or the dedicated service API method that is provided for this purpose. In other words, although SAP IoT makes a difference between an "inactive" rule (one that has never been active) and a "deactivated" rule (one that has already been active, but deactivated later), this service method can be used to activate any rule.

Request

URI: /v1/projects/<projectId>/batch-rules/<ID>/activation

HTTP Method: *POST*

Permissions: <rule>.a

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the batch rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be activated.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation
```

With this request, you activate the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Headers

Header	Description
[header name]	[Description, possible values]

Response Status and Error Codes

Code	Description
202	Accepted. Rule activated successfully.
401	Unauthorized. Rule couldn't be activated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "name": "MyBatchRuleName",
  "activationDetails": [
```

```

    {
      "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "createdBy": "ACTIVATION_ENDPOINT",
      "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "status":
"INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
VATION_COMPLETED",
      "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
    }
  ],
  "texts": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    }
  ],
  "tags": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "tag": "MyRuleTag"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "name": "timeSeriesDOName_aggregate"
    }
  ],
  "createdOn": "2020-10-15T15:45:36.209Z",
  "lastChangedOn": "2020-10-15T15:45:36.209Z",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "draftDetails": {
    "scheduling": {
      "startTime": "2019-03-18T13:26:58.756Z",
      "endTime": "2019-03-20T13:26:58.756Z",
      "value": "* / 5 * * * * *"
    },
    "timeFrame": "PT1H",
    "isToggle": true
  },
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "activeDetails": {
    "scheduling": {
      "startTime": "2019-03-18T13:26:58.756Z",
      "endTime": "2019-03-20T13:26:58.756Z",
      "value": "* / 5 * * * * *"
    },
    "timeFrame": "PT1H",
    "isToggle": true,
  }
}

```

In the response payload, you can find the activation status and timestamp in the respective attributes.

Related Information

[Batch Rule \[page 1042\]](#)

[Create a Batch Rule \[page 1043\]](#)

[Deactivate a Batch Rule \[page 1063\]](#)

[Read Activation Details \[page 1068\]](#)

18.2.7 Deactivate a Batch Rule

Deactivates an active batch rule so that data processing stops.

With this service method, you can deactivate an already active rule, thereby stopping the rule from processing data.

After a rule has been activated, it starts processing incoming time series data by testing the rule condition against the data. It's not unusual to realize that something has gone wrong with the rule configuration and that certain parameters need to be changed to make the rule perform as expected. To prevent the system from erratic behavior, it's a good idea to stop it from further processing data as long as you modify its settings. To accomplish this, you deactivate the rule with this service method.

Request

URI: `/v1/projects/<projectId>/batch-rules/<ID>/activation`

HTTP Method: `DELETE`

Permissions: `<rule>.a`

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the batch rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be deactivated.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation
```

With this request, you deactivate the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
202	Accepted. Rule deactivated successfully.
401	Unauthorized. Rule couldn't be deactivated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "ETag": 1234143531234253600,
  "name": "MyBatchRuleName"
  {
    "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "createdBy": "ACTIVATION_ENDPOINT",
    "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "status":
      "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
      VATION_COMPLETED",
    "target": "CLOUD,EDGE",
    "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
  }
],
"texts": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "language": "en",
    "shortText": "Short text for my rule",
    "description": "Long description for my rule"
  }
],
"tags": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "tag": "MyRuleTag"
  }
],
"inputDataObjectNames": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "name": "timeSeriesDOName_aggregate"
  }
],
"createdOn": "2020-10-15T16:03:54.384Z",
"lastChangedOn": "2020-10-15T16:03:54.384Z",
"brProjectId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"draftDetails": {
  "scheduling": {
    "startTime": "2019-03-18T13:26:58.756Z",
    "endTime": "2019-03-20T13:26:58.756Z",
    "value": "*/5 * * * * *"
  }
},
}
```

```

    "timeFrame": "PT1H",
    "isToggle": true
  },
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "activeDetails": {
    "scheduling": {
      "startTime": "2019-03-18T13:26:58.756Z",
      "endTime": "2019-03-20T13:26:58.756Z",
      "value": "*/5 * * * *",
    },
    "timeFrame": "PT1H",
    "isToggle": true,
  }
}

```

Related Information

[Batch Rule \[page 1042\]](#)

[Activate a Batch Rule \[page 1060\]](#)

[Read Activation Details \[page 1068\]](#)

18.2.8 Read Simulation Data

Provides test data for rule simulation runs.

With this service method, you can provide test data for executing a rule in simulation mode.

If you have decided to better test a new rule before feeding it with large amounts of live data in your production environment, the next question arises: How can I provide test data to the rule? You can accomplish this by first calling this service method. The test data to be processed by the rule are imported via the request payload. Of course, you have to take care that the test data has the same structure than the expected live data so that the rule condition can be applied to the test data in a reasonable manner.

Once you've successfully uploaded the simulation data for the rule, you send a request to the simulation service method. See [Simulate a Batch Rule \[page 1066\]](#).

Request

URI: `/v1/projects/<projectId>/batch-rules/<ID>/simulation-input-template`

HTTP Method: `GET`

Permissions: `<rule>.a`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectID	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to simulate.	Path
active	No	boolean	Indicates for which version of the rule the test data shall be used. - False: draft (= default) - True: active	Query

Response

Response Status and Error Codes

Code	Description
200	Simulation data uploaded successfully.
401	Unauthorized. Simulation data couldn't be uploaded due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "myDataObjectName_aggregate": {
    "myProperty_AVG": "<Number>"
  }
}
```

Related Information

[Batch Rule \[page 1042\]](#)

[Simulate a Batch Rule \[page 1066\]](#)

18.2.9 Simulate a Batch Rule

Execute a rule with test data.

With this service method, you can simulate the rule behavior with test data.

It's in the very nature of any IoT scenario that there are lots of data to be processed. When this data is fed into a rule as data input, any mistake or flaw in the rule setup can easily result in large amounts of trash data or impose high system load on the technical infrastructure. Therefore, it's a good idea to test the rule behavior in advance with a small set of test data before you activate it in the production environment. However, it's up to your choice whether the simulation is done with either the draft or the active version of a rule. To accomplish this, use the `active` parameter with the desired setting.

Request

URI: `/v1/projects/<projectId>/batch-rules/<ID>/simulation`

HTTP Method: `POST`

Permissions: `<rule>.a`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to simulate.	Path
active	No	boolean	Indicates which version of the rule shall be simulated. - False: draft (= default) - True: active	Query
simulation Payload	Yes	string	Test data to be used for the simulation.	Request body

Request Example

```
{
  "myDataObjectName_aggregate": {
    "myProperty_AVG": "<Number>"
  }
}
```

Response

Response Status and Error Codes

Code	Description
200	Rule simulated successfully.
401	Unauthorized. Rule couldn't be simulated due to insufficient access rights.

Code	Description
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{"conditionIsMet":false}
```

Related Information

[Batch Rule \[page 1042\]](#)

[Read Simulation Data \[page 1065\]](#)

18.2.10 Read Activation Details

Retrieves a list of activation status changes for a rule.

With this service method, you can retrieve a complete list of events related to changes to the activation status of the specified rule.

In SAP IoT, a rule has to be in active state in order to process incoming time series data. The rule service keeps track of each state transition for every rule you define, with up to seven different states that can apply to a rule.

Each record consists of the rule status, a timestamp, the deployment target of the rule, and the correlation ID, which allows easy tracking of any system activity related to the status change, across all components of SAP IoT. With this data, you can investigate the root causes for potential unexpected system behavior. Also, presenting the list of activation details may be required in auditing scenarios.

Request

URI: `/v1/projects/<projectId>/batch-rules/<ID>/activation/details`

HTTP Method: [GET](#)

Permissions: `<rule>.r`

Request Headers

Header	Required	Values
[header_name]	[Yes No]	[Possible values, default values]

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectID	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation/details

Response

Response Headers

Header	Description
[header name]	[Description, possible values]

Response Status and Error Codes

Code	Description
200	Activation details retrieved successfully.
401	Unauthorized. Data couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
[
  {
    "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "createdBy": "ACTIVATION_ENDPOINT",
    "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "status":
      "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
      VATION_COMPLETED",
    "target": "CLOUD,EDGE",
    "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
  }
]
```

Related Information

[Batch Rule \[page 1042\]](#)

[Activate a Batch Rule \[page 1060\]](#)

18.2.11 Execute a Batch Rule

Manually execute a batch rule.

With this service method, you can initiate the execution of the specified batch rule.

As opposed to a streaming rule (which, by definition, is constantly monitoring a specified data stream once it's activated), a batch rule (also known as scheduled rule) has to be started manually before it starts analyzing the data aggregate that has been defined for the rule.

Note

You can only execute a batch rule that has been activated.

For this service method, the following rate limiting conditions are in effect:

- Calling this service method is possible only once per minute.
- Executing the same rule with this service method is possible only every 2 minutes.

Request

URI: `v1/projects/<projectId>/batch-rules/<ruleId>/executions`

HTTP Method: `POST`

Permissions: `<rule>.a`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the batch rule belongs.	Path
ruleId	Yes	string	Unique ID of the batch rule to be executed.	Path

Request Example

```
: v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/d54a9b0d-1731-4f01-a7d3-a92771e45064/executions
```

With this request, you execute the batch rule with ID `d54a9b0d-1731-4f01-a7d3-a92771e45064` from rule project `185d9a72-a629-4b94-b421-a2f0301bb072`.

Note

You don't have to provide any data in the request payload for this service method.

Response

Response Status and Error Codes

Code	Description
202	Accepted. Rule executed successfully.
401	Unauthorized. Rule couldn't be executed due to insufficient access rights.
403	Forbidden
404	Rule not found in runtime application. Possible reasons: • Invalid rule ID or project ID. • Rule hasn't been activated.
429	Too many requests. Rate limiting conditions were violated (see <i>Note</i> in introductory section.)

Response Example

```
{
  "ExecutionId": "9e699aaa-9fd3-4a93-9807-24b3e8c5ed2f"
}
```

The system returns an ID for each individual execution of a rule. This execution ID can be useful for analyzing log files and for auditing purposes.

Related Information

[Batch Rule \[page 1042\]](#)

18.2.12 Read a Batch Rule Execution

Retrieves the details of a single rule execution.

Whenever a batch rule is executed, the system keeps track of that execution by writing a small data record to the application log. With this service method, you can retrieve this data record for a fully specified execution (that is, by providing the IDs of the respective rule project, rule, and execution).

The easiest way to find out about the existing execution IDs is calling the collective GET method for all executions of a particular batch rule and then pick the one you're interested in. For more information, see [Read all Batch Rule Executions \[page 1074\]](#).

Note

For this service method, the following rate limiting condition is in effect:

- Calling this service method is possible only 10 times per minute.

Request

URI: `v1/projects/<projectId>/batch-rules/<ruleId>/executions/<executionId>`

HTTP Method: [GET](#)

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the batch rule belongs.	Path
ruleId	Yes	string	Unique ID of the batch rule to be executed.	Path
executionId	Yes	string	Unique ID of the batch rule execution.	Path

Request Example

`v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/d54a9b0d-1731-4f01-a7d3-a92771e45064/executions/dfdca371-d027-4ec8-abb6-851cd811453f`

With this request, you can retrieve the log data recorded for execution ID `dfdca371-d027-4ec8-abb6-851cd811453f` of the specified batch rule.

Response

Response Status and Error Codes

HTTP Status and Error Codes

Code	Description
200	OK. Execution data retrieved successfully.
401	Unauthorized. Execution data couldn't be retrieved due to insufficient access rights.
403	Forbidden
404	Execution data not found in runtime application. Possible reasons: - Invalid rule ID, project ID, or execution ID. - Rule hasn't been activated.
429	Too many requests. Rate limiting conditions were violated (see Note in introductory section.)

The rule execution status codes in the following table refer to the possible values defined for the `<Status>` field of the payload.

Rule Execution Status Codes

Status	Description
SUBMITTED	Rule has been submitted for execution.
RUNNING	Rule execution has been started and rule is currently running/ executing.
FAILED	Rule execution has failed. An error has occurred.
PARTIAL_SUCCESS	One or more errors occurred, but there is at least one success scenario.
FINISHED	Rule has been executed successfully.

The rule execution error codes in the following table refer to the possible values defined for the `<Error>` field of the payload.

Rule Execution Error Codes

Error	Description
NULL	No error. Rule has been executed successfully.
810000010	Rate limiting violation. Execution request has been made within the 2-minutes window of upcoming or previous execution of the same rule.
810000011	Partial error while executing rule. Check logs for more details.
810000012	Error while executing rule. Check logs for more details
810000013	No rule execution found in runtime with the specified ID.

Response Example

```
{
  "Id": "05560ead-65cb-4cbe-9814-c8b6c823d650",
  "Status": "FINISHED",
  "SubmittedOn": "2021-01-13T17:03:35.856Z",
  "StatusUpdatedOn": "2021-01-13T17:03:36.377Z",
  "Error": {
    "Code": "810000011",
    "Message": "Partial error while executing rule. Please check logs for more details."
  }
}
```

Related Information

[Batch Rule \[page 1042\]](#)

[Read all Batch Rule Executions \[page 1074\]](#)

18.2.13 Read all Batch Rule Executions

Retrieves the details of all executions of a given rule.

Whenever a batch rule is executed, the system keeps track of that execution by writing a small data record to the application log. With this service method, you can retrieve the data records for all executions of a specified rule.

Note

For this service method, the following rate limiting condition is in effect:

- Calling this service method is possible only 10 times per minute.

Request

URI: `v1/projects/<projectId>/batch-rules/<ruleId>/executions`

HTTP Method: `GET`

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the batch rule belongs.	Path
ruleId	Yes	string	Unique ID of the batch rule to be executed.	Path

Request Example

`v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/batch-rules/d54a9b0d-1731-4f01-a7d3-a92771e45064/executions`

With this request, you retrieve a list of data records that the system has logged for all executions of the specified rule.

Response

Response Status and Error Codes

Code	Description
200	OK. Execution data retrieved successfully.
401	Unauthorized. Execution data couldn't be retrieved due to insufficient access rights.

Code	Description
403	Forbidden
404	Execution data not found in runtime application. Possible reasons: - Invalid rule ID, project ID, or execution ID. - Rule hasn't been activated.
429	Too many requests. Rate limiting conditions were violated (see <i>Note</i> in introductory section.)

Response Example

```
[
  {
    "Id": "05560ead-65cb-4cbe-9814-c8b6c823d650",
    "Status": "FINISHED",
    "SubmittedOn": "2021-01-13T17:03:35.856Z",
    "StatusUpdatedOn": "2021-01-13T17:03:36.377Z",
    "Error": null
  },
  {
    "Id": "dfdca371-d027-4ec8-abb6-851cd811453f",
    "Status": "FINISHED",
    "SubmittedOn": "2021-01-13T17:00:00.224Z",
    "StatusUpdatedOn": "2021-01-13T17:00:00.800Z",
    "Error": null
  },
  {
    "Id": "c340b8c0-39df-45fe-8ac7-1e6bd5010cf8",
    "Status": "FINISHED",
    "SubmittedOn": "2021-01-13T17:06:08.084Z",
    "StatusUpdatedOn": "2021-01-13T17:06:08.390Z",
    "Error": null
  },
  {
    "Id": "8f8a0ac2-217e-439d-a0e1-357d055692c6",
    "Status": "FINISHED",
    "SubmittedOn": "2021-01-13T16:59:45.773Z",
    "StatusUpdatedOn": "2021-01-13T16:59:46.952Z",
    "Error": null
  }
]
```

Related Information

[Batch Rule \[page 1042\]](#)

18.3 Streaming Rule

A service for applying rules to a live stream of time series data in an IoT scenario.

You use streaming rules for time series data produced by sensors attached to devices in an IoT scenario. Each rule contains a rule expression, which is used to test whether the data matches a certain condition or not. In

case the condition is met, further actions can be taken, such as triggering actions, sending an alert message, and so on.

Each rule is part of a so-called rule project, which serves as a container for one or many rules, as well as for a set of data objects, which is shared by all the rules within the project.

Looking at the list of methods supported by a rule, you realize that there's a number of specialized methods going beyond the usual set of CRUD (create, retrieve, update, delete) methods. You can activate and deactivate a rule as well as provide test data that you can use to simulate the rule behavior prior to activating it in a productive environment. Last, but not least, you can call an API service method that returns a list of activations and deactivations for a specified rule, which can be required for auditing reasons.

Base URI:

- Formal Description: `https://<server address>[:<port number>][<path>]/v1/projects/<projectId>/stream-rules`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-noah-live-rules-designtime.cfapps.us10.hana.ondemand.com/v1/projects/<projectId>/stream-rules/`

Permissions:

`<rule>.c`

`<rule>.r`

`<rule>.u`

`<rule>.d`

`<rule>.a`

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create a Streaming Rule [page 1077]	<code>/v1/projects/<projectId>/stream-rules</code>	<code><rule>.c</code>
<i>GET</i>	Read a Streaming Rule [page 1084]	<code>/v1/projects/<projectId>/stream-rules/<ID></code>	<code><rule>.r</code>
<i>GET</i>	Read all Streaming Rules [page 1089]	<code>/v1/projects/<projectId>/stream-rules</code>	<code><rule>.r</code>
<i>PUT</i>	Update a Streaming Rule [page 1091]	<code>/v1/projects/<projectId>/stream-rules/<ID></code>	<code><rule>.u</code>
<i>DELETE</i>	Delete a Streaming Rule [page 1095]	<code>/v1/projects/<projectId>/stream-rules/<ID></code>	<code><rule>.d</code>
<i>POST</i>	Activate a Streaming Rule [page 1096]	<code>/v1/projects/<projectId>/stream-rules/<ID>/activation</code>	<code><rule>.a</code>
<i>DELETE</i>	Deactivate a Streaming Rule [page 1099]	<code>/v1/projects/<projectId>/stream-rules/<ID>/activation</code>	<code><rule>.a</code>

HTTP Method	Action	URI	Scopes
POST	Simulate a Streaming Rule [page 1103]	/v1/projects/<projectId>/stream-rules/<ID>/simulation	<rule>.a
GET	Read Simulation Data (Streaming Rule) [page 1101]	/v1/projects/<projectId>/stream-rules/<ID>/simulation-input-template	<rule>.a
GET	Read Activation Details (Streaming Rule) [page 1104]	/v1/projects/<projectId>/stream-rules/<ID>/activation/details	<rule>.r

Related Information

[Batch Rule \[page 1042\]](#)

[Rule Project \[page 1024\]](#)

18.3.1 Create a Streaming Rule

With this method, you create a new streaming rule object.

As with all rule service methods in SAP IoT, you have to provide the ID of the rule project to which the new rule shall be assigned. This ensures that the new rule can access all elements of the data objects defined in the rule project.

Note

Once you've successfully created a new rule, start the [Rule Projects](#) app from the SAP IoT Fiori launchpad to assign one or more data objects that are available in the rule project. Also, for the rule to actually process data, you have to activate it. You can accomplish this either in the app or with the help of the API service method that is provided for this purpose.

Request

URI: /v1/projects/<projectId>/stream-rules

HTTP Method: POST

Permissions: <rule>.c

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the new rule shall be assigned.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules

With this service request, a new streaming rule is created and assigned to the rule project specified by its ID. The detailed settings for the new rule are all contained in the following request payload.

Payload

```
{
  "name": "MyStreamRuleName",
  "sleepingTimeFrame": "PT1H",
  "isToggle": true,
  "duration": {
    "eventSuspensionTimeFrame": "PT1H",
    "eventCreationMode": "ONCE"
  },
  "consecutiveConditionFulfillment": {
    "eventSuspensionCount": 3,
    "eventCreationMode": "EACH_TIME"
  },
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "name": "MyDataObjectName"
    },
    {
      "name": "SAP_Stream_Event"
    },
    {
      "name": "SAP_GeofenceData"
    }
  ],
  "brRuleData": {
    "Branches": [
      {
        "Id": "f44194e3a0714e1cb90f6bb7ae194f18",
        "SequenceNumber": 1,

```

```

        "Condition": {
            "Expression": "",
            "AST": [
                {
                    "Id": "2e0319e60e9b497d80a85e34f06cc047",
                    "Root": false,
                    "Value": "100",
                    "Parentheses": false,
                    "Children": [],
                    "Output": {
                        "DataObjectType": "E",
                        "BusinessDataType": "N"
                    }
                },
                {
                    "Id": "969dafe70373439fbb93022a011577e4",
                    "Root": true,
                    "Value": null,
                    "Function": "IsGreater",
                    "Parentheses": false,
                    "Children": [
                        {
                            "Id": "663da75ee4484d7d99e76589683283d4",
                            "SequenceNumber": 1
                        },
                        {
                            "Id": "2e0319e60e9b497d80a85e34f06cc047",
                            "SequenceNumber": 2
                        }
                    ],
                    "Output": {
                        "DataObjectType": null,
                        "BusinessDataType": null
                    }
                },
                {
                    "Id": "663da75ee4484d7d99e76589683283d4",
                    "Root": false,
                    "Value": null,
                    "Reference": "/77d422e394f74dd5a4134a94cbae6b52/
caa36402ea414ab98faa831b2ea47508",
                    "Parentheses": false,
                    "Children": [],
                    "Output": null
                }
            ]
        },
        "Operation": [
            {
                "Id": "b044d0873e5b4568888a6de2970ecbce",
                "SequenceNumber": 3,
                "Segment": "77c813a220384e52abcb7cb2a28cc06f",
                "Expression": null,
                "AST": [
                    {
                        "Id": "EEE4B2AF97474F349D31E4A6A611ECB2",
                        "Root": true,
                        "Value": "high",
                        "Parentheses": false,
                        "Children": [],
                        "Output": {
                            "DataObjectType": "E",
                            "BusinessDataType": "S"
                        }
                    }
                ]
            }
        ]
    },
    {

```

```

        "Id": "7770379f26274734a1618360bafceb43",
        "SequenceNumber": 2,
        "Segment": "85a70a28841044bba3d75091f168b4ed",
        "Expression": null,
        "AST": [
            {
                "Id": "375FD781637C4E10A2790D065568EEA7",
                "Root": true,
                "Value": "NewEvent",
                "Parentheses": false,
                "Children": [],
                "Output": {
                    "DataObjectType": "E",
                    "BusinessDataType": "S"
                }
            }
        ]
    },
    ],
    "Default": {
        "Id": "544f71f2d399455fa1d1a9d84949cc0f",
        "Operation": [
            {
                "Id": "0b717244129c4970818c7abd211d1f74",
                "SequenceNumber": 4,
                "Segment": "39c694c2044047f496459abb16a6a0ce",
                "Expression": null,
                "AST": [
                    {
                        "Id": "94B18535FF2748DD984048C5426F84A4",
                        "Root": true,
                        "Value": "",
                        "Parentheses": false,
                        "Children": [],
                        "Output": {
                            "DataObjectType": "E",
                            "BusinessDataType": "S"
                        }
                    }
                ]
            }
        ]
    }
}

```

Field Explanation

Name	Mandatory	Description
<name>	yes	Technical name of the rule.
<sleepingTimeFrame>	no	Specifies a period of time, for which the rule does not trigger further events after the first occurrence of a fulfilled rule condition. Values must be formatted according to ISO 8601 and can range from 10 seconds to 1 hour (for example, "PT1H").
<toggle>	no	Controls how the rule behaves if the rule condition is fulfilled over a longer period: • <code>true</code>: Only one event is triggered. • <code>false</code> (= default): Events are triggered as long as the condition is fulfilled.

Name	Mandatory	Description
<code><duration></code>	no	Event suppression settings: Rule triggers an event only if the condition is constantly fulfilled over the specified period of time.
<code><eventSuspensionTimeFrame></code>	yes	Specifies a period of time over which the rule condition has been constantly fulfilled before the rule triggers an event.
<code><eventCreationMethod></code>	yes	Indicates whether the rule triggers an event only once or each time the condition is fulfilled. Possible values: • ONCE • EACH_TIME
<code><consecutiveConditionFulfillment></code>	no	Event suppression settings: Rule triggers an event only if the condition is constantly fulfilled for the specified number of measurements.
<code><eventSuspensionCount></code>	yes	Number of consecutive condition fulfillments before an event is triggered.
<code><eventCreationMethod></code>	yes	Indicates whether the rule triggers an event only once or each time the condition is fulfilled. Possible values: • ONCE • EACH_TIME
<code><inputDataObjectNames></code>	yes	Array of the names of data objects to be used as rule input. Possible values: • <code><time series data object name></code>: All-purpose data monitoring. • <code>SAP_Geofence_Data</code>: Geolocation data monitoring (for example, used by Segment Service [page 1121]).
<code><outputDataObjectNames></code>	no	Name of the data object used for handling the output value after rule execution.

i Note
This field can be used only for streaming rules with subtype Derivation.

Response

Response Headers

Header	Description
Location	Path to the newly created rule, for example: <code>/v1/projects/3c814fbf-1a6f-4063-8e25-38ae144dc43c/stream-rules/d1c005f8-7b61-4263-8eb5-76bbc14d57be</code>
Etag	Identifier of the rule instance version, for example: <code>2dadd04e709323c68ac3d65065208e05</code>

Response Status and Error Codes

Code	Description
200	Rule created successfully.
400	Bad request. For example, the payload may have caused a validation error.
401	Unauthorized. Rule couldn't be created due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "id": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
  "name": "StreamRuleName_1606989893600",
  "projectId": "6cbb6fe9-1673-4acf-ad60-c4988f65fa96",
  "activationDetails": [
    {
      "status": "INACTIVE",
      "createdOn": "2020-12-03T10:04:57.694Z",
      "createdBy": "RULE_ENDPOINT"
    }
  ],
  "duration": {
    "eventSuspensionTimeFrame": "PT1H",
    "eventCreationMode": "ONCE"
  },
  "consecutiveConditionFulfillment": {
    "eventSuspensionCount": 3,
    "eventCreationMode": "EACH_TIME"
  },
  "texts": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "name": "timeSeriesDOName"
    },
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "name": "SAP_Stream_Event"
    },
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "name": "SAP_GeofenceData"
    }
  ]
}
```



```

    },
    "outputDataObjectName": "Result_Stream",
    "createdOn": "2020-12-03T10:04:57.696Z",
    "lastChangedOn": "2020-12-03T10:04:57.696Z",
    "brProjectId": "753c08d8f8924626b20079d24fb3ce2b",
    "brDraftRuleId": "5cb136d1650d4d0aa672bc9786716d29",
    "brActiveRuleId": "bc15258f26114dd5b9dff25446caafd3",
    "brDraftRuleServiceId": "83039dd8315a4eb792101b8f2cc6eb96",
    "brActiveRuleServiceId": "5389f0a4b622469db29ed0519b373242",
    "brDraftRuleSetId": "112684050cb24bbea53960960303f3cf",
    "brActiveRuleSetId": "d5d211770f5444f0bd6aa9ed1bb63e9c",
    "subtype": "EVENT",
    "draftDetails": {
      "sleepingTimeFrame": "PT1H",
      "isToggle": false
    },
    "activeDetails": {}
  }
}

```

The following table provides explanations for those fields that are only present in the response payload, but not in the creation request. The returned field values are automatically determined by the system.

Additional Field Explanations

Name	Description
<id>	Unique ID of the newly created rule. The ID is a 36 characters hex code, grouped into sections by hyphens.
<projectId>	Unique ID of the rule project to which the rule belongs.
<activationDetails.status>	Activation status of the rule. Possible values: • INACTIVE • ACTIVATION_TRIGGERED • ACTIVATION_COMPLETED • ACTIVATION_FAILED • DEACTIVATION_TRIGGERED • DEACTIVATION_COMPLETED • DEACTIVATION_FAILED
i Note Only rules in status <code>ACTIVATION_COMPLETED</code> can be executed.	
<subtype>	Additional characterization of a streaming rule. The following subtypes are supported: • <code>EVENT</code>: Rule triggers an event if the rule condition is fulfilled. • <code>DERIVATION</code>: Rule returns a result value based on the processed input data.
<createdOn>	ISO timestamp of creation time. Example: 2020-12-02T10:43:56.467Z
<lastChangedOn>	ISO timestamp of last change. Example: 2020-12-05T10:43:56.467Z
<draftDetails>	A field array containing all the settings for the rule in draft version (= inactive). These settings take effect once the rule has been successfully activated.

Name	Description
<code><activeDetails></code>	A field array containing all the settings for the rule in active version. These settings are currently in effect when the rule is executed. In the response payload shown, this section is empty because the rule hasn't been activated yet.

Related Information

[Streaming Rule \[page 1075\]](#)

[Activate a Streaming Rule \[page 1096\]](#)

18.3.2 Read a Streaming Rule

Retrieves a streaming rule from the database.

With this method, you send a request to the server to retrieve a particular streaming rule object specified by its ID and the ID of the rule project to which it belongs.

Request

URI: `/v1/projects/<projectId>/stream-rules/<ID>`

HTTP Method: [GET](#)

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>projectId</code>	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
<code>ID</code>	Yes	string	Unique ID of the rule to be retrieved.	Path
<code>includeBrRuleData</code>	No	boolean	Indicates whether the associated BRM rule object data shall be returned (default: false).	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you retrieve the rule with ID "79ded171..." that is contained in rule project "185d9a72..."

Response

Response Status and Error Codes

Code	Description
200	Rule retrieved successfully.
401	Unauthorized. Rule couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "name": "MyStreamRuleName",
  "activationDetails": [
    {
      "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "createdBy": "ACTIVATION_ENDPOINT",
      "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "status":
"INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
VATION_COMPLETED",
      "target": "CLOUD,EDGE",
      "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
    }
  ],
  "texts": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    }
  ],
  "tags": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "tag": "MyRuleTag"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "name": "MyPropertySet"
    }
  ],
  "createdOn": "2020-10-20T09:15:51.795Z",
  "lastChangedOn": "2020-10-20T09:15:51.795Z",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "subtype": [
    "EVENT"
  ],
  "draftDetails": {
    "sleepingTimeFrame": "PT1H",
```

```

"isToggle": true,
"duration": {
  "eventSuspensionTimeFrame": "PT1H",
  "eventCreationMode": "ONCE"
},
"consecutiveConditionFulfillment": {
  "eventSuspensionCount": 2,
  "eventCreationMode": "ONCE"
},
"brRuleData": {
  "Branches": [
    {
      "Condition": {
        "AST": [
          {
            "Children": [
              {
                "Id": "string",
                "SequenceNumber": 0
              }
            ],
            "Function": "string",
            "Id": "string",
            "Output": {
              "BusinessDataType": "string",
              "DataObjectType": "string"
            },
            "Parentheses": true,
            "Reference": "string",
            "Root": true,
            "Value": "string"
          }
        ],
        "Expression": "string"
      },
      "Id": "string",
      "Operation": [
        {
          "AST": [
            {
              "Children": [
                {
                  "Id": "string",
                  "SequenceNumber": 0
                }
              ],
              "Function": "string",
              "Id": "string",
              "Output": {
                "BusinessDataType": "string",
                "DataObjectType": "string"
              },
              "Parentheses": true,
              "Reference": "string",
              "Root": true,
              "Value": "string"
            }
          ],
          "Expression": "string",
          "Id": "string",
          "Segment": "string",
          "SequenceNumber": 0
        }
      ],
      "SequenceNumber": 0
    }
  ],
  "Default": {

```

```

        "Id": "string",
        "Operation": [
            {
                "AST": [
                    {
                        "Children": [
                            {
                                "Id": "string",
                                "SequenceNumber": 0
                            }
                        ],
                        "Function": "string",
                        "Id": "string",
                        "Output": {
                            "BusinessDataType": "string",
                            "DataObjectType": "string"
                        },
                        "Parentheses": true,
                        "Reference": "string",
                        "Root": true,
                        "Value": "string"
                    }
                ],
                "Expression": "string",
                "Id": "string",
                "Segment": "string",
                "SequenceNumber": 0
            }
        ]
    },
    "activeDetails": {
        "scheduling": {
            "startTime": "2019-03-18T13:26:58.756Z",
            "endTime": "2019-03-20T13:26:58.756Z",
            "value": "*/5 * * * *",
            "recurrence": "string"
        },
        "timeFrame": "PT1H",
        "sleepingTimeFrame": "PT1H",
        "isToggle": true,
        "duration": {
            "eventSuspensionTimeFrame": "PT1H",
            "eventCreationMode": "ONCE"
        },
        "consecutiveConditionFulfillment": {
            "eventSuspensionCount": 2,
            "eventCreationMode": "ONCE"
        },
        "brRuleData": {
            "Branches": [
                {
                    "Condition": {
                        "AST": [
                            {
                                "Children": [
                                    {
                                        "Id": "string",
                                        "SequenceNumber": 0
                                    }
                                ],
                                "Function": "string",
                                "Id": "string",
                                "Output": {
                                    "BusinessDataType": "string",
                                    "DataObjectType": "string"
                                }
                            }
                        ]
                    }
                }
            ]
        }
    }
}

```

```

        "Parentheses": true,
        "Reference": "string",
        "Root": true,
        "Value": "string"
    }
],
"Expression": "string"
},
"Id": "string",
"Operation": [
    {
        "AST": [
            {
                "Children": [
                    {
                        "Id": "string",
                        "SequenceNumber": 0
                    }
                ],
                "Function": "string",
                "Id": "string",
                "Output": {
                    "BusinessDataType": "string",
                    "DataObjectType": "string"
                },
                "Parentheses": true,
                "Reference": "string",
                "Root": true,
                "Value": "string"
            }
        ],
        "Expression": "string",
        "Id": "string",
        "Segment": "string",
        "SequenceNumber": 0
    }
],
"SequenceNumber": 0
}
],
"Default": {
    "Id": "string",
    "Operation": [
        {
            "AST": [
                {
                    "Children": [
                        {
                            "Id": "string",
                            "SequenceNumber": 0
                        }
                    ],
                    "Function": "string",
                    "Id": "string",
                    "Output": {
                        "BusinessDataType": "string",
                        "DataObjectType": "string"
                    },
                    "Parentheses": true,
                    "Reference": "string",
                    "Root": true,
                    "Value": "string"
                }
            ],
            "Expression": "string",
            "Id": "string",
            "Segment": "string",
            "SequenceNumber": 0
        }
    ]
}

```

```
}  
  ]  
}  
}  
}  
}
```

Related Information

[Streaming Rule \[page 1075\]](#)

18.3.3 Read all Streaming Rules

Retrieves all streaming rules for the specified project from the database.

With this service method, you can retrieve all the streaming rules contained in the specified rule project. You can use the optional query parameters to keep the number of returned entries low.

Note

The maximum number of entries to be retrieved with this method is 500 entries per method call.

Request

URI: `/v1/projects/<projectId>/stream-rules`

HTTP Method: `GET`

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project.	Path
\$count	No	boolean	Indicates whether the total number of rules in the specified project shall be returned. Default: <code>false</code> .	Query string
\$filter	No	string	Filter condition to be applied;	Query string
\$skip	No	integer	Number of the first n records to be excluded from the result set.	Query string
\$top	No	integer	Number of records to include in the result set. Maximum allowed value: 500	Query string

Parameter	Required	Data Type	Description	Parameter Type
\$orderby	No	string	Field name to be used for sorting the result set.	Query string

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules

With this request, you retrieve all the streaming rules that are contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
200	Rules retrieved successfully.
401	Unauthorized. Rules couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "count": 543,
  "previous": "http://localhost:8080/v1/vocabulary?$skip=500",
  "next": "http://localhost:8080/v1/vocabulary?$skip=500",
  "values": [
    {
      "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "ETag": 1234143531234253600,
      "name": "MyStreamRuleName",
      "activationDetails": [
        {
          "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "createdBy": "ACTIVATION_ENDPOINT",
          "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "status":
            "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
            VATION_COMPLETED",
          "target": "CLOUD,EDGE",
          "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
        }
      ],
      "texts": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "language": "en",
          "shortText": "Short text for my rule",
          "description": "Long description for my rule"
        }
      ],
      "tags": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "tag": "MyRuleTag"
        }
      ]
    }
  ]
}
```



```

    ],
    "inputDataObjectNames": [
      {
        "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
        "name": "MyPropertySet"
      }
    ],
    "createdOn": "2020-10-20T09:36:00.362Z",
    "lastChangedOn": "2020-10-20T09:36:00.362Z",
    "brProjectId": "4f5697d3240d4f258b900c181e35a835",
    "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
    "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
    "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
    "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
    "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
    "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
    "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
    "subtype": [
      "EVENT"
    ],
    "draftDetails": {
      "sleepingTimeFrame": "PT1H",
      "isToggle": true,
      "duration": {
        "eventSuspensionTimeFrame": "PT1H",
        "eventCreationMode": "ONCE"
      },
      "consecutiveConditionFulfillment": {
        "eventSuspensionCount": 2,
        "eventCreationMode": "ONCE"
      }
    },
  },
]
}

```

Related Information

[Streaming Rule \[page 1075\]](#)

18.3.4 Update a Streaming Rule

Updates a streaming rule.

With this service method, you can modify the attribute values of a streaming rule specified by its ID and rule project ID. The modified values are provided via the request payload, which contains the modified values along with all the values that shall remain unchanged.

Request

URI: `/v1/projects/<projectId>/stream-rules/<ID>`

HTTP Method: *PUT*

Permissions: <rule>.u

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the streaming rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be modified.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you update the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
200	Rule updated successfully.
401	Unauthorized. Rule couldn't be updated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "name": "MyStreamRuleName",
  "sleepingTimeFrame": "PT1H",
  "isToggle": true,
  "duration": {
    "eventSuspensionTimeFrame": "PT1H",
    "eventCreationMode": "ONCE"
  },
  "consecutiveConditionFulfillment": {
    "eventSuspensionCount": 3,
    "eventCreationMode": "EACH_TIME"
  },
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    }
  ]
}
```

```

    {
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "name": "MyDataObjectName"
    },
    {
      "name": "SAP_Stream_Event"
    },
    {
      "name": "SAP_GeofenceData"
    }
  ],
  "brRuleData": {
    "Branches": [
      {
        "Id": "f44194e3a0714e1cb90f6bb7ae194f18",
        "SequenceNumber": 1,
        "Condition": {
          "Expression": "",
          "AST": [
            {
              "Id": "2e0319e60e9b497d80a85e34f06cc047",
              "Root": false,
              "Value": "100",
              "Parentheses": false,
              "Children": [],
              "Output": {
                "DataObjectType": "E",
                "BusinessDataType": "N"
              }
            }
          ],
          "Output": {
            "DataObjectType": "E",
            "BusinessDataType": "N"
          }
        },
        {
          "Id": "969dafe70373439fbb93022a011577e4",
          "Root": true,
          "Value": null,
          "Function": "IsGreater",
          "Parentheses": false,
          "Children": [
            {
              "Id": "663da75ee4484d7d99e76589683283d4",
              "SequenceNumber": 1
            },
            {
              "Id": "2e0319e60e9b497d80a85e34f06cc047",
              "SequenceNumber": 2
            }
          ],
          "Output": {
            "DataObjectType": null,
            "BusinessDataType": null
          }
        }
      ],
      {
        "Id": "663da75ee4484d7d99e76589683283d4",
        "Root": false,
        "Value": null,
        "Reference": "/77d422e394f74dd5a4134a94cbae6b52/caa36402ea414ab98faa831b2ea47508",

```

```

        "Parentheses": false,
        "Children": [],
        "Output": null
    }
]
},
"Operation": [
    {
        "Id": "b044d0873e5b4568888a6de2970ecbce",
        "SequenceNumber": 3,
        "Segment": "77c813a220384e52abcb7cb2a28cc06f",
        "Expression": null,
        "AST": [
            {
                "Id": "EEE4B2AF97474F349D31E4A6A611ECB2",
                "Root": true,
                "Value": "high",
                "Parentheses": false,
                "Children": [],
                "Output": {
                    "DataObjectType": "E",
                    "BusinessDataType": "S"
                }
            }
        ]
    },
    {
        "Id": "7770379f26274734a1618360bafceb43",
        "SequenceNumber": 2,
        "Segment": "85a70a28841044bba3d75091f168b4ed",
        "Expression": null,
        "AST": [
            {
                "Id": "375FD781637C4E10A2790D065568EEA7",
                "Root": true,
                "Value": "NewEvent",
                "Parentheses": false,
                "Children": [],
                "Output": {
                    "DataObjectType": "E",
                    "BusinessDataType": "S"
                }
            }
        ]
    }
]
},
"Default": {
    "Id": "544f71f2d399455fa1d1a9d84949cc0f",
    "Operation": [
        {
            "Id": "0b717244129c4970818c7abd211d1f74",
            "SequenceNumber": 4,
            "Segment": "39c694c2044047f496459abb16a6a0ce",
            "Expression": null,
            "AST": [
                {
                    "Id": "94B18535FF2748DD984048C5426F84A4",
                    "Root": true,
                    "Value": "",
                    "Parentheses": false,
                    "Children": [],
                    "Output": {
                        "DataObjectType": "E",
                        "BusinessDataType": "S"
                    }
                }
            ]
        }
    ]
}

```

```
}
  }
}
  ]
}
]
```

Related Information

[Streaming Rule \[page 1075\]](#)

18.3.5 Delete a Streaming Rule

Deletes a streaming rule from the database.

With this service method, you can delete a streaming rule.

Note

When deleting a streaming rule, keep the following in mind:

- Deleting a rule may lead to inconsistencies in other areas of SAP IoT where the rule may be used (for example, actions or segment service). The rule service component is unaware of such potential usages. Therefore, it's up to you to manually check in advance whether a rule can be deleted without causing damage.
- The data object associated with a rule is a separate entity that belongs to the rule project and is **not** affected by deleting a rule. Therefore, it's safe to delete a rule even if other rules in the same rule project are using the same data object.

Request

URI: /v1/projects/<projectId>/stream-rules/<ID>

HTTP Method: [DELETE](#)

Permissions: <rule>.d

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the streaming rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be modified.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you delete the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
204	Rule deleted successfully.
401	Unauthorized. Rule couldn't be deleted due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Related Information

[Streaming Rule \[page 1075\]](#)

18.3.6 Activate a Streaming Rule

Activates a streaming rule so that data can be processed.

After creating a new rule, the rule cannot start immediately with processing time series data. Instead, you have to activate the rule first.

The SAP IoT rule service features a detailed activation concept for rules so that you have a precise overview of the activation history of a given rule. The following activation status values exist:

Rule Status Values

Status	Description
Inactive	Inactive. This is the initial status for every rule, indicating that there has never been any attempt to activate it.
Activation Triggered	Activation message has been sent to the respective runtime component waiting for confirmation.
Active	Activation has been confirmed by the respective runtime component.
Deactivation Triggered	Deactivation message has been sent to the respective runtime component waiting for confirmation.
Deactivated	Deactivation has been confirmed by the respective runtime component.

Should you feel the need to stop an active rule from processing time series data, you can deactivate it at any time. To accomplish this, use either the [Rule Projects](#) app or the dedicated service API method that is provided for this purpose. In other words, although SAP IoT makes a difference between an "inactive" rule (one that has never been active) and a "deactivated" rule (one that has already been active, but deactivated later), this service method can be used to activate any rule.

Request

URI: /v1/projects/<projectId>/stream-rules/<ID>/activation

HTTP Method: [POST](#)

Permissions: <rule>.a

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the streaming rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be activated.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation
```

With this request, you activate the rule with ID "79ded171..." that is contained in rule project "185d9a72..."

Response

Response Status and Error Codes

Code	Description
202	Accepted. Rule activated successfully.
401	Unauthorized. Rule couldn't be activated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "name": "MyStreamRuleName",
  "activationDetails": [
    {
      "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "createdBy": "ACTIVATION_ENDPOINT",
      "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "status":
"INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
VATION_COMPLETED",
      "target": "CLOUD,EDGE",
      "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
    }
  ],
  "texts": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    }
  ],
  "tags": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "tag": "MyRuleTag"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "name": "MyPropertySet"
    }
  ],
  "createdOn": "2020-10-20T11:54:25.423Z",
  "lastChangedOn": "2020-10-20T11:54:25.423Z",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
  "subtype": [
    "EVENT"
  ],
  "draftDetails": {
    "sleepingTimeFrame": "PT1H",
```



```

    "isToggle": true,
    "duration": {
      "eventSuspensionTimeFrame": "PT1H",
      "eventCreationMode": "ONCE"
    },
    "consecutiveConditionFulfillment": {
      "eventSuspensionCount": 2,
      "eventCreationMode": "ONCE"
    },
    "activeDetails": {
      "sleepingTimeFrame": "PT1H",
      "isToggle": true,
      "duration": {
        "eventSuspensionTimeFrame": "PT1H",
        "eventCreationMode": "ONCE"
      },
      "consecutiveConditionFulfillment": {
        "eventSuspensionCount": 2,
        "eventCreationMode": "ONCE"
      },
    },
  },
}

```

In the response payload, you can find the activation status and timestamp in the respective attributes.

Related Information

[Streaming Rule \[page 1075\]](#)

[Create a Streaming Rule \[page 1077\]](#)

[Deactivate a Streaming Rule \[page 1099\]](#)

[Read Activation Details \(Streaming Rule\) \[page 1104\]](#)

18.3.7 Deactivate a Streaming Rule

Deactivates an active streaming rule so that data processing stops.

With this service method, you can deactivate an already active rule, thereby stopping the rule from processing data.

After a rule has been activated, it starts processing incoming time series data by testing the rule condition against the data. It's not unusual to realize that something has gone wrong with the rule configuration and that certain parameters need to be changed to make the rule perform as expected. To prevent the system from erratic behavior, it's a good idea to stop it from further processing data as long as you modify its settings. To accomplish this, you deactivate the rule with this service method.

Request

URI: `/v1/projects/<projectId>/stream-rules/<ID>/activation`

HTTP Method: `DELETE`

Permissions: <rule>.a

Request Headers

Header	Required	Values
If-match	Yes	Check if cached version matches current server version of the streaming rule.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to be deactivated.	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation
```

With this request, you deactivate the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
202	Accepted. Rule deactivated successfully.
401	Unauthorized. Rule couldn't be deactivated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "name": "MyStreamRuleName"
  {
    "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "createdBy": "ACTIVATION_ENDPOINT",
    "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "status":
      "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTIVATION_COMPLETED",
    "target": "CLOUD,EDGE",
    "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
  }
},
"texts": [
  {
    "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
```

```

        "language": "en",
        "shortText": "Short text for my rule",
        "description": "Long description for my rule"
    }
],
"tags": [
    {
        "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
        "tag": "MyRuleTag"
    }
],
"inputDataObjectNames": [
    {
        "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
        "name": "MyPropertySet"
    }
],
"createdOn": "2020-10-15T16:03:54.384Z",
"lastChangedOn": "2020-10-15T16:03:54.384Z",
"brProjectId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
"brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
"draftDetails": {
    "isToggle": true
}
},
"projectId": "185d9a72-a629-4b94-b421-a2f0301bb072",
"activeDetails": {
    "sleepingTimeFrame": "PT1H",
    "isToggle": true,
    "duration": {
        "eventSuspensionTimeFrame": "PT1H",
        "eventCreationMode": "ONCE"
    },
    "consecutiveConditionFulfillment": {
        "eventSuspensionCount": 2,
        "eventCreationMode": "ONCE"
    }
}
}
}

```

Related Information

[Streaming Rule \[page 1075\]](#)

[Activate a Streaming Rule \[page 1096\]](#)

[Read Activation Details \(Streaming Rule\) \[page 1104\]](#)

18.3.8 Read Simulation Data (Streaming Rule)

Provides test data for rule simulation runs.

With this service method, you can provide test data for executing a rule in simulation mode.

If you have decided to better test a new rule before feeding it with large amounts of live data in your production environment, the next question arises: How can I provide test data to the rule? You can accomplish this by first calling this service method. The test data to be processed by the rule is imported via the request payload. Of course, you have to take care that the test data has the same structure than the expected live data so that the rule condition can be applied to the test data in a reasonable manner.

Once you've successfully uploaded the simulation data for the rule, you send a request to the simulation service method. See [Simulate a Batch Rule \[page 1066\]](#).

Request

URI: /v1/projects/<projectId>/stream-rules/<ID>/simulation-input-template

HTTP Method: [GET](#)

Permissions: <rule>.a

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule to simulate.	Path

Response

Response Status and Error Codes

Code	Description
200	Simulation data uploaded successfully.
401	Unauthorized. Simulation data couldn't be uploaded due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "timeSeriesDOName": {
    "Temperature": "<Number>"
  }
}
```

Related Information

[Streaming Rule \[page 1075\]](#)

[Simulate a Streaming Rule \[page 1103\]](#)

18.3.9 Simulate a Streaming Rule

Execute a rule with test data.

With this service method, you can simulate the rule behavior with test data.

It's in the very nature of any IoT scenario that there are lots of data to be processed. When this data is fed into a rule as data input, any mistake or flaw in the rule setup can easily result in large amounts of trash data or impose high system load on the technical infrastructure. Therefore, it's a good idea to test the rule behavior in advance with a small set of test data before you activate it in the production environment. However, it's up to your choice whether the simulation is done with either the draft or the active version of a rule. To accomplish this, use the `active` parameter with the desired setting.

Request

URI: `/v1/projects/<projectId>/stream-rules/<ID>/simulation`

HTTP Method: `POST`

Permissions: `<rule>.a`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>projectId</code>	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
<code>ID</code>	Yes	string	Unique ID of the rule to simulate.	Path
<code>active</code>	No	boolean	Indicates which version of the rule shall be simulated. - False: draft (= default) - True: active	Query

Request Example

```
{
  "timeSeriesDOName": {
    "Temperature": "101"
  }
}
```

With this request payload, you simulate the reception of a temperature value of 101 degrees.

Response

Response Status and Error Codes

Code	Description
200	Rule simulated successfully.
401	Unauthorized. Rule couldn't be simulated due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{"conditionIsMet":false}
```

Related Information

[Streaming Rule \[page 1075\]](#)

[Read Simulation Data \(Streaming Rule\) \[page 1101\]](#)

18.3.10 Read Activation Details (Streaming Rule)

Retrieves a list of activation status changes for a rule.

With this service method, you can retrieve a complete list of events related to changes to the activation status of the specified rule.

In SAP IoT, a rule has to be in active state in order to process incoming time series data. The rule service keeps track of each state transition for every rule you define, with up to seven different states that can apply to a rule.

Each record consists of the rule status, a timestamp, the deployment target of the rule, and the correlation ID, which allows easy tracking of any system activity related to the status change, across all components of SAP IoT. With this data, you can investigate the root causes for potential unexpected system behavior. Also, presenting the list of activation details may be required in auditing scenarios.

Request

URI: `/v1/projects/<projectId>/stream-rules/<ID>/activation/details`

HTTP Method: `GET`

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectID	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path
ID	Yes	string	Unique ID of the rule.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100/activation/details

Response

Response Status and Error Codes

Code	Description
200	Activation details retrieved successfully.
401	Unauthorized. Data couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
[
  {
    "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "createdBy": "ACTIVATION_ENDPOINT",
    "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
    "status":
      "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
      VATION_COMPLETED",
    "target": "CLOUD,EDGE",
    "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
  }
]
```

Related Information

[Streaming Rule \[page 1075\]](#)

[Activate a Streaming Rule \[page 1096\]](#)

[Deactivate a Streaming Rule \[page 1099\]](#)

18.4 Derivation Rule

A service for deriving values from measured values recorded by sensors.

Derivation rules can be used in IoT scenarios where time series data is measured, but the measured values require some extra treatment before they can be used for further processing. Here are some examples of such special scenarios:

- Filtering of outlier data that may be caused by hardware defects (both electrical and mechanical)
- Categorizing and grouping of data rather than considering each individual measured value
- Mathematical derivation of physical dimensions that can't be measured directly by the installed sensors

❖ Example

You want to monitor the fill level of a silo used for storing liquids. The constant dimensions of the silo are known (height h , radius r), and you have an optical sensor installed that can measure the distance d between the liquid surface and the top position inside the silo where the sensor is installed. With a derivation rule, you set up the calculation of the fill level as follows:

$$\text{Level} = h * \pi * r^2 - d * \pi * r^2$$

The calculated result of this formula is the remaining volume of liquid in the silo. You can then trigger different actions based on the calculated value.

API Structure of Derivation Rules

Derivation rules have almost the same structure as streaming rules. In fact, both rule types even use the same endpoint. Derivation rules can be described as streaming rules with a drastically simplified payload structure. For example, none of the streaming rule features aiming at reducing potential event flooding are applicable for derivation rules.

i Note

For this reason, we're just listing the different API methods provided for derivation rules but only go into the details for a few of them. For the remaining methods, refer to the respective methods described for streaming rules.

Base URI:

- Formal Description: `https://<server address>[:<port number>][<path>]/v1/projects/<projectId>/stream-rules`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-noah-live-rules-designtime.cfapps.us10.hana.ondemand.com/v1/projects/<projectId>/stream-rules/`

Permissions:

```
<rule>.c
<rule>.r
<rule>.u
<rule>.d
<rule>.a
```


Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create a Derivation Rule [page 1107]	/v1/projects/<projectId>/stream-rules	<rule>.c
<i>GET</i>	Read a Derivation Rule [page 1110]	/v1/projects/<projectId>/stream-rules/<ID>	<rule>.r
<i>GET</i>	See Read all Streaming Rules [page 1089]	/v1/projects/<projectId>/stream-rules	<rule>.r
<i>PUT</i>	See Update a Streaming Rule [page 1091]	/v1/projects/<projectId>/stream-rules/<ID>	<rule>.u
<i>DELETE</i>	See Delete a Streaming Rule [page 1095]	/v1/projects/<projectId>/stream-rules/<ID>	<rule>.d
<i>POST</i>	See Activate a Streaming Rule [page 1096]	/v1/projects/<projectId>/stream-rules/<ID>/activation	<rule>.a
<i>DELETE</i>	See Deactivate a Streaming Rule [page 1099]	/v1/projects/<projectId>/stream-rules/<ID>/activation	<rule>.a
<i>POST</i>	See Simulate a Streaming Rule [page 1103]	/v1/projects/<projectId>/stream-rules/<ID>/simulation	<rule>.a
<i>GET</i>	See Read Simulation Data (Streaming Rule) [page 1101]	/v1/projects/<projectId>/stream-rules/<ID>/simulation-input-template	<rule>.a
<i>GET</i>	See Read Activation Details (Streaming Rule) [page 1104]	/v1/projects/<projectId>/stream-rules/<ID>/activation/details	<rule>.r

Related Information

[Streaming Rule \[page 1075\]](#)

[Rule Project \[page 1024\]](#)

[Batch Rule \[page 1042\]](#)

18.4.1 Create a Derivation Rule

With this method, you create a new derivation rule object.

As with all rule service methods in SAP IoT, you have to provide the ID of the rule project to which the new rule shall be assigned. This ensures that the new rule can access all elements of the data objects defined in the rule project.

Request

URI: /v1/projects/<projectId>/stream-rules

HTTP Method: *POST*

Permissions: <rule>.c

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the new rule shall be assigned.	Path

Request Example

/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules

With this service request, a new derivation rule is created and assigned to the rule project specified by its ID. The detailed settings for the new rule are all contained in the following request payload.

```
{
  "name": "streamRuleName",
  "texts": [
    {
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "name": "timeSeriesDOName"
    }
  ],
  "outputDataObjectName": "derivedDataDOName"
}
```

Response

Response Headers

Header	Description
Location	Path to the newly created rule, for example: /v1/projects/3c814fbf-1a6f-4063-8e25-38ae144dc43c/stream-rules/d1c005f8-7b61-4263-8eb5-76bbc14d57be
Etag	Identifier of the rule instance version, for example: 2dadd04e709323c68ac3d65065208e05

Response Status and Error Codes

Code	Description
200	Rule created successfully.
400	Bad request. For example, the payload may have caused a validation error.
401	Unauthorized. Rule couldn't be created due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid project ID has been provided.

Response Example

```
{
  "id": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
  "name": "StreamRuleName_1606989893600",
  "projectId": "6cbb6fe9-1673-4acf-ad60-c4988f65fa96",
  "activationDetails": [
    {
      "status": "INACTIVE",
      "createdOn": "2020-12-03T10:04:57.694Z",
      "createdBy": "RULE_ENDPOINT"
    }
  ],
  "texts": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "tag": "MyRule"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
```

```

        "name": "timeSeriesDOName"
      },
      ],
      "outputDataObjectName": "derivedDataDOName"
    },
    "createdOn": "2020-12-03T10:04:57.696Z",
    "lastChangedOn": "2020-12-03T10:04:57.696Z",
    "brProjectId": "753c08d8f8924626b20079d24fb3ce2b",
    "brDraftRuleId": "5cb136d1650d4d0aa672bc9786716d29",
    "brActiveRuleId": "bc15258f26114dd5b9dff25446caafd3",
    "brDraftRuleServiceId": "83039dd8315a4eb792101b8f2cc6eb96",
    "brActiveRuleServiceId": "5389f0a4b622469db29ed0519b373242",
    "brDraftRuleSetId": "112684050cb24bbea53960960303f3cf",
    "brActiveRuleSetId": "d5d211770f5444f0bd6aa9ed1bb63e9c",
    "subtype": "DERIVATION",
    "activeDetails": {}
  }
}

```

Note

For a detailed explanation of the payload fields, see [Create a Streaming Rule \[page 1077\]](#). However, derivation rules support only a subset of the fields that are available for streaming rules.

Related Information

[Derivation Rule \[page 1106\]](#)

[Create a Streaming Rule \[page 1077\]](#)

18.4.2 Read a Derivation Rule

Retrieves a streaming rule from the database.

With this method, you send a request to the server to retrieve a particular derivation rule object specified by its ID and the ID of the rule project to which it belongs.

Request

URI: /v1/projects/<projectId>/stream-rules/<ID>

HTTP Method: [GET](#)

Permissions: <rule>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
projectId	Yes	string	Unique ID of the rule project to which the rule is assigned.	Path

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique ID of the rule to be retrieved.	Path
includeBrRuleData	No	boolean	Indicates whether the associated BRM rule object data shall be returned (default: false).	Path

Request Example

```
/v1/projects/185d9a72-a629-4b94-b421-a2f0301bb072/stream-rules/79ded171-8926-4dff-bf73-fc2d3070a100
```

With this request, you retrieve the rule with ID "79ded171..." that is contained in rule project "185d9a72...".

Response

Response Status and Error Codes

Code	Description
200	Rule retrieved successfully.
401	Unauthorized. Rule couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found. For example, an invalid rule ID or project ID has been provided.

Response Example

```
{
  "id": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
  "name": "StreamRuleName_1606989893600",
  "projectId": "6cbb6fe9-1673-4acf-ad60-c4988f65fa96",
  "activationDetails": [
    {
      "status": "INACTIVE",
      "createdOn": "2020-12-03T10:04:57.694Z",
      "createdBy": "RULE_ENDPOINT"
    }
  ],
  "texts": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    },
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "language": "de",
      "shortText": "Kurztext für die Regel",
      "description": "Lange Beschreibung für die erstellte Regel"
    }
  ],
  "tags": [
    {
      "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
      "tag": "MyRule"
    }
  ]
}
```

```

    },
    "inputDataObjectNames": [
      {
        "ruleId": "0cc0d058-3731-4e5b-9185-b7a0f57f553a",
        "name": "timeSeriesDOName"
      }
    ],
    "outputDataObjectName": "derivedDataDOName",
    "createdOn": "2020-12-03T10:04:57.696Z",
    "lastChangedOn": "2020-12-03T10:04:57.696Z",
    "brProjectId": "753c08d8f8924626b20079d24fb3ce2b",
    "brDraftRuleId": "5cb136d1650d4d0aa672bc9786716d29",
    "brActiveRuleId": "bc15258f26114dd5b9dff25446caafd3",
    "brDraftRuleServiceId": "83039dd8315a4eb792101b8f2cc6eb96",
    "brActiveRuleServiceId": "5389f0a4b622469db29ed0519b373242",
    "brDraftRuleSetId": "112684050cb24bbea53960960303f3cf",
    "brActiveRuleSetId": "d5d211770f5444f0bd6aa9ed1bb63e9c",
    "subtype": "DERIVATION",
    "activeDetails": {}
  }
  "brActiveRuleId": "bc15258f26114dd5b9dff25446caafd3",
  "brDraftRuleServiceId": "83039dd8315a4eb792101b8f2cc6eb96",
  "brActiveRuleServiceId": "5389f0a4b622469db29ed0519b373242",
  "brDraftRuleSetId": "112684050cb24bbea53960960303f3cf",
  "brActiveRuleSetId": "d5d211770f5444f0bd6aa9ed1bb63e9c",
  "subtype": "EVENT",
  "draftDetails": {
    "sleepingTimeFrame": "PT1H",
    "isToggle": false
  },
  "activeDetails": {}
}

```

Related Information

[Derivation Rule \[page 1106\]](#)

18.5 Rule Data Management and Rules Service

Two services providing methods for exporting all rule-related data in a tenant.

Rule Data Management

The rule data management service mainly aims at fulfilling auditing requirements for providing a complete overview of all the data related to rules within a given tenant.

Base URI:

- Formal description: `http://<server address>[:<port number>][/path]/v1/data-management/tenant`

- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-noah-live-rules-designtime.cfapps.us10.hana.ondemand.com/v1/data-management/tenant`

Rules

The generic Rules service helps you to find rules independent of their type or subtype, and across all rule projects in a tenant.

Base URI:

- Formal description: `http://<server address>[:<port number>][/path]/v1/rules`
- Example for a base URI in a cloud foundry environment: `https://sap-iot-ae-explore.iot-sap.cfapps.eu10.hana.ondemand.com/v1/sap/rest/v1/rules`

Methods

Currently, the Rule Data Management service comprises only one method that you can use to export all the data related to rules that is stored within the current tenant.

Rule Data Management

HTTP Method	Action	URI
GET	Export Rule Data [page 330]	<code>/v1/data-management/tenant</code>

The cross-project rule service provides the following methods:

Rules Service

HTTP Method	Action	URI
GET	Find a Rule [page 1116]	<code>/v1/rules/<ID></code>
GET	Read all Rules [page 1118]	<code>/v1/rules</code>

Related Information

[Thing: Time Series Data \[page 939\]](#)

18.5.1 Export Rule Data

Lets you export all the data related to rules and rule contexts.

As a preparatory step for customer offboarding, SAP offers this service method that can be used to export all the data related to rules and rule contexts. With that, you have the opportunity to move to a platform other

than SAP IoT without losing rule-related data. The method collects all rule-related data available in the tenant and exports it into a data stream that can be stored as a ZIP file.

SAP IoT makes use of SAP Business Rules as an underlying rule engine. This means that while you are creating and maintaining objects with the rule modeling tools of SAP IoT, the system automatically reflects that in corresponding secondary objects handled by SAP Business Rules. This is true, e.g., for rule conditions and event names. When using the rule export service, you can decide whether the system shall export these corresponding objects as well, depending on a parameter setting provided for that purpose.

Note

When using this service, keep the following in mind:

- Exporting the corresponding rule objects along with the primary rule objects maintained in SAP IoT is a time-consuming feature, which results in a response time slowdown of approximately 0.5 seconds per rule context. Therefore, if you want to export a high number of rule contexts, you should pay extra attention to the processing time.
- There is currently no import tool available that you could use to bring exported data back into the system.
- The internal format of the data files contained inside the ZIP file is subject to change. It is therefore **not** advisable to invest any efforts in developing any kind of tools that you might want to use for accessing the data.

Request

URI: `v1/data-management/tenant`

HTTP Method: `GET`

Permissions:

`rules.r`

`voc.r`

Request Header Fields

Name	Required	Description
content-type	Yes	application/zip

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
addRuleCondition	No	Boolean	Indicates whether secondary rule objects shall be exported along with the primary rule objects. Default value: <code>False</code>	Query string

Request Example

`v1/data-management/tenant?addRuleCondition=false`

With this request, the system collects all the primary rule data that is present in the current tenant and returns a byte stream in its payload that represents the content of a ZIP file. The optional `addRuleCondition` parameter could as well have been omitted, because it defaults to `False` anyway.

Response

After successful operation, the service returns a byte array that can be stored as a ZIP file in the file system for backup purposes. The internal structure of the resulting ZIP file is as follows: The ZIP file contains a flat list of data files. There is one data file for each rule as well as one for each rule context. If the method has been invoked with the `addRuleCondition` parameter set to `True`, a third set of data files is added to the ZIP file which contain the associations of rules with a rule context. The data files are named according to the following naming convention:

- `Rule_<Rule_ID>`
- `Vocabulary_<Rule_Context_ID>`
- `RuleDataForVocabulary_<Rule_Context_ID>`

In the files that belong to the third type, the following entries are logged for each rule:

- `<Rule_Name>_<Creation_Time>_draft`: Contains the rule data of the (inactive) draft version of the rule
- `<Rule_Name>_<Creation_Time>`: Contains the rule data of the active version of the rule

Response Status and Error Codes

Code	Reason
200	Rule data exported successfully.

Response Example

Here is an example of a data file representing a rule:

```
{ "createdOn": "2019-05-14T07:22:56.663Z", "lastChangedOn": "2019-05-15T06:21:41.868Z",
  "id": "db7f2b98-dcb9-4c2e-baa4-ae6351721c90", "name": "VocabularyName_1557818569402",
  "eTag": "0f51bef3c244df0a483c91058c854958", "ermProjectId": "65f832f22d1c4e77870eab352506aa79",
  "texts": [ { "language": "en", "shortText": null, "description": "" } ],
  "thingModels": [ { "vocabularyId": "db7f2b98-dcb9-4c2e-baa4-ae6351721c90", "propertySet": "timeSeriesData",
    "thingType": "noah.sbrules02.rules:MultiVocThingType", "propertySetType": "noah.sbrules02.rules:MultiVocTimeSeries",
    "referencePropertySetType": "noah.sbrules02.rules:MultiVocReferencePst", "useThreshold": true, "modelType": "TimeSeriesData",
    "dataObjectName": "timeSeriesDOName" } ] }
```

Related Information

[Offboarding](#)

18.5.2 Find a Rule

Find a rule of whatever type or subtype.

With this service method, you can find any rule as long as you know its ID.

From an architectural point of view, the rule processing service of SAP IoT strictly distinguishes between the various rule types such as batch or streaming. This distinction is reflected by the fact that the different rule types are managed by different dedicated services, all offered with their individual specific endpoints. As a consequence, when you need to look up a rule, it is normally required that you know the type and subtype of that rule in advance.

However, under certain circumstances, you find yourself with nothing but the rule ID without any further information. For example, that's a typical situation for administrators or help desk personnel who try to resolve an issue based on the application logs where they see nothing but the ID of a rule involved.

In such situations, this service method comes in handy because it scans all the rules that are present in a tenant, regardless of their type and subtype, and across all rule projects.

Request

URI: `/v1/rules/<ID>`

HTTP Method: [GET](#)

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique ID of the rule.	Path

Request Example

`/v1/rules/79ded171-8926-4dff-bf73-fc2d3070a100`

With this request, you retrieve the rule with the specified ID, regardless of its type and subtype.

Response

Response Status and Error Codes

Code	Description
200	Rule retrieved successfully.
401	Unauthorized. Rule couldn't be retrieved due to insufficient access rights.
403	Forbidden.

Code	Description
404	Not found. For example, an invalid rule ID has been provided.

Response Example

```
{
  "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
  "type": "STREAM",
  "ETag": 1234143531234253600,
  "subtype": [
    "EVENT"
  ],
  "name": "MyStreamRuleName",
  "activationDetails": [
    {
      "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "createdBy": "ACTIVATION_ENDPOINT",
      "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "status":
"INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
VATION_COMPLETED",
      "target": "CLOUD,EDGE",
      "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
    }
  ],
  "texts": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "language": "en",
      "shortText": "Short text for my rule",
      "description": "Long description for my rule"
    }
  ],
  "tags": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "tag": "MyRuleTag"
    }
  ],
  "inputDataObjectNames": [
    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "name": "MyPropertySet"
    }
  ],
  "createdOn": "2020-10-23T09:49:26.570Z",
  "lastChangedOn": "2020-10-23T09:49:26.570Z",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072"
}
```

Related Information

[Rule Data Management and Rules Service \[page 1112\]](#)

18.5.3 Read all Rules

Retrieves all rules of whatever type or subtype.

With this service method, you can find all the rules that exist in your tenant, regardless of their type or subtype, and across all rule projects.

From an architectural point of view, the rule processing service of SAP IoT strictly distinguishes between the various rule types such as batch or streaming. This distinction is reflected by the fact that the different rule types are managed by different dedicated services, all offered with their individual specific endpoints. As a consequence, when you need to look up a rule, it is normally required that you know the type and subtype of that rule in advance.

However, as a project leader or administrator, you're often interested in getting an overview of the entirety of rules that exist in a tenant, regardless of their type or subtype, and across all rule projects. To accomplish this goal, just call this service method. You can use the optional query parameters to keep the number of returned entries low.

Note

The maximum number of entries to be retrieved with this method is 500 entries per method call.

Request

URI: `/v1/rules`

HTTP Method: `GET`

Permissions: `<rule>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>\$count</code>	No	boolean	Indicates whether the total number of rules in the current tenant shall be returned. Default: <code>false</code> .	Query string
<code>\$filter</code>	No	string	Filter condition to be applied;	Query string
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set.	Query string
<code>\$top</code>	No	integer	Number of records to include in the result set. Maximum allowed value: 500	Query string
<code>\$orderby</code>	No	string	Field name to be used for sorting the result set.	Query string

Request Example

/v1/rules?\$count=True&\$skip=50&\$top=100

With this request, the system retrieves 100 rules of all types and from all projects, starting with rule entry number 51.

Response

Response Status and Error Codes

Code	Description
200	Rules retrieved successfully.
401	Unauthorized. Rules couldn't be retrieved due to insufficient access rights.
403	Forbidden.
404	Not found.

Response Example

```
{
  "count": 543,
  "previous": "http://localhost:8080/v1/vocabulary?$skip=500",
  "next": "http://localhost:8080/v1/vocabulary?$skip=500",
  "values": [
    {
      "id": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "type": "STREAM",
      "ETag": 1234143531234253600,
      "subtype": [
        "EVENT"
      ],
      "name": "MyStreamRuleName",
      "activationDetails": [
        {
          "correlationId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "createdBy": "ACTIVATION_ENDPOINT",
          "createdOn": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "status":
            "INACTIVE,ACTIVATION_TRIGGERED,ACTIVATION_COMPLETED,DEACTIVATION_TRIGGERED,DEACTI
            VATION_COMPLETED",
          "target": "CLOUD,EDGE",
          "activationId": "79ded171-8926-4dff-bf73-fc2d3070a100"
        }
      ],
      "texts": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "language": "en",
          "shortText": "Short text for my rule",
          "description": "Long description for my rule"
        }
      ],
      "tags": [
        {
          "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
          "tag": "MyRuleTag"
        }
      ],
      "inputDataObjectNames": [
```

```

    {
      "ruleId": "79ded171-8926-4dff-bf73-fc2d3070a100",
      "name": "MyPropertySet"
    }
  ],
  "createdOn": "2020-10-23T12:26:13.471Z",
  "lastChangedOn": "2020-10-23T12:26:13.471Z",
  "brProjectId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleServiceId": "4f5697d3240d4f258b900c181e35a835",
  "brDraftRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "brActiveRuleSetId": "4f5697d3240d4f258b900c181e35a835",
  "projectId": "185d9a72-a629-4b94-b421-a2f0301bb072"
}
]
}

```

Related Information

[Rule Data Management and Rules Service \[page 1112\]](#)

[Find a Rule \[page 1116\]](#)

19 Segment Service

A group of services used for dynamically identifying time series segments.

i Note

Important: All apps and APIs related to SAP IoT Segment Service are deprecated as of November 2021 and will be decommissioned by end of May 2022. In case you've used any of the apps and APIs in your SAP IoT system landscape, we recommend getting in touch with SAP support in order to find an alternative solution. For many use cases covered by Segment Service, you may go for a combination of rules, events, and actions, which may help you reach the same goal.

Overview

When continuously collecting sensor data in an IoT-based business scenario, it's a common experience that sooner or later certain patterns appear that you can relate to corresponding business activities. It's then a natural desire to have these business activities carried out automatically whenever a given pattern occurs, rather than taking action manually. The Segment Service APIs provide the features you need to set up a tool scenario that covers this requirement.

Segment Service comprises the following major building blocks:

- [Recognition Configuration \[page 1127\]](#): A recognition configuration is a data structure used to associate a thing type with a set of rules. It's up to the rules to determine the start as well as the end of a segment of time series data, which has been collected by a thing derived from the specified thing type. Setting up a recognition configuration is a prerequisite for having the system automatically generate data segments based on rules.

i Note

Recognition configurations are the technical equivalent of segment configurations that you find in the corresponding Segment Service Fiori app that is part of SAP IoT.

- [Segment \[page 1142\]](#): A segment is a concrete set of time series data that was identified by rules as being significant for a particular business scenario (for example, a truck entering a geofence that represents a warehouse location).
- [Tag \[page 1153\]](#): Tags are extremely simple, yet very useful elements. Each tag is nothing but a user-defined string that can be attached to a recognition configuration. Using tags allows for grouping, searching, and finding those configurations that have been set up for serving a particular purpose in a given scenario.

Rule-Based Segments Versus Manually Defined Segments

As the previous explanations show, Segment Service offers two different approaches for creating time series data segments:

- Segments that are automatically created based on the rules assigned to a [Recognition Configuration \[page 1127\]](#).
- Segments that you manually create by directly accessing the [Segment \[page 1142\]](#) service methods.

Both approaches address a similar goal, but under different boundary conditions, which leads us to the following recommendation:

→ Recommendation

- If you want to cover a scenario of recurring business events with the same type of objects involved (for example, freight delivery to a certain destination with dozens of trucks of the same type), use recognition configurations. Once the configurations have been properly set up, they take the burden of constantly monitoring endless data streams from you.
- If you want to focus on a single, individual business event, you may find it sufficient and more convenient to directly specify a data segment for a particular thing, rather than using the higher level of abstraction provided by a recognition configuration.

Integration with SAP Event Mesh

The Segment Service provided by SAP IoT takes advantage of the Event Mesh service (formerly known as Enterprise Messaging) that is part of SAP BTP in the following way:

1. Whenever the system creates a new segment based on the rules specified in a recognition configuration, the system sends a message with a fixed data structure.
2. This message is automatically configured in a way that is required to make it identifiable as related to Segment Service.
3. For customer-specific applications that are built on SAP IoT, it is possible to create a message queue in Event Mesh and have it subscribe to the message topic used by Segment Service.
4. After these preparations, a customer-specific application can access the message queue and process the message topics that have been collected in the queue.

For further details, see [Segment Service Messaging \[page 1123\]](#).

Referential Integrity

For Segment Service being a component with a high number of connections to other SAP IoT services, it's vital to have a strategy for handling changes to referenced objects as well as temporary interruptions of the message exchange between services. Here's how Segment Service responds to this kind of events:

- **Thing:** If a thing that is referenced by a segment is deleted, the referencing segment is deleted as well.
- **Property Set Type/Property Set:** If a change in the sensitivity level of a property set type or a property set referenced by a recognition configuration is detected, Segment Service tries to verify its current status by

sending a request to the Thing service. Should this request fail for whatever reason, the system reacts as follows:

1. The sensitivity level of the referencing recognition configuration is set to the highest possible level. This is to avoid accidental processing of personal or sensitive data, thereby ensuring strict compliance with data protection and privacy law.
 2. A repair job is created and scheduled for later processing to repeat the failed access to the property set type at a later point in time to verify the element status.
- **Thing Type:** If a thing type referenced by a recognition configuration is deleted, the referencing recognition configuration is deleted as well.
 - **Rule:** If a rule referenced by a recognition configuration is deleted, the status of the referencing recognition configuration is set to `inconsistent`. Further events sent by the remaining rule (either start rule or end rule) are ignored as long as the recognition configuration hasn't been manually adjusted.
 - **Rule:** If the name of a rule referenced by a recognition configuration is changed, the referencing recognition configuration continues processing as before.

Related Information

[Actions \[page 753\]](#)

[Rule Services \[page 1022\]](#)

[Event Services \[page 1194\]](#)

[SAP Event Mesh](#)

19.1 Segment Service Messaging

Segment Service Integration with SAP Event Mesh.

Overview

The Segment Service provided by SAP IoT takes advantage of the Event Mesh service (EMS; formerly known as Enterprise Messaging) that is part of SAP BTP.

Prerequisites

- You have acquired a license for using SAP Event Mesh.
- You have subscribed to the SAP Event Mesh service in your SAP BTP subaccount.

i Note

The integration with SAP Event Mesh supports only segments that have been automatically created based on the rules specified in a recognition configuration. As opposed to this, manually created segments are **not** considered by SAP Event Mesh.

Whenever the system creates a new segment based on rules, an HTTP message is created with a payload as shown in the following example:

```
{
  "cloudEventsVersion": "1.0",
  "eventId": "c1a39ff2-a74d-4fa1-962a-689803ff8b1d",
  "eventType": "com.sap.apptot.eventtypes:SegmentNotifications",
  "source": "IOT-BSV-SEG",
  "eventTime": "2020-07-15T12:31:28.5181973Z",
  "contentType": "application/json",
  "extensions": {
    "modelId": "testThing",
    "dataModel": "Thing",
    "correlationId": "92f4f42c-de49-47c3-9deb-0b669bd479e4"
  },
  "data": [
    {
      "entityType": "SEGMENT",
      "action": "OPEN",
      "entityId": "ab96b7cc-e553-4bdd-ac2e-f6dfc60edfa9",
      "location": https://iot-applications-noah-sandbox-segment-
service.cfapps.sap.hana.ondemand.com/v1/segments/ab96b7cc-e553-4bdd-ac2e-
f6dfc60edfa9
    }
  ]
}
```

Messages of this kind are automatically associated with an EMS topic named `sap/liot/svc/segments`, which is reserved for messages related to Segment Service. Developers of custom applications based on the SAP BTP ecosystem are free to define a message queue in EMS that is listening to topics matching the Segment Service topic name. If such a queue is present, it catches all messages matching the specified topic pattern and stores them for later processing.

Note

Specifying a queue listening to Segment Service topics is a prerequisite for storing these topics in the system. Without any queue listening, all Segment Service topics immediately vanish from the scene and can't be used anymore, whatever the purpose may be.

Segment Actions

In the `data` array that is part of the payload shown above, there's one field that is used for indicating what has actually happened to a segment, the `action` field. In other words, the string stored in the `action` field answers the question why a message has been sent at all. The `action` field value is therefore an equivalent of the current segment status. The following actions are currently supported:

Segment Actions

Name	Description
OPEN	New segment has been created.
START_TIME_UPDATED	Segment start time has been updated due to a latecomer event.
END_TIME_UPDATED	Segment end time has been updated due to a latecomer event.
CLOSED	Segment has been closed.

Name	Description
HARDENED	Both an open and a close event have been received for the segment. Since the last received event, the predefined grace period for accepting further changes is exceeded. The segment can't be changed anymore.

Note

For more information on updating and hardening of segments, see [Handling of Delayed Events \(Latecomers\)](#) [page 1126].

Message Fields related to EMS Integration

In the following table, you can find some information on how to fill the fields of the generic EMS data structure to establish messaging between Segment Service and EMS:

Fields for Using EMS

Name	Description
<code><eventId></code>	Unique ID generated by Segment Service.
<code><eventType></code>	Unique ID string for Segment Service events; always evaluates as <code>com.sap.apiot.eventtypes:SegmentNotifications</code> .
<code><source></code>	ACH ID for Segment Service; always evaluates as BSV-IOT-SEG.
<code><eventTime></code>	Time stamp when the event was raised.
<code><correlationId></code>	Correlation ID of the rule event, which opened or closed the segment.
<code><entityId></code>	Unique ID of the segment.
<code><location></code>	URL used for a GET request to read the segment.

Related Information

[SAP Event Mesh](#)

19.2 Handling of Delayed Events (Latecomers)

Explains the system strategy to handle events received in an out-of-order sequence.

Introduction

In an ideal world, the operation of the system is based on continuous data being ingested into SAP IoT ordered by the business timestamp. However, under real-world conditions, the ingestion of data into the system is dependent on many different factors, like Internet connectivity, device behavior like the queuing model applied when sending data (FIFO or LIFO), and so on. Such factors influence the data ingestion and can result in arrival of data out of order into the IoT platform.

In order to handle such situations, the segment service runtime updates segments for up to 5 days after creation, according to the business timestamp of the event (see [Create and Update Events \[page 1214\]](#)). This time window is referred to as the "delay window".

Principles for Latecomer Handling

For a given segment, the earliest occurrence of the segment open event and the segment end event determine the start time and end time of a segment, respectively.

Depending on the time sequence of events, the system determines the segment start as well as segment end as follows:

Segment Start Determination

- Event for segment start created during the delay window in correct order: Segment start time is set correctly.
- Event for segment start outside the delay window in correct order: Event is rejected. Neither is a new segment created nor is an existing segment updated with a new start time.
- Event for segment start during the delay window, but out of order: Segment start time is set correctly.
- Event for segment start outside the delay window and out of order: Event is rejected. Neither is a new segment created nor is an existing segment updated with a new start time.

Segment End Determination

- Event for Segment end created during the delay window in correct order: Segment end time is set correctly.
- Event for Segment end outside the delay window in correct order: Event is rejected. Neither is a segment closed nor updated with a new end time.
- Event for Segment end during the delay window, but out of order: Segment end time is set correctly.
- Event for Segment end outside the delay window and out of order: Event is rejected. Neither is a segment closed nor updated with a new end time.

Segment Hardening

For a segment, both start time and end time can be updated several times, for example, due to out of order latecomers. Therefore, the question arises, when is a segment finalized and no updates will be accepted anymore? To answer this question, SAP IoT distinguishes between open, closed and hardened segments:

- Open: Only start event(s) have been received for the segment, no close event yet. Updates to the segment via events are still allowed.
- Closed: Both start events as well as close events have been received for the segment. Updates to the segment via events are still allowed, as late coming data might still lead to an update of the segment.
- Hardened: Both start events as well as close events have been received for the segment. Updates to the segment via events are **not** allowed anymore. The period for considering late coming data has passed.

19.3 Recognition Configuration

Managing the recognition of time series data segments.

A recognition configuration (aka segment configuration) is a data structure used to associate a thing type with a set of rules. It's up to the rules to determine the start as well as the end of a segment of time series data, which has been collected by a thing derived from the specified thing type. Setting up a recognition configuration is a prerequisite for having the system automatically generate data segments based on rules at runtime.

i Note

After having created a recognition configuration, the system continuously checks if the associated entities (that is, thing type and rules) are still available and in proper shape. If these checks fail (for example, because the thing type has been renamed or a rule has been deleted or deactivated), the recognition configuration is flagged as inconsistent and can no longer be used.

Base URI: `/v1/segments/recognitionConfigurations`

Permissions: `seg.cud, seg.r`

Methods

HTTP Method	Action	URI
<i>POST</i>	Create a Recognition Configuration [page 1128]	<code>/v1/segments/recognitionConfigurations</code>
<i>POST</i>	Activate Recognition Configurations [page 1131]	<code>/v1/segments/recognitionConfigurations/activate</code>
<i>POST</i>	Deactivate Recognition Configurations [page 1133]	<code>/v1/segments/recognitionConfigurations/deactivate</code>

HTTP Method	Action	URI
<i>GET</i>	Read a Recognition Configuration [page 1134]	/v1/segments/recognitionConfigurations/<configuration ID>
<i>GET</i>	Read all Recognition Configurations [page 1136]	/v1/segments/recognitionConfigurations
<i>PATCH</i>	Update a Recognition Configuration [page 1138]	/v1/segments/recognitionConfigurations/<configuration ID>
<i>DELETE</i>	Delete a Recognition Configuration [page 1140]	/v1/segments/recognitionConfigurations/<configuration ID>

19.3.1 Create a Recognition Configuration

Create a new recognition configuration.

With this service method, you create a new segment configuration. For that, you associate a thing type with a pair of rules. The rule definition is responsible for detecting the start and the end of a segment of time series data, which is collected by the things derived from the specified thing type. The tags that you can assign to a recognition configuration are automatically inherited by all the segments that the system creates at runtime based on the configured rules.

i Note

- Before you can start using a segment configuration, you first have to activate it. To accomplish this, use the [Activate Recognition Configurations \[page 1131\]](#) service method.
- Activating the `sendNotifications` setting requires that you're subscribed to the SAP Event Mesh service.

Before you can start using a segment configuration, you first have to activate it. To accomplish this, use the [Activate Recognition Configurations \[page 1131\]](#) service method.

Request

URI: /v1/segments/recognitionConfigurations

HTTP Method: *POST*

Permissions: `seg.cud`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
sendNotifications	No	boolean	Indicates whether the system shall send a notification whenever a segment is created or a change occurs to the segments derived from the new segment configuration. Default: <code>false</code> .	Request body
name	Yes	string	Name describing the purpose of the configuration.	Request body
thingTypeId	Yes	string	Fully qualified ID of the thing type to be monitored.	Request body
startRuleId	Yes	string	Unique ID of the rule used for determining the data point at which a segment starts.	Request body
endRuleId	Yes	string	Unique ID of the rule used for determining the data point at which a segment ends.	Request body
sensitivityLevel	No	string	Sensitivity level of the observed sensor data. Possible values: <code>com.sap.apptot.security:pii</code> (= personal data), <code>com.sap.apptot.security:ssii</code> (= sensitive personal data), <code>com.sap.apptot.security:none</code> (= not sensitive)	Request body
hardeningPeriod	No	integer	Lag period in days during which delayed sensor data are still evaluated. Allowed values: 0..7	Request body
tags	No	string array	A list of terms used for semantically categorizing the configuration.	Request body

Note

For the `sensitivityLevel` field, the following rules apply to enforce data protection and privacy (DPP):

- For each property set assigned to the specified `thingType`, the system checks if they've been flagged as carrying personal or sensitive data. The highest sensitivity level found in the property sets is then automatically assigned to the recognition configuration as well to provide the highest data protection level.
- The automatic derivation of the appropriate sensitivity level always overrides any manual value assignment to the `sensitivityLevel` field. It should therefore be omitted in the request payload.
- Whenever a new data segment is created based on the configuration, the system performs the same checks to enforce data protection and privacy.
- Whenever a new data segment is created directly via the respective service API, the system performs the same checks to enforce data protection and privacy.

- After a recognition configuration has been defined, the Segment Service application constantly listens to thing model change notifications so that later changes to the sensitivity level are always properly reflected.

Request Example

```
{
  "sendNotifications": true,
  "name": "My Recognition Configuration",
  "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
  "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
  "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
  "hardeningPeriod": 5,
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ]
}
```

Response

Response Status and Error Codes

Code	Description
201	Configuration created successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
  "version": 1,
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "name": "My Recognition Configuration",
  "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
  "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
  "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
  "startRuleName": "my_start_rule",
  "endRuleName": "my_end_rule",
  "state": "ACTIVE",
  "sensitivityLevel": "com.sap.apptot.security:pii",
  "isDeleted": false,
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ],
  "createdOn": "2020-05-06T09:54:35.599Z"
}
```


Related Information

[Recognition Configuration \[page 1127\]](#)

[Activate Recognition Configurations \[page 1131\]](#)

19.3.2 Activate Recognition Configurations

Lets you activate one or more recognition configurations.

After having created a recognition configuration, you must activate it before it can be used. With this method, you can activate all the configurations specified in a list of IDs provided via the service payload.

i Note

Regarding the current state of a recognition configuration, the method behaves as follows:

- **ACTIVE, INACTIVE:** Target state is **ACTIVE**.
- **INCONSISTENT:** Target state remains unchanged (that is, **INCONSISTENT**). In other words, an inconsistent configuration cannot be "repaired" with this service method.

Request

URI: `/v1/segments/recognitionConfigurations/activate`

HTTP Method: `POST`

Permissions: `seg.cud`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
id	Yes	string	Unique ID of the configuration to be activated.	Request body
etag	Yes	string	Entity tag used to identify a particular instance of a recognition configuration.	Request body
state	No	string	Returns one of the following values: ACTIVE , INACTIVE , INCONSISTENT	Request body

Parameter	Required	Data Type	Description	Parameter Type
message	No	string	Returns either OK for successful execution or an error message.	Request body

Note

The service method can handle any number of attribute sets with these four parameters given simultaneously in one request.

Request Example

```
[
  {
    "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
    "etag": "8cbfee81bbcbd7097bb09347c8b7c04a"
  }
]
```

Response

Response Status and Error Codes

Code	Description
200	Recognition configurations activated successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
[
  {
    "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
    "etag": "8cbfee81bbcbd7097bb09347c8b7c04a",
    "state": "ACTIVE",
    "message": "OK"
  }
]
```

Related Information

[Recognition Configuration \[page 1127\]](#)

19.3.3 Deactivate Recognition Configurations

Lets you deactivate one or more recognition configurations.

After having activated a recognition configuration, you may want to deactivate it for a limited or unlimited amount of time, but without losing its settings. With this method, you can deactivate all the active configurations specified in a list of IDs, which is provided via the service payload.

i Note

Regarding the current state of a recognition configuration, the method behaves as follows:

- **ACTIVE, INACTIVE:** Target state is **INACTIVE**.
- **INCONSISTENT:** Target state remains unchanged (that is, **INCONSISTENT**). In other words, an inconsistent configuration cannot be "repaired" with this service method.

Request

URI: `/v1/segments/recognitionConfigurations/deactivate`

HTTP Method: `POST`

Permissions: `seg.cud`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
id	Yes	string	Unique ID of the configuration to be activated.	Request body
etag	Yes	string	Entity tag used to identify a particular instance of a recognition configuration.	Request body
state	No	string	Returns one of the following values: ACTIVE , INACTIVE , INCONSISTENT	Request body
message	No	string	Returns either OK for successful execution or an error message.	Request body

i Note

The service method can handle any number of attribute sets with these four parameters given simultaneously in one request.

Request Example

```
[
  {
    "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
    "etag": "8cbfee81bbcbd7097bb09347c8b7c04a"
  }
]
```

Response

Response Status and Error Codes

Code	Description
200	Recognition configurations deactivated successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
[
  {
    "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
    "etag": "8cbfee81bbcbd7097bb09347c8b7c04a",
    "state": "INACTIVE",
    "message": "OK"
  }
]
```

Related Information

[Recognition Configuration \[page 1127\]](#)

19.3.4 Read a Recognition Configuration

Read a recognition configuration.

With this service method, you can retrieve the recognition configuration with the specified ID. Optionally, you can specify the number of a particular version of the configuration. If the version parameter is omitted, the method returns the most recent version of the configuration.

Request

URI: /v1/segments/recognitionConfigurations/<configuration ID>[/<version>]

HTTP Method: [GET](#)

Permissions: seg.r

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
configuration ID	Yes	string	Unique ID of the configuration.	Path
version	No	string	Number of a previous version of the configuration.	Path

Request Example

/v1/segments/recognitionConfigurations/6cbd182c-4c8b-4f57-859d-8f3bc27e3c59/2

With this request, you can retrieve version 2 of the specified configuration.

Response

Response Status and Error Codes

Code	Description
200	Configuration retrieved successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
  "version": 2,
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "name": "My Recognition Configuration",
  "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
  "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
  "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
  "startRuleName": "my_start_rule",
  "endRuleName": "my_end_rule",
  "state": "ACTIVE",
```

```
"sensitivityLevel": "com.sap.appiot.security:pii",
"isDeleted": false,
"tags": [
  "tag_a",
  "tag_b",
  "tag_c"
],
"createdOn": "2020-05-06T14:22:07.900Z"
}
```

Related Information

[Recognition Configuration \[page 1127\]](#)

19.3.5 Read all Recognition Configurations

Returns a list of all recognition configurations

With this service method, you can retrieve a list of all recognition configurations from the database. The method supports sorting and filtering, so that you can narrow down the result to those entries you're most interested in.

Request

URI: `/v1/segments/recognitionConfigurations`

HTTP Method: [GET](#)

Permissions: `seg.r`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>\$count</code>	No	boolean	If set to <code>true</code> , the total number of matching records is added to the response.	Query string
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set.	Query string

Parameter	Required	Data Type	Description	Parameter Type
\$top	No	integer	Number of records to include in the result set. Allowed maximum: 500	Query string
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order.	Query string
name, startRuleId, endRuleId, thingTypeId, state, tags	No	string	Optional filter parameters; see note below.	Query string

Note

For the fields listed as optional filter parameter, the following applies:

- **<name>**: The provided search string is evaluated using the `contains` logic, that is, any configuration name that contains the search string is returned as a match.
- **<state>**: Use this filter to retrieve segment configurations matching one of the predefined status values (`ACTIVE`, `INACTIVE`, `INCONSISTENT`). This is helpful for creating consistent subsets of configurations to which you want to apply the same action (for example, for activating only inactive configurations).
- **<tags>**: Filtering by tags expects a comma-separated list of up to 30 tags. Each tag can hold up to 128 characters. The filter returns any configuration that has any of the given tags attached as a match.

Request Example

```
/v1/segments/recognitionConfigurations?name=test
```

With this example, you can retrieve the list of all configurations that contain the string `test` as a part of their **<name>**.

Response

Response Status and Error Codes

Code	Description
200	Configurations retrieved successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
```

```

"count": 214,
"previous": "http://localhost:8081/v1/api/path?$skip=500",
"next": "http://localhost:8081/v1/api/path?$skip=500",
"values": [
  {
    "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
    "version": 1,
    "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
    "name": "My Recognition Configuration",
    "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
    "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
    "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
    "startRuleName": "my_start_rule",
    "endRuleName": "my_end_rule",
    "state": "ACTIVE",
    "sensitivityLevel": "com.sap.apptot.security:pii",
    "isDeleted": false,
    "tags": [
      "tag_a",
      "tag_b",
      "tag_c"
    ],
    "createdOn": "2020-05-06T15:46:44.291Z"
  }
]
}

```

The response payload shows only one matching result for reasons of readability. However, from the initial `<count>` field, you can see that actually 214 matching results were retrieved.

Related Information

[Recognition Configuration \[page 1127\]](#)

19.3.6 Update a Recognition Configuration

With this method, you modify the properties of a configuration.

This update method uses the HTTP [PATCH](#) verb rather than [PUT](#). Therefore, it's sufficient to only provide the payload fields that you actually want to change, instead of providing the entire payload structure.

i Note

Updating a recognition configuration is possible only for **inactive** configurations. To change an already active configuration, deactivate it prior to the modification. However, changes that do **not** affect the functional behavior are allowed even for active configurations.

During updating, field validation is limited to those fields only that you pass on to the service for update. That is, if the configuration contains improper values in any of the fields that are **not** present in the request payload, the method doesn't take notice of that issue.

Updating a configuration triggers an implicit versioning mechanism for the configuration. This versioning mechanism is implemented as follows:

- The system increments the `<version>` field value in the payload by 1 with each update applied to the specified configuration.
- Previous versions of the configuration are kept in the database for reference or auditing purposes. Such older versions cannot be modified. However, you can read a particular configuration version by adding its version number as an additional path parameter.
- Versioning takes place only for changes of field values that affect the functional behavior of the configuration. That is, changes done to `<name>`, `<sendNotifications>`, and `<hardeningPeriod>` are **not** subject to versioning.

Request

URI: `/v1/segments/recognitionConfigurations/<configuration ID>`

HTTP Method: `PATCH`

Permissions: `seg.cud`

Request Headers

Header	Required	Values
<code>If-Match</code>	Yes	Check if cached version matches server version of the configuration.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>ID</code>	Yes	string	Unique ID of the configuration to be changed.	Path

Request Example

`/v1/segments/recognitionConfigurations/6cbd182c-4c8b-4f57-859d-8f3bc27e3c59`

```
{
  "sendNotifications": true,
  "name": "My Recognition Configuration",
  "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
  "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
  "hardeningPeriod": 5,
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ]
}
```

Response

Response Headers

Header	Description
eTag	Updated instance identifier for the changed configuration.

Response Status and Error Codes

Code	Description
200	Configuration updated successfully.
204	No content.
401	Unauthorized.
403	Forbidden.

Response Example

```
{
  "id": "6cbd182c-4c8b-4f57-859d-8f3bc27e3c59",
  "version": 3,
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "name": "My Recognition Configuration",
  "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
  "startRuleId": "4484b038-448c-499c-af51-5d39908122c3",
  "endRuleId": "478a5df7-57e5-4df2-afd0-bdc1d78f189a",
  "startRuleName": "my_start_rule",
  "endRuleName": "my_end_rule",
  "state": "ACTIVE",
  "sensitivityLevel": "com.sap.apptot.security:pii",
  "isDeleted": false,
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ],
  "createdOn": "2020-06-26T15:36:29.804Z"
}[response example]
```

Related Information

[Recognition Configuration \[page 1127\]](#)

[Deactivate Recognition Configurations \[page 1133\]](#)

19.3.7 Delete a Recognition Configuration

Delete a recognition configuration.

With this service method, you can delete an existing recognition configuration. As a consequence, the system will no longer be able to determine segments of time series data based on the setup of the configuration.

Request

URI: /v1/segments/recognitionConfigurations/<configuration ID>

HTTP Method: *DELETE*

Permissions: seg.cud

Request Headers

Header	Required	Values
Authorization	Yes	Bearer token.
If-Match	Yes	Check if cached version matches server version of the configuration.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
configuration ID	Yes	string	Unique ID of the configuration.	Path

Request Example

/v1/segments/recognitionConfigurations/6cbd182c-4c8b-4f57-859d-8f3bc27e3c59

Response

Response Status and Error Codes

Code	Description
200	Configuration deleted successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Related Information

[Recognition Configuration \[page 1127\]](#)

19.4 Segment

A description of a well-defined set of sensor data collected by a thing.

A segment is a description of a concrete set of time series data that was identified by rules as being significant for a particular business scenario (for example, a truck entering a geofence that represents a warehouse location). In addition, a segment can also be manually defined (that is, without the help of rules) by specifying a thing of interest plus start and end date for the time series data to be considered.

Base URI: `/v1/segments`

Permissions: `seg.cud`, `seg.r`

Methods

HTTP Method	Action	URI
<i>POST</i>	Create a Segment [page 1142]	<code>/v1/segments</code>
<i>GET</i>	Read a Segment [page 1145]	<code>/v1/segments/<segment ID></code>
<i>GET</i>	Read all Segments [page 1147]	<code>/v1/segments</code>
<i>PATCH</i>	Update a Segment [page 1150]	<code>/v1/segments/<segment ID></code>
<i>DELETE</i>	Delete a Segment [page 1151]	<code>/v1/segments/<segment ID></code>

19.4.1 Create a Segment

Create a data segment manually.

With this service method, you create a time series data segment for an individual thing and a fixed time period. Manually creating a segment is an alternative to the automated creation of data segments that you can accomplish with setting up a recognition configuration, which is based on thing types and data monitored via rules.

Request

URI: `/v1/segments`

HTTP Method: *POST*

Permissions: `seg.cud`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
thingId	Yes	string	Unique ID of the thing sending sensor data.	Request body
startTime	Yes	timestamp	Starting point of the time series data segment.	Request body
endTime	Yes	timestamp	End of the time series data segment.	Request body
tags	No	string array	A list of terms used for semantically categorizing the segment.	Request body

Request Example

```
{
  "startTime": "2020-05-07T08:32:41.340Z",
  "endTime": "2020-05-07T09:32:41.340Z",
  "thingId": "MyThingID",
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ]
}
```

With this request, you create a segment for the thing named `MyThingID`. The segment covers data collected during one hour, and it has three tags assigned for later retrieval or data analysis.

Response

Response Status and Error Codes

Code	Description
201	Segment created successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "id": "1acd182d-1323-4f57-8eec-8f3bd17e3c22",
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "startTime": "2020-05-07T08:32:41.370Z",
  "endTime": "2020-05-07T09:32:41.370Z",
}
```

```

"thingModel": {
  "thingId": "MyThingID",
  "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6"
},
"tags": [
  "tag_a",
  "tag_b",
  "tag_c"
],
"state": "HARDENED",
"type": {
  "name": "rule-based"
},
"sensitivityLevel": "com.sap.appiot.security:pii",
"createdOn": "2020-05-07T08:32:41.370Z"
}

```

As you can see in the response payload, the system augments the data passed in the request with numerous other details. Among this data, you can also find the relevant thing type from which the thing has been derived: `segments.sandbox02.segments:integrationTestTT_6`. The different parts in this notation are as follows:

- Tenant: `segments.sandbox02`
- Package: `segments`
- Thing Type: `integrationTestTT_6`

The `<state>` field found in the response payload is automatically filled by the system with one of the following string values:

- OPEN
- CLOSED
- HARDENED
- INCONSISTENT

The system assigns the appropriate value by comparing the start and end time values with the system time at runtime. If the request is made after the lag period of the segment is expired, `<state>` contains the value `HARDENED`. The `INCONSISTENT` state value is assigned to segments that can no longer be used, for example, because of changes made to the underlying thing model entities.

Note

For the automatic determination of the `<sensitivityLevel>` value that is returned with the response payload, the system proceeds as follows:

1. For all property sets that the specified thing inherits from the thing type, the highest sensitivity level is stored.
2. The stored sensitivity level is compared with the sensitivity level of the geofence event that triggered the creation of the segment.
3. The higher one of these two sensitivity levels (that is, based on the property sets and the trigger event) is then assigned to the segment.

Related Information

[Create a Segment \[page 1142\]](#)

19.4.2 Read a Segment

Read a data segment.

With this service method, you can retrieve the segment with the specified ID. The ID is automatically assigned to a segment upon creation. It's a string made up of 36 characters.

For a closed segment, you can optionally specify a property set type used by a thing related to the segment. The response payload then returns aggregates for the measured values that have been recorded for the various properties of the property set type.

Request

URI: `/v1/segments/<segment ID>`

HTTP Method: *GET*

Permissions: `seg.r`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.
sap-iot-thingpst	No	Name of a property set type for which aggregate values shall be returned.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
segment ID	Yes	string	Unique ID of the data segment.	Path

Request Example

`/v1/segments/1acd182d-1323-4f57-8eec-8f3bd17e3c22`

Response

Response Status and Error Codes

Code	Description
200	Segment retrieved successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "id": "1acd182d-1323-4f57-8eec-8f3bd17e3c22",
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "startTime": "2020-05-07T12:01:39.134Z",
  "endTime": "2020-05-07T12:01:39.134Z",
  "thingModel": {
    "thingId": "MyThingID",
    "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
    "version": "3"
  },
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ],
  "state": "HARDENED",
  "type": {
    "name": "rule-based"
  },
  "sensitivityLevel": "com.sap.appiot.security:pii",
  "createdOn": "2020-05-07T12:01:39.134Z",
  "aggregates": [{
    "fill_level_SUM": "702.0",
    "fill_level_TMAX": "2021-02-17T09:03:47.784+00:00",
    "fill_level_FIRST": 90,
    "fill_level_TLAST": "2021-02-17T09:07:44.157+00:00",
    "fill_level_MIN": 18,
    "fill_level_AVG": "54.0",
    "fill_level_LAST": 18,
    "fill_level_COUNT": "13",
    "fill_level_STDDEV": "22.44994432064365",
    "fill_level_TMIN": "2021-02-17T09:07:44.157+00:00",
    "fill_level_PERCENT_GOOD": "100.0",
    "fill_level_MAX": 90,
    "fill_level_TFIRST": "2021-02-17T09:03:47.784+00:00"
  }
]
```

This example shows the response payload for a rule-based segment. That is, a segment that was automatically created by the rules that are assigned to a recognition configuration along with the thing type listed in the response. The trailing `<aggregates>` array in the payload contains the aggregated measured values recorded for the property set type specified by the `sap-iot-thingpst` header parameter. Note that the aggregates are only returned for a closed segment (that is, `"state": "HARDENED"`).

Related Information

[Segment \[page 1142\]](#)

19.4.3 Read all Segments

Retrieve all data segments.

With this service method, you can retrieve all the data segments that exist in the system. The method retrieves all segments, regardless of whether they've been created manually or in an automated process controlled by rules.

→ Recommendation

Since automatically created data segments can easily pile up to unpredictable numbers, we highly recommend always taking advantage of the built-in method features for paged and filtered output.

Request

URI: `/v1/segments`

HTTP Method: `GET`

Permissions: `seg.r`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
<code>\$count</code>	No	boolean	If set to <code>true</code> , the total number of matching records is added to the response.	Query string
<code>\$skip</code>	No	integer	Number of the first n records to be excluded from the result set.	Query string
<code>\$top</code>	No	integer	Number of records to include in the result set. Allowed maximum: 500	Query string
<code>\$orderby</code>	No	string	Field name to be used for sorting the result set in ascending or descending order.	Query string
Various filter parameters (see the following table)	No	string	Filter condition to be applied. For the supported fields, see the explanations in the following table.	Query string

Supported Fields for Filtering

Field Name	Description
<code><duration></code>	Segments with the specified duration formatted according to ISO 8601 (see below).
<code><recognitionConfigurationId></code>	Segments that were created based on the specified recognition configuration.
<code><startPropertySetId></code> , <code><endPropertySetId></code>	Segments that were created or closed based on properties from the specified property sets.
<code><startTime></code> , <code><endTime></code>	Segments starting after <code><startTime></code> or before <code><endTime></code> .
<code><state></code>	Segments with the specified status (OPEN, CLOSED, HARDENED)
<code><tags></code>	Comma-separated list of up to 30 tags. Each tag can hold up to 128 characters. The filter returns any segment that has any of the given tags attached as a match.
<code><thing ID></code>	Segments that were created for the specified thing.
<code><thingTypeId></code>	Segments that were created for the specified thing type.
<code><type></code>	Segment with the specified type (MANUAL_TIME_RANGE, MANUAL_RULE_BASED, RULE_BASED)

For the `<duration>` filter parameter, the system expects time periods specified according to ISO 8601. The following operators are supported:

- `ge` (greater than or equal)
- `le` (less than or equal)
- `gt` (greater than)
- `lt` (less than)
- `eq` (equal)

Example

Read all segments that lasted for one day and three hours or more:

```
/v1/segments?duration= ge P1DT3H
```

Read all segments that lasted less than 500 milliseconds:

```
/v1/segments?duration= lt PT0.500S
```

Note

The `<duration>` field contains a valid value in the following scenarios:

- Segment has been created manually.
- Segment has been created automatically **and** is in status `closed`.

Since the timestamps used for the `<duration>` field are recorded with a precision of 1 millisecond, it is normally **not** recommended to use the `eq` operator.

Request Example

```
/v1/segments?type=RULE_BASED
```

With this request, you can retrieve a list of all segments that have been automatically created by rules assigned to a recognition configuration.

Response

Response Status and Error Codes

Code	Description
200	Segments retrieved successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "count": 214,
  "previous": "http://localhost:8081/v1/api/path?$skip=500",
  "next": "http://localhost:8081/v1/api/path?$skip=500",
  "values": [
    {
      "id": "1acd182d-1323-4f57-8eec-8f3bd17e3c22",
      "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
      "startTime": "2020-05-07T12:49:48.683Z",
      "endTime": "2020-05-07T12:49:48.683Z",
      "thingModel": {
        "thingId": "MyThingID",
        "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6"
      },
      "tags": [
        "tag_a",
        "tag_b",
        "tag_c"
      ],
      "state": "HARDENED",
      "type": {
        "name": "rule-based"
      },
      "sensitivityLevel": "com.sap.apptot.security:pii",
      "createdOn": "2020-05-07T12:49:48.683Z"
    }
  ]
}
```

Related Information

[Segment \[page 1142\]](#)

19.4.4 Update a Segment

With this method, you modify the properties of a segment of time series data.

This update method uses the HTTP [PATCH](#) verb rather than [PUT](#). Therefore, it's sufficient to only provide the payload fields that you actually want to change, instead of providing the entire payload structure.

Request

URI: `/v1/segments/<segment ID>`

HTTP Method: [PATCH](#)

Permissions: `seg.cud`

Request Headers

Header	Required	Values
If-Match	Yes	Check if cached version matches server version of the segment.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ID	Yes	string	Unique ID of the segment to be updated.	Path

Request Example

```
{
  "startTime": "2020-09-02T15:04:34.812Z",
  "endTime": "2020-09-02T15:04:34.812Z",
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ]
}
```

In the above example, new values are provided only to the two timestamp fields as well as to the `<tags>` array. All other field values of the segment remain unchanged.

Response

Response Status and Error Codes

Code	Description
200	Segment updated successfully.

Code	Description
204	No content.
401	Unauthorized.
403	Forbidden.

Response Example

```
{
  "ETag": "8cbfee81bbcbd7097bb09347c8b7c04a",
  "messages": [
    "string"
  ],
  "startTime": "2020-09-02T15:04:34.857Z",
  "thingModel": {
    "thingTypeId": "segments.sandbox02.segments:integrationTestTT_6",
    "thingId": "MyThingID"
  },
  "sensitivityLevel": "com.sap.apptot.security:pii",
  "id": "1acd182d-1323-4f57-8eec-8f3bd17e3c22",
  "endTime": "2020-09-02T15:04:34.857Z",
  "state": "hardened",
  "type": {
    "name": "rule-based"
  },
  "createdOn": "2020-09-02T15:04:34.857Z",
  "tags": [
    "tag_a",
    "tag_b",
    "tag_c"
  ]
}
```

Related Information

[Segment \[page 1142\]](#)

19.4.5 Delete a Segment

Delete a data segment.

With this service method, you can delete a segment of time series data.

i Note

Deleting a segment only deletes the description of the subset of time series data to which it refers. The time series data itself is of course **not** deleted and remains untouched in the database.

Request

URI: `/v1/segments/<segment ID>`

HTTP Method: `DELETE`

Permissions: `seg.cud`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer token.
If-Match	Yes	Check if cached version matches server version of the segment.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
segment ID	Yes	string	Unique ID of the segment to be deleted.	Path

Request Example

`/v1/segments/lacd182d-1323-4f57-8eec-8f3bd17e3c2`

Response

Response Status and Error Codes

Code	Description
200	Segment deleted successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Related Information

[Segment \[page 1142\]](#)

19.5 Tag

A service for managing textual annotations for data segments.

Tags are extremely simple, yet very useful elements. Each tag is nothing but a user-defined string that can be attached to a recognition configuration or a segment of time series data. Using tags allows for grouping, searching, and finding those configurations and segments that have been set up for serving a particular purpose in a given scenario.

i Note

The Tag service takes care of all the tags you maintain for recognition configurations or segments. Tags assigned to a recognition configuration are automatically inherited by all segments that the system creates based on the rules assigned to the configuration.

Base URI: `/v1/segments/recognitionConfigurations/tags`

Permissions: `seg.r`

Methods

HTTP Method	Action	URI
GET	Read all Tags [page 1153]	<code>/v1/segments/recognitionConfigurations/tags</code>

i Note

As the *Methods* table suggests, the service only offers a collective [GET](#) request as the single currently supported API method. Creating and assigning tags is only possible in the context of a segment or configuration to which a tag is assigned.

19.5.1 Read all Tags

Retrieve all tags assigned to segments and configurations.

With this service method, you can retrieve all the tags that have been assigned to segments and recognition configurations. Retrieving such a list can be useful to gain an overview of all the different terms used so far. You can then use this list as a starting point for consolidating and unifying the terms used for grouping and categorizing.

Request

URI: `/v1/segments/recognitionConfigurations/tags`

HTTP Method: [GET](#)

Permissions: `seg.r`

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
\$count	No	boolean	If set to <code>true</code> , the total number of matching records is added to the response.	Query string
\$skip	No	integer	Number of the first n records to be excluded from the result set.	Query string
\$top	No	integer	Number of records to include in the result set. Allowed maximum: 500	Query string
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order.	Query string
\$filter	No	string	Filter condition to be applied. Supported fields are: <code><name></code> . All tags containing the given string are returned.	Query string

Request Example

`/v1/segments/recognitionConfigurations/tags`

Response

Response Status and Error Codes

Code	Description
200	Tags retrieved successfully.
401	Unauthorized.
403	Forbidden.
404	Not found.

Response Example

```
{
  "count": 214,
  "previous": "http://localhost:8081/v1/api/path?$skip=500",
  "next": "http://localhost:8081/v1/api/path?$skip=500",
  "values": [
    "string"
  ]
}
```

Related Information

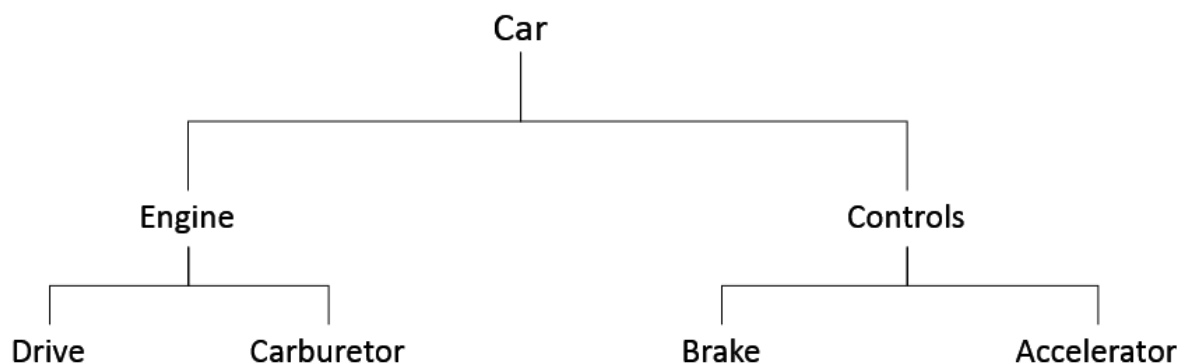
[Tag \[page 1153\]](#)

20 Thing Hierarchy

Hierarchy is a way of structuring and organizing objects in a tree structure, where every object except the top one (root) has exactly one immediate superior object and all objects may have one or multiple subordinate objects. This is called a parent-child relationship.

SAP IoT services offer OData services to create, read, and maintain thing hierarchies. A Thing Hierarchy represents a group of things, with one dedicated thing at the top and potentially multiple levels of things below. It defines the parent-child relationship between these things.

The following diagram illustrates a hierarchical representation of a list of things:



Note

In the above example,

- **Drive** and **Carburetor** are child nodes of thing **Engine**.
- **Brake** and **Accelerator** are child nodes of thing **Controls**.
- **Engine** and **Controls** are child nodes of thing **Car**.

Homogenous hierarchy: The hierarchy contains the same object types. The only supported object type is Thing.

Multiple hierarchies: You can maintain multiple hierarchies for a specific tenant, and there exists only one root node in a hierarchy. A thing can belong to multiple hierarchies. However, a thing cannot appear multiple times in the same hierarchy.

Hierarchy information: Within a hierarchy you only create, update, or delete relationships between things. Thing instances themselves are not affected by operations performed on the hierarchy. For example, when you create a thing hierarchy, a parent-child relationship between the things is created. When you delete a thing within a hierarchy, only the parent-child relationship between the deleted thing and its associated things (if any) is removed. The thing instance is not deleted.

Related Information

[Thing Hierarchy \[page 1157\]](#)

20.1 Thing Hierarchy

Thing hierarchy related services

Overview

The service allows you to create, read, and maintain hierarchy of related things.

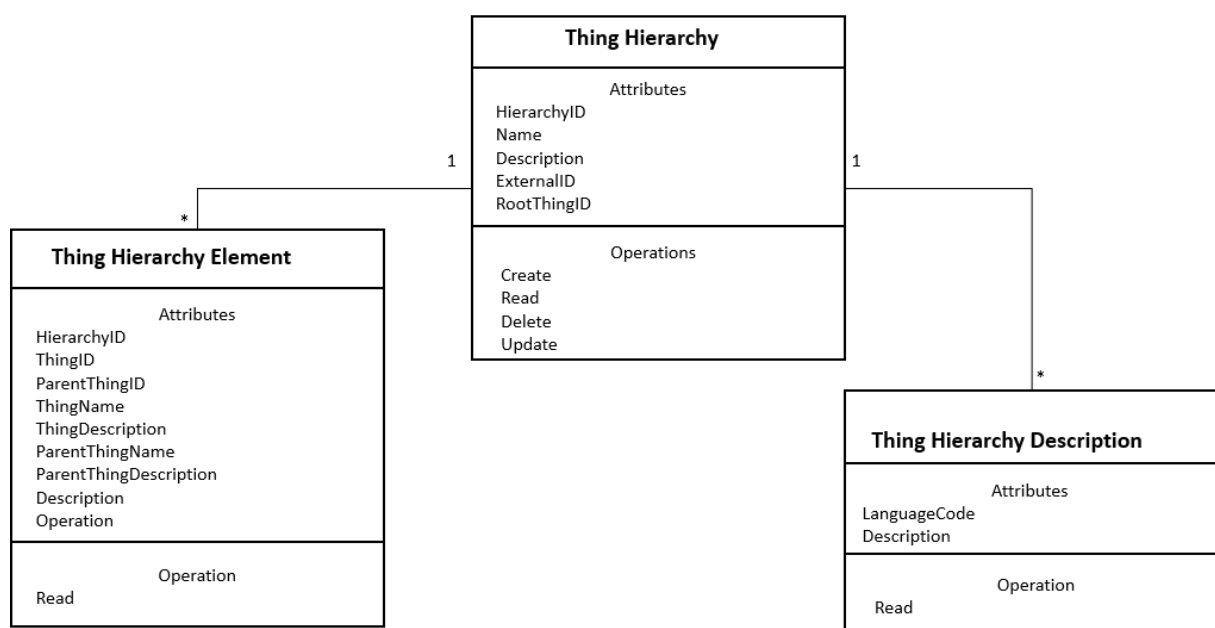
OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/ThingHierarchy`

Example for a Root URI in a cloud foundry environment: `https://apiot-thing-hierarchy.cfapps.eu10.hana.ondemand.com/ThingHierarchy`

Entity Data Model (EDM)

The following diagram shows the EDM of the Thing Hierarchy:



Service Metadata URI: `http://<server address>[:<port number>]/ThingHierarchy/v1/$metadata`

Resources

Resource	Description	Path
Thing Hierarchy [page 1158]	Represents thing hierarchies	<code>/v1/ThingHierarchies</code>
Thing Hierarchy Element [page 1185]	Thing hierarchy elements	<code>/v1/ThingHierarchies?\$expand=ThingHierarchyElements</code>
Thing Hierarchy Description [page 1191]	Thing hierarchy descriptions	<code>/v1/ThingHierarchies?\$expand=ThingHierarchyDescriptions</code>

20.1.1 Thing Hierarchy

Represents thing hierarchies

Resource Path:`http://<server address>[:<port number>]/ThingHierarchy/v1/ThingHierarchies`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
<i>READ</i>	Read Metadata of Thing Hierarchy [page 1162]	<code>/ThingHierarchy/v1/\$metadata</code>	<code><ths>.r</code>
<i>POST</i>	Create Thing Hierarchy [page 1166]	<code>/v1/ThingHierarchies</code>	<code><ths>.c</code> <code><ohs>.c</code>
<i>GET</i>	Read Thing Hierarchy [page 1168]	<code>/v1/ThingHierarchies ('<thing hierarchy ID>')</code>	<code><ths>.r</code>
<i>READ</i>	Read Sub-hierarchy for a Thing [page 1172]	<code>/ThingHierarchy/v1/ThingHierarchies ('<thing hierarchy ID>')/ThingHierarchyElements?\$filter=ThingID eq '<thing ID>' & \$inlinecount=allpages& \$format=json&sap.apptot.level=1</code>	<code><ths>.r</code>

HTTP Method	Operation	URI	Scopes
GET	Read all Thing Hierarchies [page 1177]	/v1/ThingHierarchies	<ths>.r
DELETE	Delete Thing Hierarchy [page 1179]	/v1/ThingHierarchies ('<thing hierarchy ID>')	<ths>.d <ohs>.d
UPDATE	Update Thing Hierarchy [page 1181]	/v1/ThingHierarchies ('<thing hierarchy ID>')	<ths>.u <ohs>.u

Thing Hierarchy Properties

Parameter	Data Type	Maximum Length	Description
HierarchyID	string	32	Unique identifier of the thing hierarchy generated by the system.
Name	string	255	Name of the thing hierarchy Note: i Note Only the following characters are supported: - Alphabets a through z and A through Z - Numeric digits 0 through 9 - Punctuation mark underscore (_)
Descriptions	Array of description objects	-	Description of the thing hierarchy The descriptive text provided in this field is ignored and is replaced with the descriptive text provided in the Description field of the Thing Hierarchy Description entity.

Parameter	Data Type	Maximum Length	Description
ExternalID	string	255	Thing hierarchy identifier (which is not unique) from an external system. You can create multiple thing hierarchies with the same external ID. i Note Only the following characters are supported: - Alphabets a through z and A through Z - Numeric digits 0 through 9 - Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)
RootThingID	string	32	Identifier of the thing in the root element of the thing hierarchy. The thing with parentThingID = 0 is considered as the root thing of the hierarchy. You cannot edit the root thing ID when you create or update a thing hierarchy.

i Note

- If the description is maintained in the requested language, the service returns the payload with description.
- If the description is not maintained in the requested language, the service returns the payload with description maintained in default language (EN – English).
- If the description is not maintained in the default language (EN – English) as well, the service returns the payload with `null` value for the description.

Thing Hierarchy Description Properties

Property	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the object description
Description	String	255	Description of the thing hierarchy

i Note

When you create an object, you can provide the description in one or more languages. If you want to update the description in a specific language, provide the modified description only for that language in the request payload. The service updates the description only for the provided language and the description in other languages, if any, are retained as is.

The following example request payload updates the description in German (de) language:

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": "updated description in German"
  }]
}
```

Similarly, if you want to delete the description in a specific language, you must provide a blank value or null value in the request payload.

The following example request payloads, deletes the description in German (de) language:

Example with blank value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": ""
  }]
}
```

Example with null value

```
{
  ...
  "Descriptions": [{
    "LanguageCode": "de",
    "Description": null
  }]
}
```

Related Information

[Thing Hierarchy Element \[page 1185\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.1.1 Read Metadata of Thing Hierarchy

With this method, you can retrieve the thing hierarchy metadata.

Request

URI: `/ThingHierarchy/v1/$metadata`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<ths>.r`

Request Parameters

None

Request Example

`/ThingHierarchy/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Thing Hierarchy metadata retrieved successfully.

Payload

```
<EntityType Name="ThingHierarchyElement">
  <Documentation>
    <Summary>Details of thing hierarchy element entity type</Summary>
  </Documentation>
  <Key>
    <PropertyRef Name="HierarchyID"></PropertyRef>
    <PropertyRef Name="ThingID"></PropertyRef>
  </Key>
  <Property Name="HierarchyID" Type="Edm.String" Nullable="false"
    MaxLength="32">
    <Documentation>
      <Summary>Unique identifier of the thing hierarchy</Summary>
      <LongDescription>It is automatically generated by the
        system when creating a thing hierarchy.</LongDescription>
    </Documentation>
  </Property>
```



```

        <Property Name="ThingID" Type="Edm.String" Nullable="false"
MaxLength="255">
            <Documentation>
                <Summary>Unique identifier of the thing</Summary>
            </Documentation>
        </Property>
        <Property Name="ThingName" Type="Edm.String" MaxLength="255"
sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Name of the thing specified when creating a
thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingDescription" Type="Edm.String"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of the thing specified when
creating a thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ParentThingID" Type="Edm.String" Nullable="true"
MaxLength="255">
            <Documentation>
                <Summary>Unique identifier of the parent thing</Summary>
            </Documentation>
        </Property>
        <Property Name="ParentThingName" Type="Edm.String"
MaxLength="255" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Name of the parent thing specified when
creating a thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ParentThingDescription" Type="Edm.String"
MaxLength="60" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of the parent thing specified when
creating a thing</Summary>
                <LongDescription>It cannot be edited during create
(POST) or update (PATCH) of a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" MaxLength="255">
            <Documentation>
                <Summary>Description of the thing hierarchy element</
Summary>
            </Documentation>
        </Property>
        <Property Name="Operation" Type="Edm.String" MaxLength="6">
            <Documentation>
                <Summary>Operation to be performed on the thing
hierarchy element</Summary>
                <LongDescription>Indicates the add or delete operation
to be performed on the thing hierarchy element during PATCH request.</
LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingType" Type="Edm.String" Nullable="true"
MaxLength="81">
            <Documentation>
                <Summary>Thing type name</Summary>
            </Documentation>

```

```

        </Property>
        <Property Name="ThingTypeDescription" Type="Edm.String"
Nullable="true" MaxLength="60">
            <Documentation>
                <Summary>Thing type description</Summary>
            </Documentation>
        </Property>
        <NavigationProperty Name="ThingHierarchy"
Relationship="com.sap.apptot.ThingHierarchyElementToHierarchyAssociation"
FromRole="ThingHierarchyElement" ToRole="ThingHierarchy"></NavigationProperty>
    </EntityType>
    <EntityType Name="ThingHierarchy">
        <Documentation>
            <Summary>Details of thing hierarchy entity type</Summary>
        </Documentation>
        <Key>
            <PropertyRef Name="HierarchyID"></PropertyRef>
        </Key>
        <Property Name="HierarchyID" Type="Edm.String" Nullable="false"
MaxLength="32">
            <Documentation>
                <Summary>Unique identifier of the thing hierarchy</
Summary>
                <LongDescription>It is automatically generated by the
system when creating a thing hierarchy.</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Name" Type="Edm.String" Nullable="true"
MaxLength="255">
            <Documentation>
                <Summary>Name of the thing hierarchy</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" Nullable="true"
MaxLength="255" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <Summary>Description of the thing hierarchy</Summary>
                <LongDescription>When creating a thing hierarchy, the
text provided in this field is ignored and replaced with the text provided in
the description field of the thing hierarchy description entity.</
LongDescription>
            </Documentation>
        </Property>
        <Property Name="ExternalID" Type="Edm.String" Nullable="true"
MaxLength="255">
            <Documentation>
                <Summary>Thing hierarchy identifier (which is not
unique) from an external system</Summary>
            </Documentation>
        </Property>
        <Property Name="RootThingID" Type="Edm.String" Nullable="true"
MaxLength="32">
            <Documentation>
                <Summary>Identifier of the thing in root element of the
thing hierarchy</Summary>
            </Documentation>
        </Property>
        <NavigationProperty Name="ThingHierarchyElements"
Relationship="com.sap.apptot.ThingHierarchyToElementAssociation"
FromRole="ThingHierarchy" ToRole="ThingHierarchyElement"></NavigationProperty>
        <NavigationProperty Name="ThingHierarchyDescriptions"
Relationship="com.sap.apptot.ThingHierarchyToDescriptionAssociation"
FromRole="ThingHierarchy" ToRole="Description"></NavigationProperty>
    </EntityType>
    <EntityType Name="Description">
        <Documentation>
            <Summary>Details of the thing hierarchy description entity
type</Summary>

```

```

        </Documentation>
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String" Nullable="false"
MaxLength="2">
            <Documentation>
                <Summary>ISO code of the language of the thing hierarchy
description</Summary>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String" MaxLength="255">
            <Documentation>
                <Summary>Description of the thing hierarchy</Summary>
            </Documentation>
        </Property>
    </EntityType>
    <Association Name="ThingHierarchyToElementAssociation">
        <End Type="com.sap.apptot.ThingHierarchy" Multiplicity="1"
Role="ThingHierarchy"></End>
        <End Type="com.sap.apptot.ThingHierarchyElement"
Multiplicity="*" Role="ThingHierarchyElement"></End>
    </Association>
    <Association Name="ThingHierarchyElementToHierarchyAssociation">
        <End Type="com.sap.apptot.ThingHierarchyElement"
Multiplicity="*" Role="ThingHierarchyElement"></End>
        <End Type="com.sap.apptot.ThingHierarchy" Multiplicity="1"
Role="ThingHierarchy"></End>
    </Association>
    <Association Name="ThingHierarchyToDescriptionAssociation">
        <End Type="com.sap.apptot.ThingHierarchy" Multiplicity="1"
Role="ThingHierarchy"></End>
        <End Type="com.sap.apptot.Description" Multiplicity="*"
Role="Description"></End>
    </Association>
    <EntityContainer Name="ThingHierarchyContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="ThingHierarchyElements"
EntityType="com.sap.apptot.ThingHierarchyElement">
            <Documentation>
                <Summary>Details of thing hierarchy elements entity set</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="ThingHierarchies"
EntityType="com.sap.apptot.ThingHierarchy">
            <Documentation>
                <Summary>Details of thing hierarchies entity set</
Summary>
            </Documentation>
        </EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.apptot.Description">
            <Documentation>
                <Summary>Details of the thing hierarchy descriptions
entity set</Summary>
            </Documentation>
        </EntitySet>
        <AssociationSet Name="ThingHierarchyToElementAssociation"
Association="com.sap.apptot.ThingHierarchyToElementAssociation">
            <End EntitySet="ThingHierarchies" Role="ThingHierarchy"></
End>
            <End EntitySet="ThingHierarchyElements"
Role="ThingHierarchyElement"></End>
        </AssociationSet>
        <AssociationSet
Name="ThingHierarchyElementToHierarchyAssociation"
Association="com.sap.apptot.ThingHierarchyElementToHierarchyAssociation">

```

```

        <End EntitySet="ThingHierarchyElements"
Role="ThingHierarchyElement"></End>
        <End EntitySet="ThingHierarchies" Role="ThingHierarchy"></
End>
        </AssociationSet>
        <AssociationSet Name="ThingHierarchyToDescriptionAssociation"
Association="com.sap.apiot.ThingHierarchyToDescriptionAssociation">
        <End EntitySet="ThingHierarchies" Role="ThingHierarchy"></
End>
        <End EntitySet="Descriptions" Role="Description"></End>
        </AssociationSet>
    </EntityContainer>

```

20.1.1.2 Create Thing Hierarchy

Creates a thing hierarchy

With this service, you can create thing hierarchy for a specific tenant. You can maintain multiple hierarchies for a specific tenant and there exists only one root node in a hierarchy. A thing can belong to multiple hierarchies. However, a thing cannot appear multiple times in the same hierarchy. The nodes within a hierarchy must be connected to at least one node and should not form cyclic reference. For example, if **Engine** and **Controls** are child nodes of the parent node **Car**, **Engine** cannot be the child node of **Controls**.

i Note

Using a single `POST` method, you can create a thing hierarchy with a maximum limit up to 20 levels and a maximum of 1000 objects. However, you can add more levels and objects to the thing hierarchy using the `PATCH` method.

When you create a thing hierarchy, you must provide the following details:

- Name of the hierarchy
- External ID
- Thing hierarchy elements
 - Thing ID
 - Parent thing ID
- Thing hierarchy description
 - ISO language code
 - Description

Request

URI: `/v1/ThingHierarchies`

Operation Type: CRUD

HTTP Method: `POST`

Permissions:

`<ths>.c`

<ohs>.c

Request Example

```
{
  "Name": "Car_XYZ_Hierarchy",
  "ExternalID": "CarXYZ-Hierarchy",
  "ThingHierarchyElements": [{
    "ThingID": "965B8AB45F624848BDEBD4837D093945",
    "ParentThingID": "0"
  }, {
    "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "ParentThingID": "965B8AB45F624848BDEBD4837D093945"
  }, {
    "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "ParentThingID": "965B8AB45F624848BDEBD4837D093945"
  }, {
    "ThingID": "43B87CB55B2D43A29AAB08AD885A3461",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E"
  }, {
    "ThingID": "3467B81CFCE74A2B97E78000027D2105",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E"
  }, {
    "ThingID": "800DEE78D35D43D0BB404BB27B98CDA8",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2"
  }, {
    "ThingID": "4E60A688A13E43E28EC78A0606785435",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2"
  }],
  "ThingHierarchyDescriptions": [{
    "LanguageCode": "en",
    "Description": "Desccribes hierarchy of units in the carXYZ"
  }]
}
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
201	Thing hierarchy created successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "__metadata": {
```

```

      "id": "https://appiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
      "uri": "https://appiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
      "type": "com.sap.appiot.ThingHierarchy"
    },
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65"
  }
}

```

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Element \[page 1185\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.1.3 Read Thing Hierarchy

Retrieves hierarchy details for a specific thing hierarchy

With this service, you can retrieve the hierarchy details for a specific thing hierarchy ID.

Request

URI: /v1/ThingHierarchies('<thing hierarchy ID>')

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <ths>.r

Request Parameters

Parameter	Required	Data Type	Description
HierarchyID	Yes	string	Unique thing hierarchy identifier

Request Example

```
/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')
```

Retrieves details of a specific thing hierarchy ID

```
/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')?
$format=json&$expand=ThingHierarchyDescriptions,ThingHierarchyElements
```

Retrieves details of a specific thing hierarchy ID along with the thing details that are part of the thing hierarchy in *JSON* format

Request Query Parameters

Parameter	Required	Data Type	Description
\$expand	No	string	Includes the related resources inline while retrieving the requested resources. Supported associations of thing hierarchy that can be retrieved using \$expand are thing hierarchy elements and thing hierarchy description.
\$filter	No	String	Filter condition to be applied; all fields in the result set are valid.
\$format	No		Format to be applied on the result set.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Thing hierarchy retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure in the following examples:

Example 1

```
/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')
```

```
{  
  "d": {
```

```

    "_metadata": {
      "id": "https://apiot-thing-hierarchy-
ci.cfapps.sap.hana.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
      "uri": "https://apiot-thing-hierarchy-
ci.cfapps.sap.hana.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
      "type": "com.sap.apiot.ThingHierarchy"
    },
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "Name": "Car_XYZ_Hierarchy",
    "Description": "Describes hierarchy of units in the carXYZ",
    "ExternalID": "CarXYZ-Hierarchy",
    "RootThingID": "965B8AB45F624848BDEBD4837D093945",
    "ThingHierarchyElements": {
      "_deferred": {
        "uri": "https://apiot-thing-hierarchy-
ci.cfapps.sap.hana.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')/ThingHierarchyElements"
      }
    },
    "ThingHierarchyDescriptions": {
      "_deferred": {
        "uri": "https://apiot-thing-hierarchy-
ci.cfapps.sap.hana.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')/ThingHierarchyDescriptions"
      }
    }
  }
}

```

Example 2

/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')?
\$format=json&\$expand=ThingHierarchyDescriptions,ThingHierarchyElements

```

{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
          "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
          "type": "com.sap.apiot.ThingHierarchy"
        },
        "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
        "Name": "Car_XYZ_Hierarchy",
        "Description": "Describes hierarchy of units in the carXYZ",
        "ExternalID": "CarXYZ-Hierarchy",
        "RootThingID": "965B8AB45F624848BDEBD4837D093945",
        "ThingHierarchyElements": {
          "results": [
            {
              "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
              "ThingID": "965B8AB45F624848BDEBD4837D093945",
              "ThingName": "Car-XYZ",
              "ThingDescription": "A car of XYZ series",
              "ParentThingID": null,
              "ParentThingName": null,
              "ParentThingDescription": null,
              "Description": null,
              "Operation": null,
              "ThingType": "core.automobiles:ABC2Series",

```



```

    "ThingTypeDescription": "ABC2Series electric car"
  },
  {
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "ThingName": "Car-XYZ-Engine",
    "ThingDescription": "Engine of Car-XYZ",
    "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
    "ParentThingName": "Car-XYZ",
    "ParentThingDescription": "A car of XYZ series",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  },
  {
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "ThingName": "Car-XYZ-ControlUnit",
    "ThingDescription": "ControlUnit of Car-XYZ",
    "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
    "ParentThingName": "Car-XYZ",
    "ParentThingDescription": "A car of XYZ series",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  },
  {
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "43B87CB55B2D43A29AAB08AD885A3461",
    "ThingName": "Car-XYZ-DriveUnit",
    "ThingDescription": "DriveUnit of Car-XYZ",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "ParentThingName": "Car-XYZ-Engine",
    "ParentThingDescription": "Engine of Car-XYZ",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  },
  {
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "3467B81CFCE74A2B97E78000027D2105",
    "ThingName": "Car-XYZ-Carburetor",
    "ThingDescription": "Carburetor of Car-XYZ",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "ParentThingName": "Car-XYZ-Engine",
    "ParentThingDescription": "Engine of Car-XYZ",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  },
  {
    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "800DEE78D35D43D0BB404BB27B98CDA8",
    "ThingName": "Car-XYZ-Brake",
    "ThingDescription": "Brake of Car-XYZ",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "ParentThingName": "Car-XYZ-ControlUnit",
    "ParentThingDescription": "ControlUnit of Car-XYZ",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  },
  {

```

```

    "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
    "ThingID": "4E60A688A13E43E28EC78A0606785435",
    "ThingName": "Car-XYZ-Accelerator",
    "ThingDescription": "Accelerator of Car-XYZ",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "ParentThingName": "Car-XYZ-ControlUnit",
    "ParentThingDescription": "ControlUnit of Car-XYZ",
    "Description": null,
    "Operation": null,
    "ThingType": "core.automobiles:ABC2Series",
    "ThingTypeDescription": "ABC2Series electric car"
  }
]
},
"ThingHierarchyDescriptions": {
  "results": [
    {
      "LanguageCode": "en",
      "Description": "Describes hierarchy of units in the carXYZ"
    }
  ]
}
}
}
}
```

Related Information

Thing Hierarchy [page 1158]

Thing Hierarchy Element [page 1185]

Thing Hierarchy Description [page 1191]

20.1.1.4 Read Sub-hierarchy for a Thing

With this method, you can retrieve the sub-hierarchy for the specified thing ID in a hierarchy.

The following new custom query parameters are introduced to retrieve the sub-hierarchy:

- `sap.appiot.level`: The value of this parameter indicates the number of levels up to which child nodes or parent nodes of the specified thing ID are retrieved. Supported values are 0 and any positive integer. If you do not specify this parameter in the request URL or you assign a value 0 for this parameter in the request URL, the method retrieves all child nodes of the specified thing ID.
- `sap.appiot.order`: The value of this parameter indicates whether child nodes or parent nodes of the specified thing ID are retrieved. Supported values are **ascending** and **descending**. If you do not specify this parameter in the request URL, the method retrieves all child nodes of the specified thing ID up to the level mentioned in the parameter `sap.appiot.level`.

For example, consider the following thing hierarchy:



If `sap.apptot.level = 2`, `sap.apptot.order = descending` and, thing ID = `72280984D25430CBDD6638163061A03`, the method will fetch a sub-hierarchy with child nodes `620CD96C317B46AD9027E39DEAD3D3` and `56A32305301A4BFB96ED5D5F736EC19F`.

If `sap.apptot.level = 1`, `sap.apptot.order = ascending` and, thing ID = `72280984D25430CBDD6638163061A03`, the method will fetch a sub-hierarchy with parent node `D666B32455A48AE8829C42765A3141`.

Note

- The query parameter `$filter` is mandatory in the request URL and the only supported field for `$filter` is thing ID.
- The custom query parameters are not supported as a valid field in query request parameter `$filter`, `$orderby`, and `$select`.

Request

URI: `/ThingHierarchy/v1/ThingHierarchies('<thing hierarchy ID>')/ThingHierarchyElements?$filter=ThingID eq '<thing ID>' &$inlinecount=allpages&$format=json&sap.apptot.level=1`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<ths>.r`

Request Parameters

Parameter	Required	Data Type	Description
thing hierarachy ID	Yes	String	Unique thing hierarchy identifier
thing ID	Yes	String	Unique thing identifier
sap.apptot.level	No	Integer	Custom query parameter and is not available in the metadata of thing hierarchy.
sap.apptot.order	No	String	Custom query parameter and is not available in the metadata of thing hierarchy.

Query Request Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; the only field supported is thing ID.
\$inlinecount	No	String	Total number of hierarchies available; permissible values are allpages and none . The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the \$top and \$skip parameters, the result contains the total count of hierarchies available. - If you use this with \$filter parameter, the result contains the total count of hierarchies based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all fields in the result set are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$skip	No	Integer	Number of records to exclude from the result set.
\$top	No	Integer	Number of records to include in the result set.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.
\$skiptoken	No	Integer	Identifies a starting point in the collection of entities identified by the URI containing the \$skiptoken parameter.
\$format	No	String	Format to be applied on the result set. For example, json or xml .

Request Example

```
/ThingHierarchy/v1/ThingHierarchies('0C714859AFC2E120E10000000A619C52')/  
ThingHierarchyElements?$filter=ThingID eq '720280984D25430CBDD6638163061A03'&  
$inlinecount=allpages&$format=json&sap.apptot.level=1
```

Response

Response Status and Error Codes

Code	Description
200	[Description]
501	Not implemented (other fields are not supported or implemented for \$filter query parameter)

Payload

```
/ThingHierarchy/v1/ThingHierarchies('0C714859AFC2E120E10000000A619C52')/  
ThingHierarchyElements?$filter=ThingID eq '720280984D25430CBDD6638163061A03'&  
$inlinecount=allpages&$format=json&sap.apptot.level=1
```

Retrieves the sub-hierarchy of thing ID 720280984D25430CBDD6638163061A03 in the hierarchy 0C714859AFC2E120E10000000A619C52. The number of levels retrieved is 1.

```
{  
  "d": {  
    "__count": "1",  
    "results": [{  
      "__metadata": {  
        "id": "http://localhost:8080/ThingHierarchy/v1/  
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='62  
0CD96C317B46AD9027E39DEAD203D3')",  
        "uri": "http://localhost:8080/ThingHierarchy/v1/  
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='62  
0CD96C317B46AD9027E39DEAD203D3')",  
        "type": "com.sap.apptot.ThingHierarchyElement"  
      },  
      "HierarchyID": "0C714859AFC2E120E10000000A619C52",  
      "ThingID": "620CD96C317B46AD9027E39DEAD203D3",  
      "ThingName": "puttest",  
      "ThingDescription": "English",  
      "ParentThingID": "720280984D25430CBDD6638163061A03",  
      "ParentThingName": "Sybase.ASE.Thing0312222016_154132_478_1_-:23.",  
      "ParentThingDescription": "Thing for analysis on Sybase-ASE",  
      "Description": "HandsonHierarchy desc",  
      "Operation": null,  
      "ThingType": "core.automobiles:ABC2Series",  
      "ThingTypeDescription": "ABC2Series electric car"  
    },  
    "ThingHierarchy": {  
      "__deferred": {  
        "uri": "http://localhost:8080/ThingHierarchy/v1/  
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='62  
0CD96C317B46AD9027E39DEAD203D3')/ThingHierarchy"  
      }  
    }  
  }  
}]  
}
```

```
/ThingHierarchy/v1/ThingHierarchies('0C714859AFC2E120E10000000A619C52')/  
ThingHierarchyElements?$filter=ThingID eq '56A32305301A4BFB96ED5D5F736EC19F'&
```

```
$format=json&$inlinecount=allpages&
$expand=ThingHierarchy&sap.apptot.order=ascending&sap.apptot.level=0
```

```
{
  "d": {
    "__count": "3",
    "results": [
      {
        "__metadata": {
          "id": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='56
A32305301A4BFB96ED5D5F736EC19F')",
          "uri": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='56
A32305301A4BFB96ED5D5F736EC19F')",
          "type": "com.sap.apptot.ThingHierarchyElement"
        },
        "HierarchyID": "0C714859AFC2E120E10000000A619C52",
        "ThingID": "56A32305301A4BFB96ED5D5F736EC19F",
        "ThingName": "SESeriesA002",
        "ThingDescription": "English",
        "ParentThingID": "620CD96C317B46AD9027E39DEAD203D3",
        "ParentThingName": "puttest",
        "ParentThingDescription": "English",
        "Description": "HandsonHierarchy desc",
        "Operation": null,
        "ThingType": "com.sap.local1.iot.tml:ABC2Series",
        "ThingTypeDescription": "English",
        "ThingHierarchy": {
          "HierarchyID": "0C714859AFC2E120E10000000A619C52",
          "Name": "HandsonHierarchy",
          "Description": "HandsonHierarchy desc",
          "ExternalID": "ExternalID",
          "RootThingID": "D6606B32455A48AE8829C42765A03141"
        }
      },
      {
        "__metadata": {
          "id": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='62
0CD96C317B46AD9027E39DEAD203D3')",
          "uri": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='62
0CD96C317B46AD9027E39DEAD203D3')",
          "type": "com.sap.apptot.ThingHierarchyElement"
        },
        "HierarchyID": "0C714859AFC2E120E10000000A619C52",
        "ThingID": "620CD96C317B46AD9027E39DEAD203D3",
        "ThingName": "puttest",
        "ThingDescription": "English",
        "ParentThingID": "720280984D25430CBDD6638163061A03",
        "ParentThingName": "Sybase.ASE.Thing0312222016_154132_478_1_-:
23.",
        "ParentThingDescription": "Thing for analysis on Sybase-ASE",
        "Description": "HandsonHierarchy desc",
        "Operation": null,
        "ThingType": "com.sap.timeputt:TT1",
        "ThingTypeDescription": "English",
        "ThingHierarchy": {
          "HierarchyID": "0C714859AFC2E120E10000000A619C52",
          "Name": "HandsonHierarchy",
          "Description": "HandsonHierarchy desc",
          "ExternalID": "ExternalID",
          "RootThingID": "D6606B32455A48AE8829C42765A03141"
        }
      }
    ]
  },
  {

```

```

        "__metadata": {
            "id": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='72
0280984D25430CBDD6638163061A03')",
            "uri": "http://localhost:8092/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='0C714859AFC2E120E10000000A619C52',ThingID='72
0280984D25430CBDD6638163061A03')",
            "type": "com.sap.apptot.ThingHierarchyElement"
        },
        "HierarchyID": "0C714859AFC2E120E10000000A619C52",
        "ThingID": "720280984D25430CBDD6638163061A03",
        "ThingName": "Sybase.ASE.Thing0312222016_154132_478_1_-:23.",
        "ThingDescription": "Thing for analysis on Sybase-ASE",
        "ParentThingID": "D6606B32455A48AE8829C42765A03141",
        "ParentThingName": "Sybase.ASE.Thing0312222016_154132_478_1_-:.",
        "ParentThingDescription": "Thing for analysis on Sybase-ASE",
        "Description": "HandsonHierarchy desc",
        "Operation": null,
        "ThingType": "sybase.test.alldatatype:ThingType",
        "ThingTypeDescription": "Thing for analysis on Sybase-ASE",
        "ThingHierarchy": {
            "HierarchyID": "0C714859AFC2E120E10000000A619C52",
            "Name": "HandsonHierarchy",
            "Description": "HandsonHierarchy desc",
            "ExternalID": "ExternalID",
            "RootThingID": "D6606B32455A48AE8829C42765A03141"
        }
    }
}
]
}
}

```

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Element \[page 1185\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.1.5 Read all Thing Hierarchies

Retrieves all thing hierarchies

With this service, you can retrieve all the thing hierarchies for a specific tenant.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/v1/ThingHierarchies`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ths>.r

Request Query Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; all fields in the result set are valid.
\$inlinecount	No	String	Total number of hierarchies available; permissible values are allpages and none . The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the \$top and \$skip parameters, the result contains the total count of hierarchies available. - If you use this with \$filter parameter, the result contains the total count of hierarchies based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all fields in the result set are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$skip	No	Integer	Number of records to exclude from the result set.
\$top	No	Integer	Number of records to include in the result set.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.
\$skiptoken	No	Integer	Identifies a starting point in the collection of entities identified by the URI containing the \$skiptoken parameter.
\$format	No	String	Format to be applied on the result set. For example, json or xml .

Request Example

```
/ThingHierarchy/v1/ThingHierarchies?$format=json
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Thing hierarchies retrieved successfully.

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [{
      "metadata": {
        "id": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
        "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')",
        "type": "com.sap.apiot.ThingHierarchy"
      },
      "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
      "Name": "Car_XYZ_Hierarchy",
      "Description": "Desccribes hierarchy of units in the carXYZ",
      "ExternalID": "CarXYZ-Hierarchy",
      "RootThingID": "965B8AB45F624848BDEBD4837D093945",
      "ThingHierarchyElements": {
        "deferred": {
          "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')/ThingHierarchyElements"
        }
      },
      "ThingHierarchyDescriptions": {
        "deferred": {
          "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchies('582E4688A7647F2CE200229BE0434C65')/ThingHierarchyDescriptions"
        }
      }
    }]
  }
}
```

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Element \[page 1185\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.1.6 Delete Thing Hierarchy

Deletes thing hierarchy with a specific ID

The ETag value is not mandatory to delete a thing hierarchy. However, to delete a thing hierarchy using ETag, you must retrieve the ETag value of the thing hierarchy using the GET (/ThingHierarchy/v1/ThingHierarchies('<thing hierarchy ID>')) service. The ETag value is assigned to the request

header parameter `If-Match` in the `DELETE` request. If the `ETag` value is not correct, the server sends HTTP response code 412.

Request

URI: `/v1/ThingHierarchies('<thing hierarchy ID>')`

Operation Type: CRUD

HTTP Method: [*DELETE*](#)

Permissions:

`<ths>.d`

`<ohs>.d`

Request Header Parameters

Parameter	Required	Values
<code>Accept-Language</code>	No	Language of the thing type description. The default language is en.
<code>If-Match</code>	No	Latest <code>ETag</code> value of a specific thing hierarchy that is updated using the <code>PATCH</code> request.

Request Parameters

Parameter	Required	Data Type	Description
<code>HierarchyID</code>	Yes	string	Unique thing hierarchy identifier

Request Example

```
/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')
```

Response

Format: [*JSON*](#)

Response Status and Error Codes

Code	Description
204	Thing hierarchy deleted successfully.

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Element \[page 1185\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.1.7 Update Thing Hierarchy

Updates thing hierarchy with a specific ID

You can update the thing hierarchy name, external ID, and the language dependent descriptions using this service for a particular thing hierarchy. In addition, you can add new nodes or delete existing nodes in the existing thing hierarchy. The new nodes cannot appear multiple times in the same hierarchy and the nodes within a hierarchy must be connected to at least one node and should not form cyclic reference. The supported operations in this service are [ADD](#) and [DELETE](#). The system does not allow you to delete objects with child nodes, you can only delete the child nodes. The system first executes all [DELETE](#) operations and then executes [ADD](#) operations. The sequence of operations you specify in the request payload does not alter the sequence of operations performed at the backend. You can perform all [PATCH](#) operations only on the existing state of the hierarchy.

The ETag value is not mandatory to update a thing hierarchy. However, to update a thing hierarchy using ETag, you must retrieve the ETag value of the thing hierarchy using the GET (/ThingHierarchy/v1/ThingHierarchies('<thing hierarchy ID>')) service. The ETag value is assigned to the request header parameter If-Match in the PATCH request. If the ETag value is not correct, the server sends HTTP response code 412 .

Request

URI: /v1/ThingHierarchies('<thing hierarchy ID>')

Operation Type: CRUD

HTTP Method: [PATCH](#)

Permissions:

<ths>.u

<ohs>.u

Request Header Parameters

Parameter	Required	Values
Accept-Language	No	Language of the thing type description. The default language is en.

Parameter	Required	Values
If-Match	No	Latest ETag value of a specific thing hierarchy that is updated using the PATCH request.

Request Parameters

Parameter	Required	Data Type	Description
HierarchyID	Yes	string	Unique thing hierarchy identifier

Request Example

Example 1

/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')

```
{
  "Name": "Car_XYZ_Hierarchy",
  "ExternalID": "CarXYZ-Hierarchy",
  "ThingHierarchyElements": [{
    "ThingID": "3467B81CFCE74A2B97E78000027D2105",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "Operation": "DELETE"
  }, {
    "ThingID": "4E60A688A13E43E28EC78A0606785435",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "Operation": "DELETE"
  }],
  "ThingHierarchyDescriptions": [{
    "LanguageCode": "en",
    "Description": "Desccribes hierarchy of units in the updated carXYZ"
  }, {
    "LanguageCode": "de",
    "Description": "Beschreibung der Hierarchie carXYZ"
  }]
}
```

In this example, the name, external ID, and the description in language code EN are modified for the thing hierarchy. In addition, two of the nodes are deleted from a different parent.

Example 2

/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')

```
{
  "ThingHierarchyElements": [{
    "ThingID": "3467B81CFCE74A2B97E78000027D2105",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "Operation": "ADD"
  }, {
    "ThingID": "800DEE78D35D43D0BB404BB27B98CDA8",
    "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "Operation": "DELETE"
  }]
}
```

In this example, a new node is added and an existing node is deleted.

Example 3

```
/ThingHierarchy/v1/ThingHierarchies('582E4688A7647F2CE200229BE0434C65')
```

```
{
  "ThingHierarchyElements": [{
    "ThingID": "90589958BF6D530DE20017D91D3A7FDC",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "Operation": "ADD"
  }, {
    "ThingID": "90589958BF6D530DE20017D91D3A7FDC",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "Operation": "DELETE"
  }]
}
```

In this example, operations are not performed on the existing state of the hierarchy, as a new node that is not existing in the hierarchy is added and the same is deleted. Hence, the response code for this request is 400, as the object that does not exist is specified for deletion.

Example 4

```
/ThingHierarchies('C333A558EF82AC01E200D797B4576E03')
```

```
{
  "ThingHierarchyElements": [
    {
      "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
      "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
      "Operation": "DELETE"
    },
    {
      "ThingID": "800DEE78D35D43D0BB404BB27B98CDA8",
      "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
      "Operation": "DELETE"
    },
    {
      "ThingID": "4E60A688A13E43E28EC78A0606785435",
      "ParentThingID": "88E2BA6E7512439E9A771EE626AB25A2",
      "Operation": "DELETE"
    }
  ]
}
```

In this example, the thing 88E2BA6E7512439E9A771EE626AB25A2 is specified for deletion. However, the thing contains two child nodes. Only after deleting the child nodes, the system allows you to delete the parent thing. Hence, in the payload of the request, you can also mention the child nodes (800DEE78D35D43D0BB404BB27B98CDA8 and 4E60A688A13E43E28EC78A0606785435) to be deleted.

Example 5

```
/ThingHierarchies('16ACA6581B8C530DE20017D91D3A7FDC')
```

```
{
  "ThingHierarchyElements": [
    {
      "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
      "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
      "Operation": "DELETE"
    },
    {
      "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
      "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
      "Operation": "DELETE"
    },
    {

```

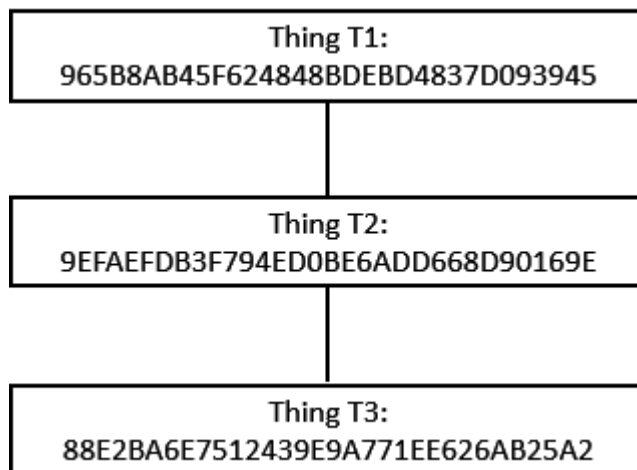
```

    "ThingID": "43B87CB55B2D43A29AAB08AD885A3461",
    "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
    "Operation": "ADD"
  },
  {
    "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "ParentThingID": "43B87CB55B2D43A29AAB08AD885A3461",
    "Operation": "ADD"
  },
  {
    "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
    "ParentThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
    "Operation": "ADD"
  }
]
}

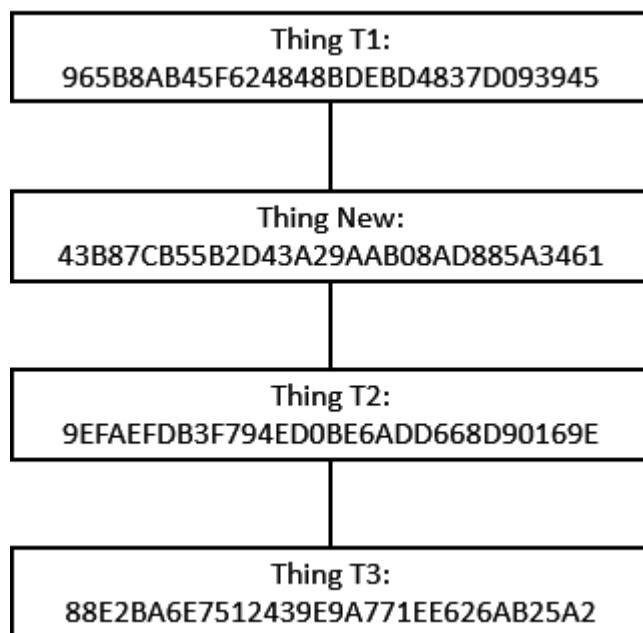
```

In this example, a new node (thing ID 43B87CB55B2D43A29AAB08AD885A3461) is added as an intermediate node.

The following diagram illustrates the existing hierarchy:



You might want to add an intermediate node and update the hierarchy as depicted in the following diagram:



Therefore, in the payload of the request, you specify the following:

1. Delete the child nodes **Thing T2** and **Thing T3**
2. Add the new intermediate node **Thing New** to the parent node **Thing T1**
3. Add the child node **Thing T2** to its new parent node **Thing New**
4. Add the child node **Thing T3** to its parent node **Thing T2**

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
204	Thing hierarchy updated successfully.

20.1.2 Thing Hierarchy Element

Represents one or more elements of an individual thing hierarchy

Resource Path:`http://<server address>[:<port number>]/ThingHierarchy/v1/ThingHierarchyElements`

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Thing Hierarchy Elements [page 1187]	/v1/ThingHierarchyElements

Thing Hierarchy Element Properties

Parameter	Data Type	Maximum Length	Description
HierarchyID	String	32	Unique identifier of the thing hierarchy generated by the system
ThingID	String	255	Unique identifier of the thing generated by the system during creation of a thing.
ThingName	String	255	Name of the thing specified when you create a thing. You cannot edit the name when you create or update the thing hierarchy.
ThingDescription	String	255	Description of the thing specified when you create a thing. You cannot edit the description when you create or update the thing hierarchy.
ParentThingID	String	255	Unique identifier of the parent thing generated by the system during creation of a thing.
ParentThingName	String	255	Name of the parent thing specified when you create a thing. You cannot edit the name when you create or update the thing hierarchy.
ParentThingDescription	String	60	Description of the parent thing. You cannot edit the description when you create or update the thing hierarchy.
Description	String	255	Description of the thing hierarchy element

Parameter	Data Type	Maximum Length	Description
Operation	String	6	Operation to be performed on the thing hierarchy element. The supported operations are 'add' and 'delete' performed on the thing hierarchy element during PATCH request.

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Description \[page 1191\]](#)

20.1.2.1 Read Thing Hierarchy Elements

Retrieves thing hierarchy elements for a specific thing ID

With this service, you can view all hierarchies to which a specific thing is associated. To retrieve the information, you must use `$filter` on thing ID and `$expand` on thing hierarchy ID. In addition, you can also retrieve the immediate child nodes of a thing in a specific hierarchy using `$filter` on parent thing ID and thing hierarchy ID.

Request

URI: `/v1/ThingHierarchyElements?$filter=ThingID eq ('<thing ID>') & $expand=ThingHierarchy&$format=json`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<ths>.r`

Request Parameters

Parameter	Required	Data Type	Description
thingID	Yes	string	Unique thing identifier

Request Example

```
/ThingHierarchy/v1/ThingHierarchyElements?$filter=ThingID eq
'9EFAEFDB3F794ED0BE6ADD668D90169E'&$expand=ThingHierarchy&$format=json
```

Retrieves all hierarchies for a specific thing

```
/ThingHierarchy/v1/ThingHierarchyElements?$filter=ParentThingID eq  
'965B8AB45F624848BDEBD4837D093945' and HierarchyID eq  
'582E459DA7647F2CE200229BE0434C65'&$format=json
```

Retrieves immediate child nodes for a thing in a specific thing hierarchy

Request Query Parameters

Parameter	Required	Data Type	Description
\$expand	Yes	string	Includes the related resources inline while retrieving the requested resources.
\$filter	Yes	string	Filter condition to be applied; all fields in the result set are valid. It is mandatory to specify thing ID or parent thing ID in the filter condition. If you specify thing ID, \$expand is mandatory.
\$format	No		Format to be applied on the result set.

Response

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

Response Status and Error Codes

Code	Description
200	Thing hierarchy retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

All hierarchies for a thing

Request:

```
/ThingHierarchy/v1/ThingHierarchyElements?$filter=ThingID eq  
'9EFAEFDB3F794ED0BE6ADD668D90169E'&$expand=ThingHierarchy&$format=json
```

Response:

```
{
```

```

    "d": {
      "results": [
        {
          "_metadata": {
            "id": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='9E
FAEFDB3F794ED0BE6ADD668D90169E')",
            "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='9E
FAEFDB3F794ED0BE6ADD668D90169E')",
            "type": "com.sap.apiot.ThingHierarchyElement"
          },
          "HierarchyID": "582E459DA7647F2CE200229BE0434C65",
          "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
          "ThingName": "Car-XYZ-Engine",
          "ThingDescription": "Engine of Car-XYZ",
          "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
          "ParentThingName": "Car-XYZ",
          "ParentThingDescription": "A car of XYZ series",
          "Description": "Desccribes hierarchy of units in the carXYZ",
          "Operation": null,
          "ThingType": "core.automobiles:ABC2Series",
          "ThingTypeDescription": "ABC2Series electric car",
          "ThingHierarchy": {
            "HierarchyID": "582E459DA7647F2CE200229BE0434C65",
            "Name": "Car_XYZ_Hierarchy",
            "Description": "Desccribes hierarchy of units in the carXYZ",
            "ExternalID": "CarXYZ-Hierarchy",
            "RootThingID": "965B8AB45F624848BDEBD4837D093945"
          }
        },
        {
          "_metadata": {
            "id": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='582E4688A7647F2CE200229BE0434C65',ThingID='9E
FAEFDB3F794ED0BE6ADD668D90169E')",
            "uri": "https://apiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='582E4688A7647F2CE200229BE0434C65',ThingID='9E
FAEFDB3F794ED0BE6ADD668D90169E')",
            "type": "com.sap.apiot.ThingHierarchyElement"
          },
          "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
          "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
          "ThingName": "Car-XYZ-Engine",
          "ThingDescription": "Engine of Car-XYZ",
          "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
          "ParentThingName": "Car-XYZ",
          "ParentThingDescription": "A car of XYZ series",
          "Description": "Desccribes hierarchy of units in the carXYZ",
          "Operation": null,
          "ThingType": "core.automobiles:ABC2Series",
          "ThingTypeDescription": "ABC2Series electric car",
          "ThingHierarchy": {
            "HierarchyID": "582E4688A7647F2CE200229BE0434C65",
            "Name": "Car_XYZ_Hierarchy",
            "Description": "Desccribes hierarchy of units in the carXYZ",
            "ExternalID": "CarXYZ-Hierarchy",
            "RootThingID": "965B8AB45F624848BDEBD4837D093945"
          }
        }
      ]
    }
  }
}

```

View immediate child nodes of a thing in a specific thing hierarchy

Request: /ThingHierarchy/v1/ThingHierarchyElements?\$filter=ParentThingID eq '965B8AB45F624848BDEBD4837D093945' and HierarchyID eq '582E459DA7647F2CE200229BE0434C65'&\$format=json

Response:

```
{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://appiot-thing-hierarchy-ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='9EFAEFDB3F794ED0BE6ADD668D90169E')",
          "uri": "https://appiot-thing-hierarchy-ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='9EFAEFDB3F794ED0BE6ADD668D90169E')",
          "type": "com.sap.appiot.ThingHierarchyElement"
        },
        "HierarchyID": "582E459DA7647F2CE200229BE0434C65",
        "ThingID": "9EFAEFDB3F794ED0BE6ADD668D90169E",
        "ThingName": "Car-XYZ-Engine",
        "ThingDescription": "Engine of Car-XYZ",
        "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
        "ParentThingName": "Car-XYZ",
        "ParentThingDescription": "A car of XYZ series",
        "Description": "Describes hierarchy of units in the carXYZ",
        "Operation": null,
        "ThingType": "core.automobiles:ABC2Series",
        "ThingTypeDescription": "ABC2Series electric car",
        "ThingHierarchy": {
          "_deferred": {
            "uri": "https://appiot-thing-hierarchy-ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='9EFAEFDB3F794ED0BE6ADD668D90169E')/ThingHierarchy"
          }
        }
      },
      {
        "_metadata": {
          "id": "https://appiot-thing-hierarchy-ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='88E2BA6E7512439E9A771EE626AB25A2')",
          "uri": "https://appiot-thing-hierarchy-ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='88E2BA6E7512439E9A771EE626AB25A2')",
          "type": "com.sap.appiot.ThingHierarchyElement"
        },
        "HierarchyID": "582E459DA7647F2CE200229BE0434C65",
        "ThingID": "88E2BA6E7512439E9A771EE626AB25A2",
        "ThingName": "Car-XYZ-ControlUnit",
        "ThingDescription": "ControlUnit of Car-XYZ",
        "ParentThingID": "965B8AB45F624848BDEBD4837D093945",
        "ParentThingName": "Car-XYZ",
        "ParentThingDescription": "A car of XYZ series",
        "Description": "Describes hierarchy of units in the carXYZ",
        "Operation": null,
        "ThingType": "core.automobiles:ABC2Series",
        "ThingTypeDescription": "ABC2Series electric car",
        "ThingHierarchy": {

```

```

      "_deferred": {
        "uri": "https://appiot-thing-hierarchy-
ci.cfapps.staging.sic.ondemand.com:443/ThingHierarchy/v1/
ThingHierarchyElements(HierarchyID='582E459DA7647F2CE200229BE0434C65',ThingID='88
E2BA6E7512439E9A771EE626AB25A2')/ThingHierarchy"
      }
    }
  ]
}

```

Related Information

[Thing Hierarchy Element \[page 1185\]](#)

20.1.3 Thing Hierarchy Description

Represents a thing hierarchy description

Resource Path: `http://<server address>[:<port number>]/ThingHierarchy/v1/ThingHierarchies?$expand=ThingHierarchyDescriptions`

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Thing Hierarchy [page 1168]	/v1/ThingHierarchies? \$expand=ThingHierarchyDescriptions

Thing Hierarchy Description Properties

Parameter	Data Type	Maximum Length	Description
LanguageCode	String	2	ISO code of the language of the Thing Hierarchy Description

Parameter	Data Type	Maximum Length	Description
Description	String	255	Description of the thing hierarchy.

i Note
The text provided in the **Description** field of the **Thing Hierarchy** entity is ignored and it is replaced with the text provided in this field.

Related Information

[Thing Hierarchy \[page 1158\]](#)

[Thing Hierarchy Element \[page 1185\]](#)

20.2 Read Version Information of Thing Hierarchy Service

This service is used to retrieve the version information of the thing hierarchy service.

Request

URI: `/ThingHierarchy/Monitor/Version`

Operation Type: CRUD | Action | Function

HTTP Method: `GET`

Permissions: `<ths>.r`

Request Example

`/ThingHierarchy/Monitor/Version`

Response

Response Status and Error Codes

Code	Description
200	Version information retrieved successfully.

Payload

Format: [JSON](#)

Only media type JSON is supported. The JSON for this method has the following structure:

```
{
  "d": {
    "results": [{
      "_metadata": {
        "id": "http://localhost:8183/ThingHierarchy/Monitor/Version('1.2.0-SNAPSHOT')",
        "uri": "http://localhost:8183/ThingHierarchy/Monitor/Version('1.2.0-SNAPSHOT')",
        "type": "com.sap.apiot.Version"
      },
      "Version": "1.2.0-SNAPSHOT"
    }]
  }
}
```

20.3 HTTP Status Codes for Thing Hierarchy

List of status codes for thing hierarchy

In the following table, you find the list of HTTP status codes that are used by the thing hierarchy services:

POST	GET (Single value)	GET (Collection)	DELETE	Description
201	200	200	204	Success
400	400	400	400	Bad request (for example: wrong filter, validation failed)
403	403	403	403	Forbidden (scope(s) not assigned for the user)
n/a	404	n/a	404	Not found
500	500	500	500	Internal server error

21 Event Services

Events are used to monitor and control any changes in the system that can possibly compromise safety measures and risks. You can use the event configuration service to configure event types and create events for those event types.

Types of Events

Events can be of different types:

- Standard events: All events are mutable. (deprecated as of May 2020)
- User-defined events: Events are mutable or immutable based on the state defined for the event type.
 - /v1 version: You can create events for event type with only one event property set type
 - /v2 version: You can create events for event type with multiple event property set types

The following table describes the state of the user-defined event type and what you can do with the corresponding events:

User-defined Event Type	EventTypeState	Events
core.automobiles:ExceededTemperature	Immutable	You cannot delete events created using this event type.
core.automobiles:EXceededPressure	Mutable	You can delete events created using this event type.

Mutable Events

The following table illustrates the life cycle of standard events:

Method	Action	CorrelationId (user input)	Time	EventId	CorrelationId (system generated)
POST	Create		10:00:00	E1	ABCD
POST	Update	ABCD	10:02:00	E1	ABCD
POST	Create	XYZ	10:04:00	E2	XYZ
POST	Update	XYZ	10:06:00	E2	XYZ
POST	Update	XYZ	10:08:00	E2	XYZ

Note

- Event **E1** is the latest event and the only accessible event with the correlation ID **ABCD**.
- Event **E2** is the latest event and the only accessible event with the correlation ID **XYZ**.

Immutable Events

The following table illustrates the life cycle of predefined events:

Method	Action	CorrelationId (user input)	Time	EventId	CorrelationId (system generated)
POST	Create		10:00:00	E1	ABCD
POST	Update	ABCD	10:02:00	E2	ABCD
POST	Update	ABCD	10:04:00	E3	ABCD
POST	Create		10:06:00	E4	XYZ
POST	Update	XYZ	10:08:00	E5	XYZ
POST	Create	PQRS	10:10:00	E6	PQRS

Note

Group of events for a specific correlation ID is used to understand the sequence of changes in the event for a specific event type.

- Events **E1**, **E2**, and **E3** are accessible with the correlation ID **ABCD**.
- Events **E4** and **E5** are accessible with the correlation ID **XYZ**.
- Event **E6** is accessible with the correlation ID **PQRS**.

Related Information

[Actions \[page 753\]](#)

[Rule Services \[page 1022\]](#)

[Segment Service \[page 1121\]](#)

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

[User-defined Events \(/v1 version\) \[page 1211\]](#)

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.1 Standard or Predefined Events (Deprecated)

Important: This service to create standard events of predefined type (`com.sap.apiot.eventtypes:StandardEventType`) is now deprecated. Instead, you can use the OData-based event service to create standard or predefined events explained in this topic – [Create and Update Events \[page 1214\]](#).

i Note

This service will be decommissioned in August 2021. We recommend you migrate the events as described in the [Migrate Standard or Pre-Defined Events \[page 1285\]](#) topic.

You can use this event service to create only standard events of predefined type (`com.sap.appiot.eventtypes:StandardEventType`) and retrieve a list of events. All standard events are mutable.

In the examples related to the industrial robots or the cars explained in the previous sections, there is information such as pressure, temperature that are constantly sent from things. This information is crucial especially when there are values that exceed a defined threshold.

Events can be constructed such that they have a reference to a Property defined in the package. This is however, not mandatory.

Request

Base URI

- **Formal description:** `http://<server address>[:<port number>][<path>]/Events`
- An example for a base URI in a cloud foundry environment: `https://appiot-mds.cfapps.eu10.hana.ondemand.com/Events`

Methods

HTTP Method	Action	URI	Scopes
POST	Create an Event [page 1197]	<code>/Events</code>	<code><thing>.Event.c</code>
GET	Read an Event [page 1199]	<code>/Events ('<EventID>')</code>	<code><thing>.Event.r</code>
GET	Read all Events [page 1201]	<code>/Events</code>	<code><thing>.Event.r</code>
POST	Update an Event [page 1204]	<code>/Events ('<EventID>')</code>	<code><thing>.Event.u</code>
POST	Update Status for Multiple Events [page 1205]	<code>/Events.SetStatus (newStatus=<status>)</code>	<code><thing>.Event.u</code>
DELETE	Delete an Event [page 1206]	<code>/Events ('<EventID>')</code>	<code><thing>.Event.d</code>
DELETE	Delete all Events [page 1207]	<code>/Events&?filter=<filter> AND _businessTimeStamp <operator> <timestamp></code>	<code><thing>.Event.d</code>
GET	Read Version Information of Event Service [page 1208]	<code>/Version</code>	<code><thing>.Event.r</code>

i Note

`<thing>` refers to the thing application name.

Related Information

[Event Services \[page 1194\]](#)

21.1.1 Create an Event

This service is used to create an event of predefined event type `com.sap.apiot.eventtypes:StandardEventType`.

Request

URI: `/Events`

HTTP Method: *POST*

Permissions:

`<thing>.Event.c`

Request Example

`/Events`

Payload

```
{
  "_businessTimeStamp": "2015-10-29T09:00:00Z",
  "_status": "Open",
  "_type": "Alert",
  "_severity": 1,
  "_source": "Test Source111",
  "_code": "1",
  "_thingId": "965B8AB45F624848BDEBD4837D093945",
  "_thingProperty": "core.automobiles:ABCXSeries/wheel_fr",
  "_description": "Front right wheel worn out",
  "_externalId": "AA2X-EXT"
}
```

Request Properties

Event Object Properties

Property	Type	Mandatory	Maximum Length	Description
_id	string	No	32	Internal identifier for an Event.
_businessTimestamp	string	No	24	Business timestamp corresponding to the event that is created.
_status	string	Yes	50	Status of the event.
				i Note The following are the only supported statuses for standard events: • Open • InProcess • Completed
_severity	integer	No	-	Severity of the event.
				i Note The following are the only supported severities for standard events: • 1 • 2 • 3
_type	string	No	71	Type of the event.
_source	string	No	100	Source of the event.
_code	string	Yes	50	Code for the event.
_thingId	string	Yes	32	Thing ID corresponding to the event created
_thingProperty	string	No	255	Thing property corresponding to the event created
_description	string	No	200	Message text used to describe the event.
_externalId	string	No	255	Event identifier (which is not unique) from an external system. You can create multiple events with the same external ID.
				i Note Only the following characters are supported: • Uppercase and lowercase alphabets <i>a</i> through <i>z</i> and <i>A</i> through <i>Z</i> • Numeric digits <i>0</i> through <i>9</i> • Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
201	Event created successfully

Note

The URL of the event created is returned in the location header of the response.

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.2 Read an Event

This service is used to retrieve the details of a specified event.

Request

URI: `/Events('<Event ID>')`

HTTP Method: [GET](#)

Permissions:

`<thing>.Event.r`

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for an event.

Request Example

```
/Events('<EventID>')
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Event details retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "_id": "<eventID>",
  "_businessTimeStamp": "2015-10-29T09:00:00Z",
  "_status": "Open",
  "_type": "Alert",
  "_severity": 1,
  "_source": "Test Source111",
  "_code": "1",
  "_thingId": "965B8AB45F624848BDEBD4837D093945",
```

```
{
  "_thingProperty": "core.automobiles:ABCXSeries/wheel_fr",
  "_description": "Front right wheel worn out",
  "_externalId": "AA2X-EXT"
}
```

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.3 Read all Events

This service is used to read all the existing events.

Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

To avoid performance decline, the system in future versions will automatically limit collective GET requests to a maximum of 500 objects that can be retrieved with one single call.

Use of `$count` as well degrades performance. Hence, a use of `$count` must also be judiciously chosen.

Therefore, for use cases where it is crucial for you to ensure that objects more than 500 have to be retrieved, you need to use paging options such as `$top` and `$skip`.

Request

URI: `/Events`

HTTP Method: `GET`

Permissions:

`<thing>.Event.r`

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip. If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameters

None

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$count	No	Boolean	Total number of event objects available based on the current user's authorizations; permissible values are true and false. The following results apply, if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of event objects available. • If you use this with \$filter parameter, the result contains the total count of event objects based on the defined filter condition.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are _status, _severity, and _businessTimeStamp. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are _thingId, _thingProperty, _status and _businessTimeStamp. The filter operators supported are eq, lt, gt, le, ge, and ne.

Parameter	Required	Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are _thingId , _thingProperty , _status , and _businessTimeStamp .

Request Example

```
/Events?$filter=_thingProperty eq 'core.automobiles:ABCXSeries/wheel_fr'
```

Retrieves all events where the thing property is `core.automobiles:ABCXSeries/wheel_fr`.

```
/Events?$filter=_thingProperty eq 'core.automobiles:ABCXSeries/wheel_fr'&
$select=_thingProperty, _status
```

Retrieves all events where the thing property is `core.automobiles:ABCXSeries/wheel_fr`. However, with `$select` parameter, only the fields [_thingProperty](#) and [_status](#) are displayed for all the retrieved events.

Response

Format: [JSON](#)

Response Properties

Property	Type	Description
value	Array of event objects	Array of event objects (Based on whether there are filter conditions applied.).

Response Status and Error Codes

Code	Description
200	Events retrieved successfully

Payload

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  value: [
    {
      "_id": "<eventID>",
      "_businessTimeStamp": "2015-10-29T09:00:00Z",
      "_status": "Open",
      "_type": "Alert",
      "_severity": 1,
      "_source": "Test Source111",
      "_code": "1",
    }
  ]
}
```

```

    "_thingId": "965B8AB45F624848BDEBD4837D093945",
    "_thingProperty": "core.automobiles:ABCXSeries/wheel_fr",
    "_description": "Front right wheel worn out",
    "_externalId": "AA2X-EXT"
  },
  {
    "_id": "<eventID2>",
    "_businessTimeStamp": "2015-10-29T09:00:00Z",
    "_status": "In progress",
    "_type": "Alert",
    "_severity": 3,
    "_source": "Test Source111",
    "_code": "1",
    "_thingId": "<thingID>",
    "_thingProperty": "core.automobiles:ABCXSeries/wheel_rr",
    "_description": "Rear right wheel worn out",
    "_externalId": "AA2X-EXT"
  }
]
}

```

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.4 Update an Event

This service is used to update certain attributes associated with an event.

Request

URI: /Events('<Event ID>')

HTTP Method: *POST*

Permissions:

<thing>.Event.u

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for an event.

Request Example

```

{
  "_businessTimeStamp": "2015-10-29T09:00:00Z",
  "_status": "Open",
  "_type": "Alert",

```

```

    "_severity": 2,
    "_source": "Test Source111",
    "_code": "1",
    "_thingId": "<thingID>",
    "_thingProperty": "core.automobiles:ABCXSeries/wheel_fr",
    "_description": "Front right wheel worn out",
    "_externalId": "AA2X-EXT"
  }

```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Attributes of the specified event updated successfully

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.5 Update Status for Multiple Events

This service is used to update the status for multiple events.

Request

URI: `/Events.SetStatus(newStatus=<status>)`

HTTP Method: *POST*

Permissions:

`<thing>.Event.u`

Request Example

```

{
  "events": [{
    "_id": "<EventID1>"
  }, {
    "_id": "<EventID2>"
  }]
}

```

```
}
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Statuses of all events updated successfully.

Response Example

```
200-OK
```

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.6 Delete an Event

This service is used to delete an event with specific event ID. This service supports deletion of standard events of event type `com.sap.appiot.eventtypes:StandardEventType`.

Request

URI: `/Events ('<Event ID>')`

HTTP Method: *DELETE*

Permissions:

`<thing>.Event.d`

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for an event.

Request Example

```
/Events('<EventID>')
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Event deleted successfully

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.7 Delete all Events

This service is used to delete the required events.

Request

URI: /Events?\$filter=<field> <operator> <value> and _businessTimeStamp <operator> <timestamp>

HTTP Method: *DELETE*

Permissions:

<thing>.Event.d

Request Parameters

None

Request Example

```
/Events?$filter=_thingProperty eq 'core.automobiles:ABCXSeries/wheel_fr' and  
_businessTimeStamp lt 2016-01-01T09:01:00Z
```

Query String Parameters

Parameter	Type	Mandatory	Description
\$filter	String	Yes	Filter condition to be applied; valid fields are <i>_businessTimeStamp</i> , <i>_thingId</i> , <i>_status</i> and <i>_thingProperty</i> .

i Note
_businessTimeStamp is a mandatory field.

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Events deleted successfully

i Note

The events that belong to a thing for which you have the capabilities assigned are deleted. Other events that belong to a thing for which you do not have the capabilities assigned are not deleted. Whether the events are deleted or not deleted, the status code displayed is 200.

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.8 Read Version Information of Event Service

This service is used to retrieve the version information of the event service.

Request

URI: */Version*

HTTP Method: *GET*

Permissions:

<thing>.Event.r

Request Example

```
/Version
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	Version information retrieved successfully.

Response Example

Format: [JSON](#)

Only media type [JSON](#) is supported. The [JSON](#) for this method has the following structure:

```
{
  "version" : "1.10"
}
```

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.1.9 HTTP Status Codes for Event Services

List of status codes for Event services

In the following table, you find the list of HTTP status codes that are used by the event services:

Post (Create)	Post (Update)	Put	Delete	Get (single value)	Get (collection)	Description
201	200	200	204	200	200	Success
n/a	404	404	n/a	404	200	No capabilities assigned

Post (Create)	Post (Update)	Put	Delete	Get (single value)	Get (collection)	Description
201	200	200	200	404	200	Read capability not assigned to read a specific thing. However, the user is assigned with the capabilities to perform operations such as create, update, and delete.
404	404	404	404	200	200	Read capability assigned to read a specific thing. However, the user is not assigned with capabilities to perform operations such as create, update, and delete.
n/a	404	404	404	404	n/a	Not found. The requested thing is not found.
403	403	403	403	403	403	Forbidden (scope(s) not assigned for the user)
400	400	400	400	400	400	Bad request (for example: header field missing, wrong filter, validation failed)
500	500	500	500	500	500	Internal server error

Related Information

[Standard or Predefined Events \(Deprecated\) \[page 1195\]](#)

21.2 User-defined Events (/v1 version)

In this section, you will learn about events based on the event type configured using the /v1 version of the event configuration service - [Event Type with Single Event Property Set \[page 525\]](#).

Resource Path: /ES/EventType/<event type name>/v1/Events

Example for a base URI in a cloud foundry environment: `https://events-sap.cfapps.eu10.hana.ondemand.com/ES/EventType/<event type name>/v1/Events`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
GET	Read Metadata for Event of an Event Type [page 1212]	/ES/EventType/<event type name>/v1/\$metadata	<tde>.r
POST	Create and Update Events [page 1214]	/ES/EventType/<event type name>/v1/Events	<tde>.c
GET	Read Events and Event Data [page 1221]	/ES/EventType/<event type name>/v1/Events	<tde>.r
DELETE	Delete an Event [page 1227]	/ES/EventType/<event type name>/v1/Events('<event ID>')	<tde>.d
GET	Read Metadata for Event [page 1228]	/ES/v1/\$metadata	<tde>.r
GET	Read Events [page 1234]	/ES/v1/Events	<tde>.r
GET	Read Event Correlations [page 1239]	/ES/v1/EventCorrelations	<tde>.r
GET	Read Events with a Correlation ID [page 1242]	/ES/v1/EventCorrelations('correlation ID')/Events	<tde>.r
DELETE	Delete an Event Using Correlation ID [page 1246]	/ES/v1/EventCorrelations('correlation ID')	<tde>.d
DELETE	Delete Events [page 1247]	/ES/v1/DeleteEvents?FromTime=datetimeoffset'<timestamp '&ToTime=datetimeoffset'<timestamp '>'&EventType='<event type name>'&ThingId='<unique thing ID>'	<tde>.d

Related Information

[Event Configuration \[page 522\]](#)

21.2.1 Read Metadata for Event of an Event Type

With this service, you can retrieve metadata for event that belongs to a specific event type.

Request

URI: /ES/EventType/<event type name>/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
event type name	Yes	String	Unique name of the event type with single event property set type	Path

Request Example

/ES/EventType/core.automobiles:ExceededTemperature/v1/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

Format: [XML](#)

Example 1

/ES/EventType/core.automobiles:ExceededTemperature/v1/\$metadata

```
<EntityType Name="DYN_ENT_core_automobiles__ExceededTemperatures">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String"></Property>
  <Property Name="eventData.Temperature" Type="Edm.String"></
Property>
  </EntityType>
  <EntityType Name="Events">
    <Key>
      <PropertyRef Name="EventId"></PropertyRef>
    </Key>
    <Property Name="EventId" Type="Edm.String" Nullable="false"></
Property>
    <Property Name="CorrelationId" Type="Edm.String"></Property>
    <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
    <Property Name="Type" Type="Edm.String"></Property>
    <Property Name="EventType" Type="Edm.String"></Property>
    <Property Name="EventStatus" Type="Edm.String"></Property>
    <Property Name="EventSeverity" Type="Edm.Int64"></Property>
    <Property Name="EventCode" Type="Edm.String"></Property>
    <Property Name="EventSource" Type="Edm.String"></Property>
    <Property Name="ThingId" Type="Edm.String"></Property>
    <Property Name="ThingProperty" Type="Edm.String"></Property>
    <Property Name="ExternalId" Type="Edm.String"></Property>
    <Property Name="EventInfo" Type="Edm.String"></Property>
    <NavigationProperty
Name="DYN_ENT_core_automobiles__ExceededTemperatures"
Relationship="com.sap.apptot.es.DYN_ENT_core_automobiles__ExceededTemperatures"
FromRole="EventEntities"
ToRole="DYN_ENT_core_automobiles__ExceededTemperatureEntities"></
NavigationProperty>
  </EntityType>
  <Association Name="DYN_ENT_core_automobiles__ExceededTemperatures">
    <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="EventEntities"></End>
    <End
Type="com.sap.apptot.es.DYN_ENT_core_automobiles__ExceededTemperature"
Multiplicity="1" Role="DYN_ENT_core_automobiles__ExceededTemperatureEntities"></
End>
  </Association>
  <EntityContainer Name="UnifiedEventsEventType"
m:IsDefaultEntityContainer="true">
    <EntitySet Name="DYN_ENT_core_automobiles__ExceededTemperatures"
EntityType="com.sap.apptot.es.DYN_ENT_core_automobiles__ExceededTemperature"></
EntitySet>
    <EntitySet Name="Events" EntityType="com.sap.apptot.es.Event"></
EntitySet>
    <AssociationSet
Name="DYN_ENT_core_automobiles__ExceededTemperatures"
Association="com.sap.apptot.es.DYN_ENT_core_automobiles__ExceededTemperatures">
      <End EntitySet="Events" Role="EventEntities"></End>
    <End
EntitySet="DYN_ENT_core_automobiles__ExceededTemperatures"
Role="DYN_ENT_core_automobiles__ExceededTemperatureEntities"></End>
    </AssociationSet>
  </EntityContainer>
```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.2 Create and Update Events

With this method, you can create and update standard events or user-defined events along with the event data.

It's mandatory to specify a valid event type (user-defined or standard event type) name in the request URL. The service creates an event only for the event type name specified in the request URL. If the event type names specified in the request URL and the request payload are different, the service displays an error message and no event is created. For example, the following are the request URLs to create different kinds of events:

- `/ES/EventType/core.automobiles:ExceededTemperature/v1/Events`
 - Along with a relevant request payload, you can create events of user-defined event type `core.automobiles:ExceededTemperature`
- `/ES/EventType/com.sap.apptot.eventtypes:StandardEventType/v1/Events` Or `/ES/EventType/<randomtext>/Events`
 - Along with a relevant request payload, you can create standard events of predefined event type `com.sap.apptot.eventtypes:StandardEventType`

i Note

The events of event type `com.sap.apptot.eventtypes:StandardEventType` were deprecated in May 2020 and the same will be decommissioned in August 2021. We recommend you migrate the events as described in the [Migrate Standard or Pre-Defined Events \[page 1285\]](#) topic.

All events are associated with a correlation ID. The correlation ID is used to group all related events and define the life cycle of an event. The correlation ID is an optional field. Multiple events can share the same correlation ID. However, events belonging to different event types cannot use the same correlation ID.

i Note

- The `POST` method supports both creation of a new event and update of an existing event.
- When you specify the correlation ID in the request payload of a `POST` method, the system validates the correlation ID and performs the following:
 - If an immutable event already exists with the correlation ID and you are creating an immutable event, the system creates a new event with a unique event ID and assigns the specified correlation ID.
 - If a mutable event already exists with the correlation ID and you are creating a mutable event, the system updates the existing event with new values for the fields provided in the request payload. After this update, you cannot access the original event that is updated.
 - If an event does not exist with the correlation ID and you are creating a mutable or immutable event, the system creates a new event with a unique event ID and assigns the specified correlation ID.
- When you do not specify the correlation ID in the request payload of a `POST` method, the system creates new event with unique event ID and generates a unique 32-bit GUID as correlation ID.

When you create an event, the fields [EventStatus](#) and [EventSeverity](#) are mandatory. However, if you have not defined enumeration values for these fields while creating the event type configuration, you can assign any free text for these fields. If you have defined enumeration values for these fields while creating the event type configuration, you can assign only the defined values for these fields.

Request

URI: /ES/EventType/<event type name>/v1/Events

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <td>.c

Request Header Parameters

Header	Required	Description
write-to-kafka	No	Supported values are true or false By default, the events are stored in HANA database and pushed to Kafka. If you do not want the service to push the event to Kafka, set value of this parameter as false .

Request Parameters

Parameter	Required	Data Type	Description
EventType	Yes	String	Unique name of the event type

Event Object Properties

Property	Type	Mandatory	Maximum Length	Description
CorrelationId	String	No	32	Unique identifier to group all related events
BusinessTimestamp	String	Yes	24	Business timestamp corresponding to the event that is created
Type	String	No	81	Additional information about the event
EventType	String	No		User-defined event type name

Property	Type	Mandatory	Maximum Length	Description
EventStatus	String	Yes	50	Status of the event i Note The following are the only supported statuses for standard events: • Open • InProcess • Completed
EventSeverity	Integer	Yes		Severity of the event i Note The following are the only supported severities for standard events: • 1 • 2 • 3
EventCode	String	No	50	Code of the event
EventSource	String	No	100	Source of the event
ThingId	String	Yes		Unique identification of a thing for which an event is created
ThingProperty	String	No	255	Property of a thing for which the event is created → Recommendation We recommend that you specify <thing type name>/<property set ID>. For example, you can specify <code>core.automobiles:ABC2Series/wheel_rr</code>.

Property	Type	Mandatory	Maximum Length	Description
ExternalId	String	No	255	Event identifier (which is not unique) from an external system. You can create multiple events with the same external ID.
				i Note Only the following characters are supported: • Uppercase and lowercase alphabets a through z and A through Z • Numeric digits 0 through 9 • Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)
EventInfo	String	No	200	Free text to provide additional information about the event.

Payload

Format: *JSON*

Media types *JSON* and *XML* are supported. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

The following request URL, along with the payload, creates an event of user-defined event type `core.automobiles:ExceededTemperature` along with the event data.

`/ES/EventType/core.automobiles:ExceededTemperature/v1/Events`

```
{
  "BusinessTimestamp": "2015-08-01T09:00:00Z",
  "Type": "Alert",
  "EventType": "core.automobiles:ExceededTemperature",
```

```

    "EventInfo": "Alert on temperature",
    "EventStatus": "Open",
    "EventSeverity": 1,
    "EventCode": null,
    "EventSource": null,
    "ThingId": "4D622E3DA6A14C4D87CDEC935B000001",
    "ThingProperty": "Engine Temperature",
    "ExternalId": "SampleEvent",
    "DYN_ENT_com_sap_automobiles__TemperatureEventPST": {
      "Temperatrure": "104.0"
    }
  }
}

```

Example 2

The following request URL, along with the payload, creates a standard event of predefined event type `com.sap.appiot.eventtypes:StandardEventType` along with the event data.

`/ES/EventType/com.sap.appiot.eventtypes:StandardEventType/v1/Events`

```

{
  "BusinessTimestamp": "2015-08-01T09:00:00Z",
  "Type": "Alert",
  "EventInfo": "Alert on engine temperature",
  "EventStatus": "Open",
  "EventSeverity": 1,
  "EventCode": null,
  "EventSource": null,
  "ThingId": "4D622E3DA6A14C4D87CDEC935B000001",
  "ThingProperty": "Engine Temperature",
  "ExternalId": "SampleEvent"
}

```

Response

Response Status and Error Codes

Code	Description
201	Event created successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#) along with the event. The [JSON](#) for this method has the structure as illustrated in the following examples.

The following is the response payload after creating an event of user-defined event type `core.automobiles:ExceededTemperature`.

```

{
  "d": {
    "__metadata": {

```



```

      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/
EventType/core.automobiles:ExceededTemperature/v1/
Events('F392018DE4D54CCFB5FEC72672D4310B')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/
EventType/core.automobiles:ExceededTemperature/v1/
Events('F392018DE4D54CCFB5FEC72672D4310B')",
      "type": "com.sap.apptot.es.Events"
    },
    "EventId": "F392018DE4D54CCFB5FEC72672D4310B",
    "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
    "BusinessTimestamp": "/Date(1438419600000)/",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededTemperature",
    "EventInfo": "Alert on temperature",
    "EventStatus": "Open",
    "EventSeverity": "1",
    "EventCode": null,
    "EventSource": null,
    "ThingId": "4D622E3DA6A14C4D87CDEC935B000001",
    "ThingProperty": "Engine temperature",
    "ExternalId": "SampleEvent",
    "DYN_ENT_com_sap_automobiles__TemperatureEventPSTs": {
      "deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('F392018DE4D54CCFB5FEC72672D4310B')/
DYN_ENT_com_sap_automobiles__TemperatureEventPSTs"
      }
    }
  }
}

```

Payload Validation

The payload is validated before updating the data in the database. An appropriate error message is displayed to correct the payload for the event data.

Header: sap-iot-strong-validations

Value: TRUE

The following table describes the payload validations for the different value data types:

Data Types	Action
<i>LargeString</i> , <i>JSON</i> , and <i>ByteArray</i> along with invalid property names	Always validated by default (regardless of the current setting of sap-iot-strong-validations).
<i>String</i> , <i>Numeric</i> , <i>Boolean</i> , <i>ThingID</i> , <i>BPID</i> , <i>Timestamp</i> , <i>DateTime</i> , and <i>Date</i> , along with <i>JSON</i> , <i>ByteArray</i> along with invalid property names	Validated only if the header parameter sap-iot-strong-validations is set to TRUE in the request.

Note

SAP IoT supports three different date time formats - *Date*, *TimeStamp*, and *DateTime*. If the header parameter sap-iot-strong-validations is set to FALSE, the value for the property of these data types is not validated for the supported date time format. For example, for a property of data type Date, the

service allows you to specify the value in *TimeStamp* format. However, while retrieving the data, the service displays the data in the correct format of the data type, that is *Date*.

The following is an example of invalid payload:

```
{
  "BusinessTimestamp": "2015-08-01T09:00:00Z",
  "Type": "Alert",
  "EventType": "core.automobiles:ExceededSpeed",
  "EventInfo": "Alert on speed",
  "EventStatus": "Open",
  "EventSeverity": 1,
  "EventCode": null,
  "EventSource": null,
  "ThingId": "4D622E3DA6A14C4D87CDEC935B000001",
  "ThingProperty": "Engine Speed",
  "ExternalId": "SampleEvent",
  "DYN_ENT_com_sap_automobiles__SpeedEventPST": {
    "Speed": "Fast"
  }
}
```

Response Status and Error Codes

Code	Description
400	Bad request

Response Example

```
{
  "error": {
    "code": null,
    "message": {
      "lang": "en",
      "value": "{ \"messages\": { \"appiot.invalidNumeric\": \"Invalid value 'Fast' for property Speed of type Numeric.\" }, \"correlationId\": \"0af05cba-11c7-473c-4a85-032e4e9608b5\" }"
    }
  }
}
```

The following is an example of valid payload:

Request Example

```
{
  "BusinessTimestamp": "2015-08-01T09:00:00Z",
  "Type": "Alert",
  "EventType": "core.automobiles:ExceededSpeed",
  "EventInfo": "Alert on speed",
  "EventStatus": "Open",
  "EventSeverity": 1,
  "EventCode": null,
  "EventSource": null,
  "ThingId": "4D622E3DA6A14C4D87CDEC935B000001",
  "ThingProperty": "Engine Speed",
  "ExternalId": "SampleEvent",
  "DYN_ENT_com_sap_automobiles__SpeedEventPST": {
    "Speed": "340"
  }
}
```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.3 Read Events and Event Data

With this method you can retrieve all events that belong to a specific event type. The response payload includes event data as well.

In addition, you can retrieve a subset of all events, according to the filter criteria provided. For a collective request for a set of events, you have these options:

- You can restrict the set of events to be retrieved by filter criteria based on all fields available in the response.
- You can define that the set of matching events shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/EventType/<event type name>/v1/Events`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<tde>.r`

Request Parameters

Parameter	Required	Data Type	Description
EventType	Yes	String	Name of the event type • Specify the user-defined event type name to retrieve events of user-defined event type • Specify <code>com.sap.apptot.eventtypes:StandardEventType</code> to retrieve standard events

Query Request Parameters

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set.
\$skip	Integer	No	Number of records to exclude from the result set.
\$inlinecount	String	No	Total number of events available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. - If you use this with <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are EventId, CorrelationId, BusinessTimestamp, EventType, EventStatus, EventSeverity, EventCode, ThingId, ThingProperty, and ExternalId. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are EventId, CorrelationId, BusinessTimestamp, EventType, EventStatus, EventSeverity, EventCode, ThingId, ThingProperty, and ExternalId.

Parameter	Type	Required	Description
\$filter	String	No	Filter condition to be applied; valid fields are EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .

Request Example

```
/ES/EventType/core.automobiles:ExceededTemperature/v1/Events
```

Retrieves all events of user-defined event type `core.automobiles:ExceededTemperature`

```
/ES/EventType/com.sap.apptot.eventtypes:StandardEventType/v1/Events
```

Retrieves all events of pre-defined event type `com.sap.apptot.eventtypes:StandardEventType`

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Media types *JSON* and *XML* are supported. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

```
/ES/EventType/core.automobiles:ExceededTemperature/v1/Events
```

Retrieves static data along with dynamic data for all events of user-defined event type `core.automobiles:ExceededTemperature`

```
{
  "d": {
    "results": [{
      "metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededTemperature/v1/Events('10A1FA6AA5C64812B24B7280E1E40FEE')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededTemperature/v1/Events('10A1FA6AA5C64812B24B7280E1E40FEE')",

```

```

        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "F392018DE4D54CCFB5FEC72672D4310B",
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
      "BusinessTimestamp": "2018-08-01T09:00:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:ExceededTemperature",
      "EventInfo": "Alert on temperature",
      "EventStatus": "Open",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": "",
      "ThingId": "001906DB14B54326A5FA0C56BD53212D",
      "ThingProperty": "Engine temperature",
      "ExternalId": "SampleEvent",
      "DYN_ENT_core_automobiles__Engines": {
        "__deferred": {
          "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededTemperature/v1/
Events('10A1FA6AA5C64812B24B7280E1E40FEE')/DYN_ENT_core_automobiles__Engines"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('E2B6A783639D4DEB96B744CCD3C8652C')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('E2B6A783639D4DEB96B744CCD3C8652C')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "E2B6A783639D4DEB96B744CCD3C8652C",
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
      "BusinessTimestamp": "2018-08-01T09:00:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:ExceededTemperature",
      "EventInfo": "Alert on temperature",
      "EventStatus": "InProgress",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": "",
      "ThingId": "001906DB14B54326A5FA0C56BD53212D",
      "ThingProperty": "Engine temperature",
      "ExternalId": "SampleEvent",
      "DYN_ENT_core_automobiles__Engines": {
        "__deferred": {
          "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededTemperature/v1/
Events('E2B6A783639D4DEB96B744CCD3C8652C')/DYN_ENT_core_automobiles__Engines"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "F2A5A34034CE4B0DB2BCD10DD30F07C2",
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",

```

```

        "BusinessTimestamp": "2018-08-01T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededTemperature",
        "EventInfo": "Alert on temperature",
        "EventStatus": "Completed",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": "",
        "ThingId": "001906DB14B54326A5FA0C56BD53212D",
        "ThingProperty": "Engine temperature",
        "ExternalId": "SampleEvent",
        "DYN_ENT_core_automobiles__Engines": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededTemperature/v1/
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')/DYN_ENT_core_automobiles__Engines"
            }
        }
    }
}
]
}
}

```

Example 2

```

/ES/EventType/core.bbautomobiles:ExceededTemperature/v1/Events?
$expand=DYN_ENT_core_automobiles__Engines

```

Retrieves all events of user-defined event type `core.automobiles:ExceededTemperature` along with details of dynamic properties of the event property set type assigned to the user-defined event type.

```

{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('10A1FA6AA5C64812B24B7280E1E40FEE')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('10A1FA6AA5C64812B24B7280E1E40FEE')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "F392018DE4D54CCFB5FEC72672D4310B",
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
      "BusinessTimestamp": "2018-08-01T09:00:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:ExceededTemperature",
      "EventInfo": "Alert on temperature",
      "EventStatus": "Open",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": null,
      "ThingId": "001906DB14B54326A5FA0C56BD53212D",
      "ThingProperty": "Engine temperature",
      "ExternalId": "SampleEvent",
      "DYN_ENT_core_automobiles__Engines": {
        "EventId": "10A1FA6AA5C64812B24B7280E1E40FEE",
        "eventData.Speed2": 0,
        "eventData.Temperature": "104.0"
      }
    }],
    {
      "__metadata": {

```

```

        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('E2B6A783639D4DEB96B744CCD3C8652C')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('E2B6A783639D4DEB96B744CCD3C8652C')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "E2B6A783639D4DEB96B744CCD3C8652C",
    "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
    "BusinessTimestamp": "2018-08-01T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededTemperature",
    "EventInfo": "Alert on temperature",
    "EventStatus": "Open",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "001906DB14B54326A5FA0C56BD53212D",
    "ThingProperty": "Engine temperature",
    "ExternalId": "SampleEvent",
    "DYN_ENT_core_automobiles__Engines": {
        "EventId": "E2B6A783639D4DEB96B744CCD3C8652C",
        "eventData.Speed2": 0,
        "eventData.Temperature": "104.0"
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededTemperature/v1/
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "F2A5A34034CE4B0DB2BCD10DD30F07C2",
    "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
    "BusinessTimestamp": "2018-08-01T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededTemperature",
    "EventInfo": "Alert on temperature",
    "EventStatus": "Open",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "001906DB14B54326A5FA0C56BD53212D",
    "ThingProperty": "Engine temperature",
    "ExternalId": "SampleEvent",
    "DYN_ENT_core_automobiles__Engines": {
        "EventId": "F2A5A34034CE4B0DB2BCD10DD30F07C2",
        "eventData.Speed2": 0,
        "eventData.Temperature": "104.0"
    }
}
]
}
}

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.4 Delete an Event

With this method, you can delete an event with the specific event ID.

Note

You can only delete mutable events and standard events. The service does not allow you to delete immutable events.

Request

URI: `/ES/EventType/<event type name>/v1/Events('<event ID>')`

Operation Type: CRUD

HTTP Method: `DELETE`

Permissions: `<td>.d`

Request Parameters

Parameter	Required	Data Type	Description
EventType	Yes	String	Unique name of the event type
EventId	Yes	String	Unique identifier of the event

Request Example

```
/ES/EventType/core.automobiles:ExceededTemperature/v1/  
Events('F2A5A34034CE4B0DB2BCD10DD30F07C2')
```

Deletes the event with the ID `F2A5A34034CE4B0DB2BCD10DD30F07C2` that belongs to the event type `core.automobiles:ExceededTempeprature`

Response

Response Status and Error Codes

Code	Description
204	Event deleted successfully

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.5 Read Metadata for Event

Retrieves metadata for events

With this service, you can retrieve metadata for events.

Request

URI: /ES/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

None

Request Example

/ES/v1/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

Format: [XML](#)

Example 1

/ES/v1/\$metadata

```
<EntityType Name="Properties">
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
    <PropertyRef Name="PropertySetType"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
```

```

        <Property Name="Type" Type="Edm.String"></Property>
        <Property Name="PropertyLength" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.applot.es.Property_Description" FromRole="Properties"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Descriptions">
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String">
            <Documentation>
                <LongDescription>Language Code</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String">
            <Documentation>
                <LongDescription>Description</LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <EntityType Name="EventPropertySetTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="DataCategory" Type="Edm.String"></Property>
        <Property Name="Language" Type="Edm.String"></Property>
        <Property Name="PropertySetTypeDescription" Type="Edm.String"></
Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.applot.es.EventPropertySetType_Property"
FromRole="EventPropertySetTypes" ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.applot.es.EventPropertySetType_Description"
FromRole="EventPropertySetTypes" ToRole="Descriptions"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.applot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="Status">
        <Key>
            <PropertyRef Name="EventStatus"></PropertyRef>
        </Key>
        <Property Name="EventStatus" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.applot.es.Status_Description" FromRole="Statuses"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="PropertySetId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <Property Name="EventTypeState" Type="Edm.String"></Property>

```

```

        <NavigationProperty Name="PropertySetDescriptions"
Relationship="com.sap.apptot.es.EventType_PropertySetDescription"
FromRole="EventTypes" ToRole="PropertySetDescriptions"></NavigationProperty>
        <NavigationProperty Name="Statuses"
Relationship="com.sap.apptot.es.EventType_Status" FromRole="EventTypes"
ToRole="Statuses"></NavigationProperty>
        <NavigationProperty Name="Severities"
Relationship="com.sap.apptot.es.EventType_Severity" FromRole="EventTypes"
ToRole="Severities"></NavigationProperty>
        <NavigationProperty Name="Codes"
Relationship="com.sap.apptot.es.EventType_Code" FromRole="EventTypes"
ToRole="Codes"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.EventType_Description" FromRole="EventTypes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Severity">
        <Key>
            <PropertyRef Name="EventSeverity"></PropertyRef>
        </Key>
        <Property Name="EventSeverity" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Severity_Description" FromRole="Severities"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Annotations">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
            <Documentation>
                <LongDescription>Name of Annotation</LongDescription>
            </Documentation>
        </Property>
        <Property Name="PackageName" Type="Edm.String" Nullable="true"
MaxLength="50" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <LongDescription>Package Name</LongDescription>
            </Documentation>
        </Property>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventCorrelations">
        <Key>
            <PropertyRef Name="CorrelationId"></PropertyRef>
        </Key>
        <Property Name="CorrelationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Event Correlation ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
        <NavigationProperty Name="Events"
Relationship="com.sap.apptot.es.EventCorrelation_Event"
FromRole="EventCorrelations" ToRole="Events"></NavigationProperty>
    </EntityType>
    <EntityType Name="PropertySetDescriptions">
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String" Nullable="false">
            <Documentation>

```

```

        <LongDescription>Language Code</LongDescription>
    </Documentation>
</Property>
<Property Name="Description" Type="Edm.String">
    <Documentation>
        <LongDescription>Description</LongDescription>
    </Documentation>
</Property>
</EntityType>
<EntityType Name="Events">
    <Key>
        <PropertyRef Name="EventId"></PropertyRef>
    </Key>
    <Property Name="EventId" Type="Edm.String" Nullable="false">
        <Documentation>
            <LongDescription>Event unique ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="CorrelationId" Type="Edm.String">
        <Documentation>
            <LongDescription>Event Correlation ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
    <Property Name="Type" Type="Edm.String"></Property>
    <Property Name="EventType" Type="Edm.String"></Property>
    <Property Name="EventStatus" Type="Edm.String"></Property>
    <Property Name="EventSeverity" Type="Edm.Int64"></Property>
    <Property Name="EventCode" Type="Edm.String"></Property>
    <Property Name="EventSource" Type="Edm.String"></Property>
    <Property Name="ThingId" Type="Edm.String"></Property>
    <Property Name="ThingProperty" Type="Edm.String"></Property>
    <Property Name="ExternalId" Type="Edm.String"></Property>
    <Property Name="EventInfo" Type="Edm.String"></Property>
</EntityType>
<EntityType Name="Codes">
    <Key>
        <PropertyRef Name="EventCode"></PropertyRef>
    </Key>
    <Property Name="EventCode" Type="Edm.String"></Property>
    <Property Name="LanguageCode" Type="Edm.String"></Property>
    <Property Name="Description" Type="Edm.String"></Property>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Code_Description" FromRole="Codes"
ToRole="Descriptions"></NavigationProperty>
</EntityType>
    <Association Name="EventPropertySetType_Description">
        <End Type="com.sap.apptot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.apptot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Property_Description">
        <End Type="com.sap.apptot.es.Property" Multiplicity="1"
Role="Properties"></End>
        <End Type="com.sap.apptot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_PropertySetDescription">
        <End Type="com.sap.apptot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.apptot.es.PropertySetDescription"
Multiplicity="*" Role="PropertySetDescriptions"></End>
    </Association>
    <Association Name="EventType_Severity">
        <End Type="com.sap.apptot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>

```

```

        <End Type="com.sap.appiot.es.Severity" Multiplicity="*"
Role="Severities"></End>
    </Association>
    <Association Name="EventType_Status">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Status" Multiplicity="*"
Role="Statuses"></End>
    </Association>
    <Association Name="EventCorrelation_Event">
        <End Type="com.sap.appiot.es.EventCorrelation" Multiplicity="1"
Role="EventCorrelations"></End>
        <End Type="com.sap.appiot.es.Event" Multiplicity="*"
Role="Events"></End>
    </Association>
    <Association Name="Severity_Description">
        <End Type="com.sap.appiot.es.Severity" Multiplicity="1"
Role="Severities"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Code_Description">
        <End Type="com.sap.appiot.es.Code" Multiplicity="1"
Role="Codes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventPropertySetType_Property">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventPropertySetType_Annotation">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Annotations" Multiplicity="*"
Role="Annotations"></End>
    </Association>
    <Association Name="EventType_Description">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Status_Description">
        <End Type="com.sap.appiot.es.Status" Multiplicity="1"
Role="Statuses"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_Code">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Code" Multiplicity="*"
Role="Codes"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Properties"
EntityType="com.sap.appiot.es.Property"></EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.es.Description"></EntitySet>
        <EntitySet Name="EventPropertySetTypes"
EntityType="com.sap.appiot.es.EventPropertySetType"></EntitySet>
        <EntitySet Name="Statuses"
EntityType="com.sap.appiot.es.Status"></EntitySet>

```

```

        <EntitySet Name="EventTypes"
EntityType="com.sap.appiot.es.EventType"></EntitySet>
        <EntitySet Name="Severities"
EntityType="com.sap.appiot.es.Severity"></EntitySet>
        <EntitySet Name="Annotations"
EntityType="com.sap.appiot.es.Annotations"></EntitySet>
        <EntitySet Name="EventCorrelations"
EntityType="com.sap.appiot.es.EventCorrelation"></EntitySet>
        <EntitySet Name="PropertySetDescriptions"
EntityType="com.sap.appiot.es.PropertySetDescription"></EntitySet>
        <EntitySet Name="Events" EntityType="com.sap.appiot.es.Event"></
EntitySet>
        <EntitySet Name="Codes" EntityType="com.sap.appiot.es.Code"></
EntitySet>
        <AssociationSet Name="EventPropertySetType_Description"
Association="com.sap.appiot.es.EventPropertySetType_Description">
        <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Property_Description"
Association="com.sap.appiot.es.Property_Description">
        <End EntitySet="Properties" Role="Properties"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_PropertySetDescription"
Association="com.sap.appiot.es.EventType_PropertySetDescription">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="PropertySetDescriptions"
Role="PropertySetDescriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Severity"
Association="com.sap.appiot.es.EventType_Severity">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="Severities" Role="Severities"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Status"
Association="com.sap.appiot.es.EventType_Status">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="Statuses" Role="Statuses"></End>
        </AssociationSet>
        <AssociationSet Name="EventCorrelation_Event"
Association="com.sap.appiot.es.EventCorrelation_Event">
        <End EntitySet="EventCorrelations"
Role="EventCorrelations"></End>
        <End EntitySet="Events" Role="Events"></End>
        </AssociationSet>
        <AssociationSet Name="Severity_Description"
Association="com.sap.appiot.es.Severity_Description">
        <End EntitySet="Severities" Role="Severities"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Code_Description"
Association="com.sap.appiot.es.Code_Description">
        <End EntitySet="Codes" Role="Codes"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Property"
Association="com.sap.appiot.es.EventPropertySetType_Property">
        <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
        <End EntitySet="Properties" Role="Properties"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Annotation"
Association="com.sap.appiot.es.EventPropertySetType_Annotation">
        <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
        <End EntitySet="Annotations" Role="Annotations"></End>

```

```

        </AssociationSet>
        <AssociationSet Name="EventType_Description"
Association="com.sap.apiot.es.EventType_Description">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Status_Description"
Association="com.sap.apiot.es.Status_Description">
            <End EntitySet="Statuses" Role="Statuses"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Code"
Association="com.sap.apiot.es.EventType_Code">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Codes" Role="Codes"></End>
        </AssociationSet>
        <FunctionImport Name="DeleteEvents" ReturnType="Edm.String"
m:HttpMethod="DELETE">
            <Parameter Name="ToTime" Type="Edm.DateTimeOffset"></
Parameter>
                <Parameter Name="EventType" Type="Edm.String"></Parameter>
                <Parameter Name="ThingId" Type="Edm.String"></Parameter>
                <Parameter Name="FromTime" Type="Edm.DateTimeOffset"></
Parameter>
            </FunctionImport>
    </EntityContainer>

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.6 Read Events

With this method you can retrieve all events.

The service retrieves static data for all events that belong to user-defined event type and standard event type with the property set type data.

In addition, you can retrieve a subset of all events, according to the filter criteria provided. For a collective request for a set of events, you have these options:

- You can restrict the set of events to be retrieved by filter criteria based on all fields available in the response.
- You can define that the set of matching events shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 events per response. You can navigate to the next set of results, if available, using the **__next** link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/Events`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.
<code>\$inlinecount</code>	String	No	Total number of events available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. • If you use this with <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.

Parameter	Type	Required	Description
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .
\$filter	String	No	Filter condition to be applied; EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .

Request Example

```
/ES/v1/Events
```

Retrieves static data for all events that belong to user-defined event type and standard event type with the property set type data

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Media types *JSON* and *XML* are supported. The *JSON* for this method has the structure as depicted in the following example:

Example 1

/ES/v1/Events

Retrieves static data for all events that belong to user-defined event type and standard event type with the property set type data

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('9DDBBD81FD904DBD8A276AA25899F5CE')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('9DDBBD81FD904DBD8A276AA25899F5CE')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "F392018DE4D54CCFB5FEC72672D4310B",
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
      "BusinessTimestamp": "2017-04-08T12:30:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:AlertEventType",
      "EventInfo": "Alert on temperature",
      "EventStatus": "going",
      "EventSeverity": "2",
      "EventCode": "EventCode2",
      "EventSource": "Test Source01304",
      "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
      "ThingProperty": "core.automobiles:AlertEventPST/alertEvent",
      "ExternalId": "AlertExternal"
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('3DAD618BA9354232B90FC79A5B542DE6')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('3DAD618BA9354232B90FC79A5B542DE6')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "5DDF968BDF12404E8D8E1FA301427209",
      "CorrelationId": "3DAD618BA9354232B90FC79A5B542DE6",
      "BusinessTimestamp": "2017-03-12T05:30:00Z",
      "Type": "Important",
      "EventType": "com.sap.apptot.eventtypes:StandardEventType",
      "EventInfo": "Alert on temperature",
      "EventStatus": "Open",
      "EventSeverity": "2",
      "EventCode": "30",
      "EventSource": "Car urgent event",
      "ThingId": "155ABA08434C4F95B56C0A84D8D30ABE",
      "ThingProperty": "core.automobiles:Car/wheel_fl/Temperature",
      "ExternalId": "CI_Pressure-Urgent-PU4312"
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('12644D8B35624BF7A85B1A425B26E700')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('12644D8B35624BF7A85B1A425B26E700')",

```

```

        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "12644D8B35624BF7A85B1A425B26E700",
    "CorrelationId": "3DAD618BA9354232B90FC79A5B542DE6",
    "BusinessTimestamp": "2017-04-19T12:00:00Z",
    "Type": "com.sap.apptot.eventtypes:StandardEventType",
    "EventType": "com.sap.apptot.eventtypes:StandardEventType",
    "EventInfo": "Alert on temperature",
    "EventStatus": "Open",
    "EventSeverity": "3",
    "EventCode": "30",
    "EventSource": "Drilling hole length measurer",
    "ThingId": "237FC64161FC46C2A72AB8BE3533C1B0",
    "ThingProperty": "core.automobiles:dd350/dd350_holes/
Hole_Info_Length",
    "ExternalId": "XW5619"
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('50F70DDB6CD44B77ACBA61A3DE09B7D2')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('50F70DDB6CD44B77ACBA61A3DE09B7D2')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "50F70DDB6CD44B77ACBA61A3DE09B7D2",
    "CorrelationId": "3DAD618BA9354232B90FC79A5B542DE6",
    "BusinessTimestamp": "2016-01-01T09:02:00Z",
    "Type": "Warning",
    "EventType": "com.sap.apptot.eventtypes:StandardEventType",
    "EventInfo": "Alert on temperature",
    "EventStatus": "Completed",
    "EventSeverity": "1",
    "EventCode": "30",
    "EventSource": "Generator",
    "ThingId": "483BA41481A4450D99010F4CFDE3B9A6",
    "ThingProperty": "core.automobiles:ABCXSeries/wheel_fr",
    "ExternalId": "eevents3_reg110"
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('EDCB5EF081C2439AB658B231631B1F7F')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('EDCB5EF081C2439AB658B231631B1F7F')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "EDCB5EF081C2439AB658B231631B1F7F",
    "CorrelationId": "c39d9066076840e18c3718ee77b4c353",
    "BusinessTimestamp": "2017-03-24T06:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:SampleEventType",
    "EventInfo": "Alert on temperature",
    "EventStatus": "open",
    "EventSeverity": "2",
    "EventCode": "EventCode1",
    "EventSource": "Test Source13687",
    "ThingId": "AB6113709D044F208C77DF2D23B42153",
    "ThingProperty": "core.automobiles:SampleEventPST/sampleEvent",
    "ExternalId": "Perf_TypedEvents_13687"
    }
},
{
    "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
Events?$skiptoken=20"
}
}

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.7 Read Event Correlations

With this method, you can retrieve a unique list of correlation IDs and the latest event corresponding to each correlation ID.

In addition, you can retrieve a subset of all correlation IDs, according to the filter criteria provided. For a collective request for a set of correlation IDs, you have these options:

- You can restrict the set of correlation IDs to be retrieved by filter criteria based on the correlation ID, business timestamp, and event ID.
- You can define that the set of matching correlation IDs shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventCorrelations`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Example

`/ES/v1/EventCorrelations`

Query Request Parameter

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$inlinecount	String	No	Total number of events available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. • If you use this with the <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are CorrelationId, BusinessTimestamp, and EventId. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are CorrelationId, BusinessTimestamp, and EventId.
\$filter	String	No	Filter condition to be applied; valid fields are CorrelationId, BusinessTimestamp, and EventId.

Response

Response Status and Error Codes

Code	Description
200	List of events retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following example.

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('BD622E3DA6A14C4D87CDEC935B000001')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('BD622E3DA6A14C4D87CDEC935B000001')",
        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "BD622E3DA6A14C4D87CDEC935B000001",
      "EventId": "F392018DE4D54CCFB5FEC72672D4310B",
      "BusinessTimestamp": "2017-02-14T06:30:00Z",
      "Events": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('BD622E3DA6A14C4D87CDEC935B000001')/Events"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('c39d9066076840e18c3718ee77b4c353')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('c39d9066076840e18c3718ee77b4c353')",
        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "c39d9066076840e18c3718ee77b4c353",
      "EventId": "3139A778A683470EBD00BCC4B0543B40",
      "BusinessTimestamp": "2017-02-14T07:00:00Z",
      "Events": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('c39d9066076840e18c3718ee77b4c353')/Events"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('5b9954a4f0a74c6f96b10e744395cac6')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/EventCorrelations('5b9954a4f0a74c6f96b10e744395cac6')",

```

```

        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "5b9954a4f0a74c6f96b10e744395cac6",
      "EventId": "2C7240C29D724D5ABC991E0054243A39",
      "BusinessTimestamp": "2017-02-15T03:00:00Z",
      "Events": {
        "__deferred": {
          "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v1/
EventCorrelations('5b9954a4f0a74c6f96b10e744395cac6')/Events"
        }
      }
    }
  ]
}

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.8 Read Events with a Correlation ID

With this service, you can retrieve all events with the specified correlation ID. All events with the same correlation ID belongs to a specific event type and they describe the life cycle of an event.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v1/EventCorrelations('correlation ID')/Events`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<tde>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlationId	Yes	String	Unique identifier to group all related events	Path

Request Example

```
/ES/v1/EventCorrelations('c39d9066076840e18c3718ee77b4c353')/Events
```

Query Request Parameter

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set. Default value is 20.
\$skip	Integer	No	Number of records to exclude from the result set. Default value is 0.
\$inlinecount	String	No	Total number of events available for a specific correlation ID; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. • If you use this with the <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are CorrelationId, BusinessTimestamp, EventType, EventStatus, EventSeverity, EventCode, ThingId, ThingProperty, and ExternalId. To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Type	Required	Description
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .
\$filter	String	No	Filter condition to be applied; valid fields are CorrelationId , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , BusinessTimestamp , and ExternalId .

Response

Response Status and Error Codes

Code	Description
200	List of events with specific correlation ID retrieved successfully

Payload

Format: [JSON](#)

Media types [JSON](#) and [XML](#) are supported. The [JSON](#) for this method has the structure as depicted in the following example.

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('5DDF968BDF12404E8D8E1FA301427209')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v1/Events('5DDF968BDF12404E8D8E1FA301427209')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "5DDF968BDF12404E8D8E1FA301427209",
      "CorrelationId": "c39d9066076840e18c3718ee77b4c353",
      "BusinessTimestamp": "2017-11-02T02:40:00Z",
      "Type": "Alert",
      "EventType": "core.bbautomobiles:ExceededTemperature",
      "EventStatus": "Open",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": null,
    ]
  }
}
```

```

        "ThingId": "D6B0B87A025B473C94E2F9421A1277C8",
        "ThingProperty": null,
        "ExternalId": "SampleEvent",
        "EventInfo": ""
    },
    {
        "_metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('9C9DFBCB4A2C4F76A953A459355AEE0B')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('9C9DFBCB4A2C4F76A953A459355AEE0B')",
            "type": "com.sap.apptot.es.Events"
        },
        "EventId": "9C9DFBCB4A2C4F76A953A459355AEE0B",
        "CorrelationId": "c39d9066076840e18c3718ee77b4c353",
        "BusinessTimestamp": "2017-11-02T02:42:00Z",
        "Type": "Alert",
        "EventType": "core.bbautomobiles:ExceededTemperature",
        "EventStatus": "InProgress",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": null,
        "ThingId": "D6B0B87A025B473C94E2F9421A1277C8",
        "ThingProperty": null,
        "ExternalId": "SampleEvent",
        "EventInfo": ""
    },
    {
        "_metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('ABC88B4C16344E4DAEDAD6F7C01C88FE')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v1/Events('ABC88B4C16344E4DAEDAD6F7C01C88FE')",
            "type": "com.sap.apptot.es.Events"
        },
        "EventId": "ABC88B4C16344E4DAEDAD6F7C01C88FE",
        "CorrelationId": "c39d9066076840e18c3718ee77b4c353",
        "BusinessTimestamp": "2017-11-02T09:14:00Z",
        "Type": "Alert",
        "EventType": "core.bbautomobiles:ExceededTemperature",
        "EventStatus": "Completed",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": null,
        "ThingId": "D6B0B87A025B473C94E2F9421A1277C8",
        "ThingProperty": null,
        "ExternalId": "SampleEvent",
        "EventInfo": ""
    }
]
}

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.9 Delete an Event Using Correlation ID

With this method, you can delete one or more events with the specific correlation ID. The corresponding event data is also deleted. This method only supports only those events of event type created using the OData service (/ES/v1/EventTypes).

Note

On deletion of the event, the system generates audit logs. If you have assigned one of the predefined annotations (`com.sap.appiot.security:pii` or `com.sap.appiot.security:spi`) for the property set type of an event type.

Request

URI: /ES/v1/EventCorrelations('<correlation ID>')

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <td>.d

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlationId	Yes	String	Correlation ID of the event	Path

Request Example

/ES/v1/EventCorrelations('F2A5A34034CE4B0DB2BCD10DD30F07C2')

Deletes the event with the correlation ID F2A5A34034CE4B0DB2BCD10DD30F07C2 that belongs to the event type `core.automobiles:ExceededTemperature`

Response

Response Status and Error Codes

Code	Description
204	Event deleted successfully

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.2.10 Delete Events

Delete events within specific time range

With this method, you can delete one or more events with a business timestamp that lies within the specified time range. The corresponding event data is also deleted. The service deletes both mutable and immutable events. You can filter the events to be deleted based on the event type or thing ID. You can specify the time range using the **FromTime** and **ToTime** parameters in the request URL. The **ToTime** parameter is mandatory. If you do not specify the **FromTime**, the service considers 1970-01-01T00:00:00.000Z as the **FromTime**.

Using this service, you can only delete up to 10000 events. If there is more number of events in the specified time range, the system will not delete any of the events. You will need to adjust the time range.

If the lifecycle of an event lies outside the specified time range, the service does not delete any of the events. For example, consider the events in the following table. The group of events E2, E3, and E4 has the same correlation ID. They depict the sequence of changes in the event for a specific event type. The events E5 and E6 does not belong to this group and they have different correlation IDs. When you call this service to delete events between the time range 10:00:00 and 10:04:00, the service does not delete the events E2, E3, and E4, because the event E4 is outside the specified time range. If the service deletes events E2 and E3, it will result in depicting incorrect lifecycle of the event. The service only deletes the events E5 and E6.

CorrelationId	Time	EventId
ABCD	10:02:00	E2
ABCD	10:04:00	E3
ABCD	10:05:00	E4
XYZ	10:03:00	E5
PQRS	10:01:00	E6

Note

On deletion of the events, the system generates audit logs for the deleted events.

Request

URI: /ES/v1/DeleteEvents?

FromTime=datetimeoffset'<timestamp'&ToTime=datetimeoffset'<timestamp>'&EventType='<event type name>'&ThingId='<unique thing ID>'

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <td>.d

Request Headers

Header	Required	Values
delete-all-events	Yes	Delete events within the specified time range. Permissible values are true or false. Only if you specify the value true for this parameter, the service deletes the events within the specified time range. If you specify the value false or do not use this header parameter, the service displays an error message and does not delete any of the events.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
FromTime	No	Date time offset	Time from which events with time-stamp value equal to greater than the value specified in this parameter are retrieved. The value for FromTime must correspond to UTC timestamp. If you do not specify value for this parameter, the service considers 1970-01-01T00:00:00.000Z as the FromTime.	Path
ToTime	Yes	Date time offset	Time up to which events with time-stamp value equal to lesser than the value specified in this parameter are retrieved. The value for ToTime must correspond to UTC timestamp.	Path
ThingId	No	String	Unique ID of the thing	Path
EventType	No	String	Event type name	Path

Request Example

```
/ES/v1/DeleteEvents?  
FromTime=datetimeoffset'2020-01-01T09:00:00Z'&ToTime=datetimeoffset'2020-02-02T09:00:00Z'&EventType='core.automobiles:ExceededTemperature'&ThingId='4335FD2B1AD94EFCB1DC92520EA04879'
```

Deletes all events with the time stamp value between the time range specified in the request URL. In addition, the events must belong to the event type `core.automobiles:ExceededTemperature` and created for the thing ID `4335FD2B1AD94EFCB1DC92520EA04879`.

Response

Response Status and Error Codes

Code	Description
204	Events deleted successfully

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.3 User-defined Events (/v2 version)

In this section, you will learn about events based on the event type configured using the /v2 version of the event configuration service - [Event Type with Multiple Event Property Sets \[page 570\]](#).

Resource Path: /ES/EventType/<event type name>/v2/Events

Example for a base URI in a cloud foundry environment:<https://events-sap.cfapps.eu10.hana.ondemand.com/ES/EventType/<event type name>/v2/Events>

Operations

CRUD Operations

HTTP Method	Operation	URI
GET	Read Metadata for Event of an Event Type [page 1250]	/ES/EventType/<event type name>/v2/\$metadata
POST	Create and Update Events [page 1252]	/ES/EventType/<event type name>/v2/Events
GET	Read Events and Event Data [page 1256]	/ES/EventType/<event type name>/v2/Events
GET	Delete an Event [page 1262]	/ES/EventType/<event type name>/v2/Events('<event ID>')
GET	Read Metadata for Event [page 1263]	/ES/v2/\$metadata
GET	Read Events [page 1270]	/ES/v2/Events
GET	Read Event Correlations [page 1275]	/ES/v2/EventCorrelations

HTTP Method	Operation	URI
<i>GET</i>	Read Events with a Correlation ID [page 1278]	/ES/v2/EventCorrelations('correlation ID')/Events
<i>DELETE</i>	Delete an Event Using Correlation ID [page 1281]	/ES/v2/EventCorrelations('<correlation ID>')
<i>DELETE</i>	Delete Events [page 1283]	/ES/v2/DeleteEvents? FromTime=datetimeoffset'<timestamp'&ToTime=datetimeoffset'<timestamp'&EventType='<event type name'&ThingId='<unique thing ID>'

Related Information

[Event Configuration \[page 522\]](#)

21.3.1 Read Metadata for Event of an Event Type

With this service, you can retrieve metadata for event that belongs to a specific event type.

Request

URI: /ES/EventType/<event type name>/v2/\$metadata

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <td>.r

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
event type name	Yes	String	Unique name of the event type with multiple event property set types	Path

Request Example

/ES/EventType/core.automobiles:ExceededTemperature/v2/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Response Payload Example

Format: XML

```
<EntityType Name="Events">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="CorrelationId" Type="Edm.String"></Property>
  <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
  <Property Name="Type" Type="Edm.String"></Property>
  <Property Name="EventType" Type="Edm.String"></Property>
  <Property Name="EventStatus" Type="Edm.String"></Property>
  <Property Name="EventSeverity" Type="Edm.Int64"></Property>
  <Property Name="EventCode" Type="Edm.String"></Property>
  <Property Name="EventSource" Type="Edm.String"></Property>
  <Property Name="ThingId" Type="Edm.String"></Property>
  <Property Name="ThingProperty" Type="Edm.String"></Property>
  <Property Name="ExternalId" Type="Edm.String"></Property>
  <Property Name="EventInfo" Type="Edm.String"></Property>
  <NavigationProperty Name="DYN_ENT_core_automobiles__engines"
Relationship="com.sap.applot.es.DYN_ENT_core_automobiles__engines"
FromRole="EventEntities" ToRole="DYN_ENT_core_automobiles__engineEntities"></
NavigationProperty>
  <NavigationProperty Name="DYN_ENT_core_automobiles__Wheels"
Relationship="com.sap.applot.es.DYN_ENT_core_automobiles__Wheels"
FromRole="EventEntities" ToRole="DYN_ENT_core_automobiles__WheelEntities"></
NavigationProperty>
</EntityType>
<EntityType Name="DYN_ENT_core_automobiles__engines">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String"></Property>
  <Property Name="enginetemp.entemp" Type="Edm.Int32"></Property>
</EntityType>
<EntityType Name="DYN_ENT_core_automobiles__Wheels">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String"></Property>
  <Property Name="WheelSpeed.whspeed" Type="Edm.Int32"></Property>
</EntityType>
<Association Name="DYN_ENT_core_automobiles__engines">
  <End Type="com.sap.applot.es.Event" Multiplicity="1"
Role="EventEntities"></End>
  <End Type="com.sap.applot.es.DYN_ENT_core_automobiles__engine"
Multiplicity="1" Role="DYN_ENT_core_automobiles__engineEntities"></End>
</Association>
<Association Name="DYN_ENT_core_automobiles__Wheels">
  <End Type="com.sap.applot.es.Event" Multiplicity="1"
Role="EventEntities"></End>
  <End Type="com.sap.applot.es.DYN_ENT_core_automobiles__Wheel"
Multiplicity="1" Role="DYN_ENT_core_automobiles__WheelEntities"></End>
</Association>
```

```

        <EntityContainer Name="UnifiedEventsEventType"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Events" EntityType="com.sap.appiot.es.Event"></
EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__engines"
EntityType="com.sap.appiot.es.DYN_ENT_core_automobiles__engine"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__Wheels"
EntityType="com.sap.appiot.es.DYN_ENT_core_automobiles__Wheel"></EntitySet>
        <AssociationSet Name="DYN_ENT_core_automobiles__engines"
Association="com.sap.appiot.es.DYN_ENT_core_automobiles__engines">
        <End EntitySet="Events" Role="EventEntities"></End>
        <End EntitySet="DYN_ENT_core_automobiles__engines"
Role="DYN_ENT_core_automobiles__engineEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__Wheels"
Association="com.sap.appiot.es.DYN_ENT_core_automobiles__Wheels">
        <End EntitySet="Events" Role="EventEntities"></End>
        <End EntitySet="DYN_ENT_core_automobiles__Wheels"
Role="DYN_ENT_core_automobiles__WheelEntities"></End>
        </AssociationSet>
        </EntityContainer>

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.2 Create and Update Events

With this method, you can create or update events for an event type with multiple event property sets. While creating an event, the event properties data block in the request payload is not mandatory. However, if you specify a property set type name (along with the properties and its value) that does not belong to the event type specified in the request payload, the service displays an error message and does not create an event.

Note

All other validations and restrictions documented as part of /v1 documentation are applicable for /v2 as well.

Request

URI: /ES/EventType/<event type name>/v2/Events

Operation Type: CRUD

HTTP Method: *POST*

Permissions: <td>.c

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	String	Name of the event type	Path

Event Object Properties

Property	Type	Mandatory	Maximum Length	Description
CorrelationId	String	No	32	Unique identifier to group all related events
BusinessTimestamp	String	Yes	24	Business timestamp corresponding to the event that is created
Type	String	No	81	Additional information about the event
EventType	String	No		User-defined event type name
EventStatus	String	Yes	50	Status of the event
EventSeverity	Integer	Yes		Severity of the event
EventCode	String	No	50	Code of the event
EventSource	String	No	100	Source of the event
ThingId	String	Yes		Unique identification of a thing for which an event is created
ThingProperty	String	No	255	Property of a thing for which the event is created

→ Recommendation

We recommend that you specify `<thing type name>/<property set ID>`. For example, you can specify `core.automobiles:ABC2Series/wheel_rr`.

Property	Type	Mandatory	Maximum Length	Description
ExternalId	String	No	255	Event identifier (which is not unique) from an external system. You can create multiple events with the same external ID. i Note Only the following characters are supported: • Uppercase and lowercase alphabets a through z and A through Z • Numeric digits 0 through 9 • Punctuation marks hyphen (-), underscore (_), colon (:), and full-stop (.)
EventInfo	String	No	200	Free text to provide additional information about the event.
DYN_ENT_<event property set type name>	List of properties	No	-	List of event properties along with data for an event property set type i Note To provide a value for the property, prefix the property name with the property set name, <propertyset>.<property>.

Request Example

```
/ES/EventType/core.automobiles:ExceededSpeed/v2/Events
```

Example request payload

```
{
  "BusinessTimestamp": "2021-01-06T09:00:00Z",
  "Type": "Alert",
  "EventType": "core.automobiles:ExceededSpeed",
  "EventInfo": "Alert on speed",
  "EventStatus": "Open",
  "EventSeverity": 1,
  "EventCode": "EQ12",
  "EventSource": null,
  "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
  "ThingProperty": "Wheel Speed engine temperature",
  "ExternalId": "SampleEvent2",
  "DYN_ENT_core_automobiles__Wheel": {
    "WheelSpeed.whspeed": 120
  },
  "DYN_ENT_core_automobiles__engine": {
    "enginetemp.entemp": 55
  }
}
```

Response

Response Status and Error Codes

Code	Description
201	Event created successfully

Response Payload Example

```
{
  "d": {
    "__metadata": {
      "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/Event  
Type/core.automobiles:ExceededSpeed/v2/Events('96581C415A46492FB8570E66F74B85F7')",
      "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/Event  
Type/core.automobiles:ExceededSpeed/v2/Events('96581C415A46492FB8570E66F74B85F7')",
      "type": "com.sap.apiot.es.Events"
    },
    "EventId": "96581C415A46492FB8570E66F74B85F7",
    "CorrelationId": "15741d1db4044081a97eeb1940cd08e1",
    "BusinessTimestamp": "2021-01-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "Open",
    "EventSeverity": 1,
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "DYN_ENT_core_automobiles__engines": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/Event  
Type/core.automobiles:ExceededSpeed/v2/Events('96581C415A46492FB8570E66F74B85F7')/DYN_ENT_core_automobiles__engines"
      }
    }
  }
}
```

```

    },
    "DYN_ENT_core_automobiles__Wheels": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')/DYN_ENT_core_automobiles__Wheels"
      }
    },
    "DYN_ENT_core_automobiles__PST3s": {
      "__deferred": {
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')/DYN_ENT_core_automobiles__PST3s"
      }
    }
  }
}

```

Related Information

[User-defined Events \(/v1 version\) \[page 1211\]](#)

21.3.3 Read Events and Event Data

With this method you can retrieve all events that belong to a specific event type. The response payload includes event data as well.

In addition, you can retrieve a subset of all events, according to the filter criteria provided. For a collective request for a set of events, you have these options:

- You can restrict the set of events to be retrieved by filter criteria based on all fields available in the response.
- You can define that the set of matching events shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/EventType/<event type name>/v2/Events`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description
EventType	Yes	String	Name of the event type

Query Request Parameters

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set.
\$skip	Integer	No	Number of records to exclude from the result set.
\$inlinecount	String	No	Total number of events available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <i>\$top</i> and <i>\$skip</i> parameters, the result contains the total count of events available. • If you use this with <i>\$filter</i> parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are <i>EventId</i>, <i>CorrelationId</i>, <i>BusinessTimestamp</i>, <i>EventType</i>, <i>EventStatus</i>, <i>EventSeverity</i>, <i>EventCode</i>, <i>ThingId</i>, <i>ThingProperty</i>, and <i>ExternalId</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.

Parameter	Type	Required	Description
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .
\$filter	String	No	Filter condition to be applied; valid fields are EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .

Request Example

```
/ES/EventType/core.automobiles:ExceededTemperature/v2/Events
```

Retrieves all events of user-defined event type `core.automobiles:ExceededTemperature`

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

Format: [JSON](#)

Media types [JSON](#) and [XML](#) are supported. The [JSON](#) for this method has the structure as depicted in the following examples:

Example 1

```
/ES/EventType/core.automobiles:ExceededSpeed/v2/Events
```

Retrieves static data along with dynamic data for all events of user-defined event type `core.automobiles:ExceededTemperature`

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')",

```



```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "type": "com.sap.appiot.es.Events"
    },
    {
        "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
        "CorrelationId": "a31c0a76903945f28cea262cbd05eccc",
        "BusinessTimestamp": "2021-01-05T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "open",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": "",
        "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
        "ThingProperty": "Wheel Speed engine temperature",
        "ExternalId": "SampleEvent2",
        "EventInfo": "Alert on speed",
        "DYN_ENT_core_automobiles__engines": {
            "__deferred": {
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')/DYN_ENT_core_automobiles__engines"
            }
        },
        "DYN_ENT_core_automobiles__Wheels": {
            "__deferred": {
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')/DYN_ENT_core_automobiles__Wheels"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('FF09C38C275D4570BF3801782EE21BC3')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('FF09C38C275D4570BF3801782EE21BC3')",
            "type": "com.sap.appiot.es.Events"
        },
        "EventId": "FF09C38C275D4570BF3801782EE21BC3",
        "CorrelationId": "218803aae7f84dcf8fdec4660c3cf657",
        "BusinessTimestamp": "2021-01-06T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "InProgress",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": "",
        "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
        "ThingProperty": "Wheel Speed engine temperature",
        "ExternalId": "SampleEvent2",
        "EventInfo": "Alert on speed",
        "DYN_ENT_core_automobiles__engines": {
            "__deferred": {
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/core.automobiles:ExceededSpeed/v2/Events('FF09C38C275D4570BF3801782EE21BC3')/DYN_ENT_core_automobiles__engines"
            }
        },
        "DYN_ENT_core_automobiles__Wheels": {
            "__deferred": {

```

```

        "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v2/Events('FF09C38C275D4570BF3801782EE21BC3') /
DYN_ENT_core_automobiles__Wheels"
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "96581C415A46492FB8570E66F74B85F7",
    "CorrelationId": "15741d1db4044081a97eeb1940cd08e1",
    "BusinessTimestamp": "2021-01-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "Open",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": "",
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "DYN_ENT_core_automobiles__engines": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v2/Events('96581C415A46492FB8570E66F74B85F7') /
DYN_ENT_core_automobiles__engines"
        }
    },
    "DYN_ENT_core_automobiles__Wheels": {
        "__deferred": {
            "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v2/Events('96581C415A46492FB8570E66F74B85F7') /
DYN_ENT_core_automobiles__Wheels"
        }
    }
}
]
}
}

```

Example 2

```

/ES/EventType/core.bbautomobiles:ExceedeSpeed/v2/Events?
$expand=DYN_ENT_core_automobiles__engines,DYN_ENT_core_automobiles__Wheels

```

Retrieves all events of user-defined event type core.automobiles:ExceededTemperature along with details of dynamic properties of the event property set type assigned to the user-defined event type.

```

{
    "d": {
        "results": [{
            "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('FF09C38C275D4570BF3801782EE21BC3')",

```

```

        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('FF09C38C275D4570BF3801782EE21BC3')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "FF09C38C275D4570BF3801782EE21BC3",
    "CorrelationId": "218803aae7f84dcf8fdec4660c3cf657",
    "BusinessTimestamp": "2021-01-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "InProgress",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "DYN_ENT_core_automobiles_engines": {
        "EventId": "FF09C38C275D4570BF3801782EE21BC3",
        "enginetemp.entemp": 55
    },
    "DYN_ENT_core_automobiles_Wheels": {
        "EventId": "FF09C38C275D4570BF3801782EE21BC3",
        "WheelSpeed.whspeed": 120
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('96581C415A46492FB8570E66F74B85F7')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "96581C415A46492FB8570E66F74B85F7",
    "CorrelationId": "15741d1db4044081a97eeb1940cd08e1",
    "BusinessTimestamp": "2021-01-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "Open",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "DYN_ENT_core_automobiles_engines": {
        "EventId": "96581C415A46492FB8570E66F74B85F7",
        "enginetemp.entemp": 55
    },
    "DYN_ENT_core_automobiles_Wheels": {
        "EventId": "96581C415A46492FB8570E66F74B85F7",
        "WheelSpeed.whspeed": 120
    }
},
{
    "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/EventType/core.automobiles:ExceededSpeed/v2/
Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "type": "com.sap.apptot.es.Events"
    }
}

```

```

    },
    "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
    "CorrelationId": "a31c0a76903945f28cea262cbd05eccc",
    "BusinessTimestamp": "2021-01-05T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "open",
    "EventSeverity": "1",
    "EventCode": "EQ12",
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "DYN_ENT_core_automobiles__engines": {
      "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
      "enginetemp.entemp": 44
    },
    "DYN_ENT_core_automobiles__Wheels": {
      "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
      "WheelSpeed.whspeed": 104
    }
  }
}
]
}
}

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.4 Delete an Event

With this method, you can delete an event with the specific event ID.

Note

You can only delete mutable events and standard events. The service does not allow you to delete immutable events.

Request

URI: /ES/EventType/<event type name>/v2/Events('<event ID>')

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <td>.d

Request Parameters

Parameter	Required	Data Type	Description
EventType	Yes	String	Unique name of the event type
EventId	Yes	String	Unique identifier of the event

Request Example

```
/ES/EventType/core.automobiles:ExceededSpeed/v2/  
Events('96581C415A46492FB8570E66F74B85F7')
```

Deletes the event with the ID 96581C415A46492FB8570E66F74B85F7 that belongs to the event type core.automobiles:ExceededSpeed

Response

Response Status and Error Codes

Code	Description
204	Event deleted successfully

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.5 Read Metadata for Event

With this service, you can retrieve metadata for events.

Request

URI: /ES/v2/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

None

Request Example

/ES/v2/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

Format: XML

Example 1

/ES/v2/\$metadata

```
<EntityType Name="EventTypes">
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
  <Property Name="Description" Type="Edm.String"
Nullable="false"></Property>
  <Property Name="LanguageCode" Type="Edm.String"></Property>
  <Property Name="EventTypeState" Type="Edm.String"></Property>
  <Property Name="IsBatch" Type="Edm.Boolean"></Property>
  <NavigationProperty Name="PropertySets"
Relationship="com.sap.appiot.es.EventType_PropertySet" FromRole="EventTypes"
ToRole="PropertySets"></NavigationProperty>
  <NavigationProperty Name="Statuses"
Relationship="com.sap.appiot.es.EventType_Status" FromRole="EventTypes"
ToRole="Statuses"></NavigationProperty>
  <NavigationProperty Name="Severities"
Relationship="com.sap.appiot.es.EventType_Severity" FromRole="EventTypes"
ToRole="Severities"></NavigationProperty>
  <NavigationProperty Name="Codes"
Relationship="com.sap.appiot.es.EventType_Code" FromRole="EventTypes"
ToRole="Codes"></NavigationProperty>
  <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.EventType_Description" FromRole="EventTypes"
ToRole="Descriptions"></NavigationProperty>
</EntityType>
<EntityType Name="Properties">
  <Key>
    <PropertyRef Name="Name"></PropertyRef>
    <PropertyRef Name="PropertySetType"></PropertyRef>
  </Key>
  <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
  <Property Name="Type" Type="Edm.String"></Property>
  <Property Name="PropertyLength" Type="Edm.String"></Property>
  <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.es.Property_Description" FromRole="Properties"
ToRole="Descriptions"></NavigationProperty>
```

```

    </EntityType>
    <EntityType Name="EventCorrelations">
        <Key>
            <PropertyRef Name="CorrelationId"></PropertyRef>
        </Key>
        <Property Name="CorrelationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Event Correlation ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
        <NavigationProperty Name="Events"
Relationship="com.sap.apptot.es.EventCorrelation_Event"
FromRole="EventCorrelations" ToRole="Events"></NavigationProperty>
    </EntityType>
    <EntityType Name="Annotations">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="81" sap:creatable="true" sap:updatable="false">
            <Documentation>
                <LongDescription>Name of Annotation</LongDescription>
            </Documentation>
        </Property>
        <Property Name="PackageName" Type="Edm.String" Nullable="true"
MaxLength="50" sap:creatable="false" sap:updatable="false">
            <Documentation>
                <LongDescription>Package Name</LongDescription>
            </Documentation>
        </Property>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="PropertySets">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PropertySetType" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="DataCategory" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <Property Name="Operation" Type="Edm.String"></Property>
        <Property Name="EventType" Type="Edm.String"></Property>
        <NavigationProperty Name="Properties"
Relationship="com.sap.apptot.es.PropertySets_Property" FromRole="PropertySets"
ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.PropertySets_Description"
FromRole="PropertySets" ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="EventPropertySetTypes">
        <Key>
            <PropertyRef Name="Name"></PropertyRef>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="PackageName" Type="Edm.String"
Nullable="false"></Property>
        <Property Name="DataCategory" Type="Edm.String"></Property>
        <Property Name="Language" Type="Edm.String"></Property>
        <Property Name="PropertySetTypeDescription" Type="Edm.String"></
Property>

```

```

        <NavigationProperty Name="Properties"
Relationship="com.sap.apptot.es.EventPropertySetType_Property"
FromRole="EventPropertySetTypes" ToRole="Properties"></NavigationProperty>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.EventPropertySetType_Description"
FromRole="EventPropertySetTypes" ToRole="Descriptions"></NavigationProperty>
        <NavigationProperty Name="Annotations"
Relationship="com.sap.apptot.es.EventPropertySetType_Annotation"
FromRole="EventPropertySetTypes" ToRole="Annotations"></NavigationProperty>
    </EntityType>
    <EntityType Name="Status">
        <Key>
            <PropertyRef Name="EventStatus"></PropertyRef>
        </Key>
        <Property Name="EventStatus" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Status_Description" FromRole="Statuses"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Codes">
        <Key>
            <PropertyRef Name="EventCode"></PropertyRef>
        </Key>
        <Property Name="EventCode" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Code_Description" FromRole="Codes"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Severity">
        <Key>
            <PropertyRef Name="EventSeverity"></PropertyRef>
        </Key>
        <Property Name="EventSeverity" Type="Edm.String"></Property>
        <Property Name="LanguageCode" Type="Edm.String"></Property>
        <Property Name="Description" Type="Edm.String"></Property>
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.apptot.es.Severity_Description" FromRole="Severities"
ToRole="Descriptions"></NavigationProperty>
    </EntityType>
    <EntityType Name="Descriptions">
        <Key>
            <PropertyRef Name="LanguageCode"></PropertyRef>
        </Key>
        <Property Name="LanguageCode" Type="Edm.String">
            <Documentation>
                <LongDescription>Language Code</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Description" Type="Edm.String">
            <Documentation>
                <LongDescription>Description</LongDescription>
            </Documentation>
        </Property>
    </EntityType>
    <EntityType Name="Events">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String" Nullable="false">
            <Documentation>
                <LongDescription>Event unique ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="CorrelationId" Type="Edm.String">

```



```

        <Documentation>
          <LongDescription>Event Correlation ID</LongDescription>
        </Documentation>
      </Property>
      <Property Name="BusinessTimestamp" Type="Edm.String"></Property>
      <Property Name="Type" Type="Edm.String"></Property>
      <Property Name="EventType" Type="Edm.String"></Property>
      <Property Name="EventStatus" Type="Edm.String"></Property>
      <Property Name="EventSeverity" Type="Edm.Int64"></Property>
      <Property Name="EventCode" Type="Edm.String"></Property>
      <Property Name="EventSource" Type="Edm.String"></Property>
      <Property Name="ThingId" Type="Edm.String"></Property>
      <Property Name="ThingProperty" Type="Edm.String"></Property>
      <Property Name="ExternalId" Type="Edm.String"></Property>
      <Property Name="EventInfo" Type="Edm.String"></Property>
    </EntityType>
    <Association Name="EventType_Severity">
      <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
      <End Type="com.sap.appiot.es.Severity" Multiplicity="*"
Role="Severities"></End>
    </Association>
    <Association Name="Severity_Description">
      <End Type="com.sap.appiot.es.Severity" Multiplicity="1"
Role="Severities"></End>
      <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Property_Description">
      <End Type="com.sap.appiot.es.Property" Multiplicity="1"
Role="Properties"></End>
      <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="PropertySets_PropertySetType">
      <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
      <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
    </Association>
    <Association Name="Code_Description">
      <End Type="com.sap.appiot.es.Code" Multiplicity="1"
Role="Codes"></End>
      <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="EventType_Status">
      <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
      <End Type="com.sap.appiot.es.Status" Multiplicity="*"
Role="Statuses"></End>
    </Association>
    <Association Name="EventType_PropertySet">
      <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
      <End Type="com.sap.appiot.es.PropertySet" Multiplicity="*"
Role="PropertySets"></End>
    </Association>
    <Association Name="EventType_Code">
      <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
      <End Type="com.sap.appiot.es.Code" Multiplicity="*"
Role="Codes"></End>
    </Association>
    <Association Name="EventPropertySetType_Annotation">
      <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>

```

```

        <End Type="com.sap.appiot.es.Annotations" Multiplicity="*"
Role="Annotations"></End>
    </Association>
    <Association Name="EventPropertySetType_Property">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventPropertySetType_Description">
        <End Type="com.sap.appiot.es.EventPropertySetType"
Multiplicity="1" Role="EventPropertySetTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="PropertySets_Description">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="Status_Description">
        <End Type="com.sap.appiot.es.Status" Multiplicity="1"
Role="Statuses"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <Association Name="PropertySets_Property">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="1"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.Property" Multiplicity="*"
Role="Properties"></End>
    </Association>
    <Association Name="EventCorrelation_Event">
        <End Type="com.sap.appiot.es.EventCorrelation" Multiplicity="1"
Role="EventCorrelations"></End>
        <End Type="com.sap.appiot.es.Event" Multiplicity="*"
Role="Events"></End>
    </Association>
    <Association Name="PropertySets_EventType">
        <End Type="com.sap.appiot.es.PropertySet" Multiplicity="*"
Role="PropertySets"></End>
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
    </Association>
    <Association Name="EventType_Description">
        <End Type="com.sap.appiot.es.EventType" Multiplicity="1"
Role="EventTypes"></End>
        <End Type="com.sap.appiot.es.Description" Multiplicity="*"
Role="Descriptions"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="EventTypes"
EntityType="com.sap.appiot.es.EventType"></EntitySet>
        <EntitySet Name="Properties"
EntityType="com.sap.appiot.es.Property"></EntitySet>
        <EntitySet Name="EventCorrelations"
EntityType="com.sap.appiot.es.EventCorrelation"></EntitySet>
        <EntitySet Name="Annotations"
EntityType="com.sap.appiot.es.Annotations"></EntitySet>
        <EntitySet Name="PropertySets"
EntityType="com.sap.appiot.es.PropertySet"></EntitySet>
        <EntitySet Name="EventPropertySetTypes"
EntityType="com.sap.appiot.es.EventPropertySetType"></EntitySet>
        <EntitySet Name="Statuses"
EntityType="com.sap.appiot.es.Status"></EntitySet>

```

```

        <EntitySet Name="Codes" EntityType="com.sap.appiot.es.Code"></
EntitySet>
        <EntitySet Name="Severities"
EntityType="com.sap.appiot.es.Severity"></EntitySet>
        <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.es.Description"></EntitySet>
        <EntitySet Name="Events" EntityType="com.sap.appiot.es.Event"></
EntitySet>
        <AssociationSet Name="EventType_Severity"
Association="com.sap.appiot.es.EventType_Severity">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Severities" Role="Severities"></End>
        </AssociationSet>
        <AssociationSet Name="Severity_Description"
Association="com.sap.appiot.es.Severity_Description">
            <End EntitySet="Severities" Role="Severities"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="Property_Description"
Association="com.sap.appiot.es.Property_Description">
            <End EntitySet="Properties" Role="Properties"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="PropertySets_PropertySetType"
Association="com.sap.appiot.es.PropertySets_PropertySetType">
            <End EntitySet="PropertySets" Role="PropertySets"></End>
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
        </AssociationSet>
        <AssociationSet Name="Code_Description"
Association="com.sap.appiot.es.Code_Description">
            <End EntitySet="Codes" Role="Codes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Status"
Association="com.sap.appiot.es.EventType_Status">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Statuses" Role="Statuses"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_PropertySet"
Association="com.sap.appiot.es.EventType_PropertySet">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="PropertySets" Role="PropertySets"></End>
        </AssociationSet>
        <AssociationSet Name="EventType_Code"
Association="com.sap.appiot.es.EventType_Code">
            <End EntitySet="EventTypes" Role="EventTypes"></End>
            <End EntitySet="Codes" Role="Codes"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Annotation"
Association="com.sap.appiot.es.EventPropertySetType_Annotation">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Annotations" Role="Annotations"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Property"
Association="com.sap.appiot.es.EventPropertySetType_Property">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Properties" Role="Properties"></End>
        </AssociationSet>
        <AssociationSet Name="EventPropertySetType_Description"
Association="com.sap.appiot.es.EventPropertySetType_Description">
            <End EntitySet="EventPropertySetTypes"
Role="EventPropertySetTypes"></End>
            <End EntitySet="Descriptions" Role="Descriptions"></End>
        </AssociationSet>

```

```

        <AssociationSet Name="PropertySets_Description"
Association="com.sap.appiot.es.PropertySets_Description">
        <End EntitySet="PropertySets" Role="PropertySets"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="Status_Description"
Association="com.sap.appiot.es.Status_Description">
        <End EntitySet="Statuses" Role="Statuses"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySets_Property"
Association="com.sap.appiot.es.PropertySets_Property">
        <End EntitySet="PropertySets" Role="PropertySets"></End>
        <End EntitySet="Properties" Role="Properties"></End>
    </AssociationSet>
    <AssociationSet Name="EventCorrelation_Event"
Association="com.sap.appiot.es.EventCorrelation_Event">
        <End EntitySet="EventCorrelations"
Role="EventCorrelations"></End>
        <End EntitySet="Events" Role="Events"></End>
    </AssociationSet>
    <AssociationSet Name="PropertySets_EventType"
Association="com.sap.appiot.es.PropertySets_EventType">
        <End EntitySet="PropertySets" Role="PropertySets"></End>
        <End EntitySet="EventTypes" Role="EventTypes"></End>
    </AssociationSet>
    <AssociationSet Name="EventType_Description"
Association="com.sap.appiot.es.EventType_Description">
        <End EntitySet="EventTypes" Role="EventTypes"></End>
        <End EntitySet="Descriptions" Role="Descriptions"></End>
    </AssociationSet>
    <FunctionImport Name="MigrateEvents" ReturnType="Edm.String"
m:HttpMethod="POST">
        <Parameter Name="EventType" Type="Edm.String"></Parameter>
        <Parameter Name="EventPropertySetType" Type="Edm.String"></
Parameter>
    </FunctionImport>
    <FunctionImport Name="DeleteEvents" ReturnType="Edm.String"
m:HttpMethod="DELETE">
        <Parameter Name="ToTime" Type="Edm.DateTimeOffset"></
Parameter>
        <Parameter Name="EventType" Type="Edm.String"></Parameter>
        <Parameter Name="ThingId" Type="Edm.String"></Parameter>
        <Parameter Name="FromTime" Type="Edm.DateTimeOffset"></
Parameter>
    </FunctionImport>
</EntityContainer>

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.6 Read Events

The service retrieves static data for all events that exist in the database.

In addition, you can retrieve a subset of all events, according to the filter criteria provided. For a collective request for a set of events, you have these options:

- You can restrict the set of events to be retrieved by filter criteria based on all fields available in the response.
- You can define that the set of matching events shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 events per response. You can navigate to the next set of results, if available, using the **__next** link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/Events`

Operation Type: CRUD

HTTP Method: `GET`

Permissions: `<td>.r`

Request Parameters

None

Query Request Parameters

Parameter	Type	Required	Description
<code>\$top</code>	Integer	No	Number of records to include in the result set.
<code>\$skip</code>	Integer	No	Number of records to exclude from the result set.

Parameter	Type	Required	Description
\$inlinecount	String	No	Total number of events available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. • If you use this with the <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are EventId, CorrelationId, BusinessTimestamp, EventType, EventStatus, EventSeverity, EventCode, ThingId, ThingProperty, and ExternalId. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are EventId, CorrelationId, BusinessTimestamp, EventType, EventStatus, EventSeverity, EventCode, ThingId, ThingProperty, and ExternalId.

Parameter	Type	Required	Description
\$filter	String	No	Filter condition to be applied; EventId , CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .

Request Example

/ES/v2/Events

Retrieves static data for all events

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

Format: [JSON](#)

Media types [JSON](#) and [XML](#) are supported. The [JSON](#) for this method has the structure as depicted in the following example:

Example 1

/ES/v2/Events

Retrieves static data for all events

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('5A89C2D4100E4E7290B21F22953A6D17')",
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('5A89C2D4100E4E7290B21F22953A6D17')",
          "type": "com.sap.apptot.es.Events"
        },
        "EventId": "5A89C2D4100E4E7290B21F22953A6D17",
        "CorrelationId": "11449786fc6e49ff8b8b7bd8697d9f",
        "BusinessTimestamp": "2021-04-07T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "Open",
        "EventSeverity": "1",
        "EventCode": "EQ12",
        "EventSource": "",
        "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
        "ThingProperty": "Wheel Speed engine temperature",
      }
    ]
  }
}
```

```

        "ExternalId": "SampleEvent2",
        "EventInfo": "Alert on speed"
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('41FE169C349F46B4A8A5CD37458FCB12')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('41FE169C349F46B4A8A5CD37458FCB12')",
            "type": "com.sap.apptot.es.Events"
        },
        "EventId": "41FE169C349F46B4A8A5CD37458FCB12",
        "CorrelationId": "59a71bebf86a4b1c80f70c22cff8cafb",
        "BusinessTimestamp": "2021-01-05T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.Vehicle:MigrationET2",
        "EventStatus": "Open",
        "EventSeverity": "1",
        "EventCode": "",
        "EventSource": "",
        "ThingId": "2125AF12C37447AEBE5E990886FA0DB9",
        "ThingProperty": "Engine Temperature",
        "ExternalId": "SampleEvent",
        "EventInfo": "Alert on engine temperature"
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('2BF52ECE636B426EA2A70188C663F721')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('2BF52ECE636B426EA2A70188C663F721')",
            "type": "com.sap.apptot.es.Events"
        },
        "EventId": "2BF52ECE636B426EA2A70188C663F721",
        "CorrelationId": "7d581679f75d454ba242c2f04c8990a6",
        "BusinessTimestamp": "2021-01-05T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles.XSeries:MigrationET2",
        "EventStatus": "Open",
        "EventSeverity": "1",
        "EventCode": "code1",
        "EventSource": "",
        "ThingId": "2125AF12C37447AEBE5E990886FA0DB9",
        "ThingProperty": "Engine Temperature",
        "ExternalId": "SampleEvent",
        "EventInfo": "Alert on engine temperature"
    },
    {
        "__metadata": {
            "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('60EDAAE0E8174D5B9BC31E2629EDCF45')",
            "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/Events('60EDAAE0E8174D5B9BC31E2629EDCF45')",
            "type": "com.sap.apptot.es.Events"
        },
        "EventId": "60EDAAE0E8174D5B9BC31E2629EDCF45",
        "CorrelationId": "c2dcc8ea72284fdb82b768b9497a292e",
        "BusinessTimestamp": "2020-12-10T09:00:00Z",
        "Type": "",
        "EventType": "core.automobiles.XSeries:ExceededPressure",
        "EventStatus": "Coming",
        "EventSeverity": "12123",
        "EventCode": "EventColl",
        "EventSource": "Jmeter Test Source",
        "ThingId": "F10D34C860E64C4F9B67402E37A4DA22",
        "ThingProperty": "com.sap.demo:EventType/eventData",
        "ExternalId": "ABCXSeries001-ENGINE-EXT",
        "EventInfo": ""
    }

```



```

    },
    "_next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
Events?$skiptoken=500"
  }
}

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.7 Read Event Correlations

With this method, you can retrieve a unique list of correlation IDs and the latest event corresponding to each correlation ID.

In addition, you can retrieve a subset of all correlation IDs, according to the filter criteria provided. For a collective request for a set of correlation IDs, you have these options:

- You can restrict the set of correlation IDs to be retrieved by filter criteria based on the correlation ID, business timestamp, and event ID.
- You can define that the set of matching correlation IDs shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/EventCorrelations`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Request Example

`/ES/v2/EventCorrelations`

Query Request Parameter

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set.
\$skip	Integer	No	Number of records to exclude from the result set.
\$inlinecount	String	No	Total number of events available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the \$top and \$skip parameters, the result contains the total count of events available. • If you use this with \$filter parameter, the result contains the total count of events based on the defined filter condition.
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are CorrelationId, BusinessTimestamp, and EventId. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are CorrelationId , BusinessTimestamp , and EventId .
\$filter	String	No	Filter condition to be applied; valid fields are CorrelationId , BusinessTimestamp , and EventId .

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as illustrated in the following example.

```
{
  "d": {
    "results": [{
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('0433D6A90BDD45F49143CF390E72F3A6')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('0433D6A90BDD45F49143CF390E72F3A6')",
        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "0433D6A90BDD45F49143CF390E72F3A6",
      "EventId": "0433D6A90BDD45F49143CF390E72F3A6",
      "BusinessTimestamp": "2020-01-01T09:00:00Z",
      "Events": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('0433D6A90BDD45F49143CF390E72F3A6')/Events"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('6F49EC50193F48299EFA97E5A91A5A8B')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('6F49EC50193F48299EFA97E5A91A5A8B')",
        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "6F49EC50193F48299EFA97E5A91A5A8B",
      "EventId": "6F49EC50193F48299EFA97E5A91A5A8B",
      "BusinessTimestamp": "2020-01-02T09:00:00Z",
      "Events": {
        "__deferred": {
          "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('6F49EC50193F48299EFA97E5A91A5A8B')/Events"
        }
      }
    },
    {
      "__metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('021C5F461B8644E8B12141D472AD0894')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/EventCorrelations('021C5F461B8644E8B12141D472AD0894')",
        "type": "com.sap.apptot.es.EventCorrelations"
      },
      "CorrelationId": "021C5F461B8644E8B12141D472AD0894",
      "EventId": "021C5F461B8644E8B12141D472AD0894",
    }
  ]
}
```

```

        "BusinessTimestamp": "2020-01-03T09:00:00Z",
        "Events": {
            "__deferred": {
                "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventCorrelations('021C5F461B8644E8B12141D472AD0894')/Events"
            }
        },
        {
            "__metadata": {
                "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventCorrelations('A0211028276D44218A8D082B1B7AC7EE')",
                "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/EventCorrelations('A0211028276D44218A8D082B1B7AC7EE')",
                "type": "com.sap.apptot.es.EventCorrelations"
            },
            "CorrelationId": "A0211028276D44218A8D082B1B7AC7EE",
            "EventId": "A0211028276D44218A8D082B1B7AC7EE",
            "BusinessTimestamp": "2020-01-04T09:00:00Z",
            "Events": {
                "__deferred": {
                    "uri": "https://events-sap-
ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventCorrelations('A0211028276D44218A8D082B1B7AC7EE')/Events"
                }
            }
        }
    ],
    "__next": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:443/ES/v2/
EventCorrelations?$skiptoken=500"
}
}

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.8 Read Events with a Correlation ID

With this service, you can retrieve all events with the specified correlation ID. All events with the same correlation ID belongs to a specific event type and they describe the life cycle of an event.

By default, the service displays a maximum of 500 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/ES/v2/EventCorrelations('correlation ID')/Events`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlationId	Yes	String	Unique identifier to group all related events	Path

Request Example

```
/ES/v2/EventCorrelations('a31c0a76903945f28cea262cbd05eecd')/Events
```

Query Request Parameter

Parameter	Type	Required	Description
\$top	Integer	No	Number of records to include in the result set. Default value is 20.
\$skip	Integer	No	Number of records to exclude from the result set. Default value is 0.
\$inlinecount	String	No	Total number of events available for a specific correlation ID; permissible values are allpages and none . The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of events available. - If you use this with the <code>\$filter</code> parameter, the result contains the total count of events based on the defined filter condition.

Parameter	Type	Required	Description
\$orderby	String	No	Field name to be used for sorting the result set in ascending order; valid fields are CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId . To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	String	No	Select condition for the data fields to be included in the result set; valid fields are CorrelationId , BusinessTimestamp , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , and ExternalId .
\$filter	String	No	Filter condition to be applied; valid fields are CorrelationId , EventType , EventStatus , EventSeverity , EventCode , ThingId , ThingProperty , BusinessTimestamp , and ExternalId .

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Response Payload Example

Format: [JSON](#)

Media types [JSON](#) and [XML](#) are supported. The [JSON](#) for this method has the structure as depicted in the following example.

```
{
  "d": {
    "results": [
      {
```

```

      "_metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
      "CorrelationId": "a31c0a76903945f28cea262cbd05eccc",
      "BusinessTimestamp": "2021-01-05T09:00:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:ExceededSpeed",
      "EventStatus": "open",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": null,
      "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
      "ThingProperty": null,
      "ExternalId": "SampleEvent2",
      "EventInfo": "Alert on speed"
    },
    {
      "_metadata": {
        "id": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/Events('F154CAD00A2A45798385E942AE954F03')",
        "uri": "https://events-sap-ci.cfapps.sap.hana.ondemand.com:
443/ES/v2/Events('F154CAD00A2A45798385E942AE954F03')",
        "type": "com.sap.apptot.es.Events"
      },
      "EventId": "F154CAD00A2A45798385E942AE954F03",
      "CorrelationId": "a31c0a76903945f28cea262cbd05eccc",
      "BusinessTimestamp": "2021-04-07T09:00:00Z",
      "Type": "Alert",
      "EventType": "core.automobiles:ExceededSpeed",
      "EventStatus": "Open",
      "EventSeverity": "1",
      "EventCode": "EQ12",
      "EventSource": null,
      "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
      "ThingProperty": null,
      "ExternalId": "SampleEvent2",
      "EventInfo": "Alert on speed"
    }
  ]
}

```

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.9 Delete an Event Using Correlation ID

With this method, you can delete one or more events with the specific correlation ID. The corresponding event data is also deleted. This method only supports only those events of event type created using the OData service (/ES/v2/EventTypes).

Note

On deletion of the event, the system generates audit logs. If you have assigned one of the predefined annotations (`com.sap.apptot.security:pii` or `com.sap.apptot.security:spi`) for the property set type of an event type.

Request

URI: `/ES/v2/EventCorrelations('<correlation ID>')`

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: `<td>.d`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlationId	Yes	String	Correlation ID of the event	Path

Request Example

```
/ES/v2/EventCorrelations('a31c0a76903945f28cea262cbd05eecd')
```

Deletes the event with the correlation ID `a31c0a76903945f28cea262cbd05eecd` that belongs to the event type `core.automobiles:ExceededSpeed`

Response

Response Status and Error Codes

Code	Description
204	Event deleted successfully

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.3.10 Delete Events

With this method, you can delete one or more events with a business timestamp that lies within the specified time range. The corresponding event data is also deleted. The service deletes both mutable and immutable events. You can filter the events to be deleted based on the event type or thing ID. You can specify the time range using the **FromTime** and **ToTime** parameters in the request URL. The **ToTime** parameter is mandatory. If you do not specify the **FromTime**, the service considers 1970-01-01T00:00:00.000Z as the **FromTime**.

Using this service, you can only delete up to 10000 events. If there is more number of events in the specified time range, the system will not delete any of the events. You will need to adjust the time range.

If the lifecycle of an event lies outside the specified time range, the service does not delete any of the events. For example, consider the events in the following table. The group of events E2, E3, and E4 has the same correlation ID. They depict the sequence of changes in the event for a specific event type. The events E5 and E6 does not belong to this group and they have different correlation IDs. When you call this service to delete events between the time range 10:00:00 and 10:04:00, the service does not delete the events E2, E3, and E4, because the event E4 is outside the specified time range. If the service deletes events E2 and E3, it will result in depicting incorrect lifecycle of the event. The service only deletes the events E5 and E6.

CorrelationId	Time	EventId
ABCD	10:02:00	E2
ABCD	10:04:00	E3
ABCD	10:05:00	E4
XYZ	10:03:00	E5
PQRS	10:01:00	E6

i Note

On deletion of the events, the system generates audit logs for the deleted events.

Request

URI: /ES/v2/DeleteEvents?

FromTime=datetimeoffset '<timestamp>'&**ToTime**=datetimeoffset '<timestamp>'&**EventType**='<event type name>'&**ThingId**='<unique thing ID>'

Operation Type: CRUD

HTTP Method: *DELETE*

Permissions: <td>.d

Request Headers

Header	Required	Values
delete-all-events	Yes	Delete events within the specified time range. Permissible values are true or false. Only if you specify the value true for this parameter, the service deletes the events within the specified time range. If you specify the value false or do not use this header parameter, the service displays an error message and does not delete any of the events.

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
FromTime	No	Date time offset	Time from which events with time-stamp value equal to greater than the value specified in this parameter are retrieved. The value for FromTime must correspond to UTC timestamp. If you do not specify value for this parameter, the service considers 1970-01-01T00:00:00.000Z as the FromTime.	Path
ToTime	Yes	Date time offset	Time up to which events with time-stamp value equal to lesser than the value specified in this parameter are retrieved. The value for ToTime must correspond to UTC timestamp.	Path
ThingId	No	String	Unique ID of the thing	Path
EventType	No	String	Event type name	Path

Request Example

/ES/v2/DeleteEvents?

FromTime=datetimeoffset'2020-01-01T09:00:00Z'&ToTime=datetimeoffset'2020-02-02T09:00:00Z'&EventType='core.automobiles:ExceededTemperature'&ThingId='4335FD2B1AD94EFCB1DC92520EA04879'

Deletes all events with the time stamp value between the time range specified in the request URL. In addition, the events must belong to the event type `core.automobiles:ExceededTemperature` and created for the thing ID `4335FD2B1AD94EFCB1DC92520EA04879`.

Response

Response Status and Error Codes

Code	Description
204	Events deleted successfully

Related Information

[User-defined Events \(/v2 version\) \[page 1249\]](#)

21.4 Migrate Standard or Pre-Defined Events

Overview

You can create standard or pre-defined events of event type `com.sap.appiot.eventtypes:StandardEventType` using the application `appiot-mds` or `events-sap`. With release 2005b, it was announced that creation of standard or pre-defined events is deprecated. We want to remind you that the same will be decommissioned in August 2021. After decommissioning, if the standard or pre-defined events are not yet migrated, you will not be able to access them using the applications `appiot-mds` and `events-sap`. We therefore recommend you migrate the standard or pre-defined events to a user-defined event type using the service explained in this section.

Request Parameters for Migration

You must provide an event type and an event property set type associated with the event type as request parameters in the request URL to migrate the standard or pre-defined events. If there are no standard or pre-defined events found in the system, the service displays HTTPS status code 400.

- The event type and the event property set type provided as request parameters, must belong to the tenant for which you are planning to migrate the events.
- The value of the `EventTypeState` field of the user-defined event type must be *Mutable*.

Before migrating, read the standard or pre-defined events for a specific tenant to understand the values stored in the fields such as severity and status. For successful migration of all the standard or pre-defined events, create an user-defined event type fulfilling one of the following conditions:

- Configuration values for the `EventSeverity` and `EventStatus` fields must be a superset of severity and status values stored in the database for the existing standard or pre-defined events, respectively
- No configuration values for *EventSeverity* and *EventStatus*

If the severity and the status values in the database conform to the standard event type (`_severity`: *1, 2, 3* and `_status`: *Open, InProcess, Completed*), creating a user-defined event type is not mandatory. You specify the event type name and the event property set type name as request parameters and the service will automatically create them to migrate the events.

For more information on creating user-defined event type, see [Create Event Type \[page 535\]](#).

When you initiate the migration, the service verifies the availability of the event type and the event property set type specified in the request URL.

- If both the event type and the event property set type are available in the database, the service compares the severity and status values of all the standard or pre-defined events existing for the tenant with the values configured for the `EventSeverity` and `EventStatus` fields of the user-defined event type. (See [Table 1 for few examples \[page 1286\]](#))
 - Only if the severity and status values are a subset of user-defined event type configuration values, the service will migrate the events.
 - Otherwise, the service will not migrate the events and displays HTTPS status code 400.
- If both the event type and the event property set type are not available in the database, the service compares the severity and status values of all the standard or pre-defined events existing for the tenant with the default configuration values for severity and status of the event type `com.sap.appiot.eventtypes:StandardEventType`. (See [Table 1 for few examples \[page 1286\]](#))
 - If they match, the service will create user-defined event type and event property set type with the names specified in the request URL and then migrate the events. The configuration values for severity, status, and code of the user-defined event type will be same as that defined for the standard event type `com.sap.appiot.eventtypes:StandardEventType`.
 - Otherwise, the service will not migrate the events and displays HTTPS status code 400.
- If the event type exists and the event property set type does not exist in the database, events are not migrated, and the service fails with HTTP status code 400.
- If the event type does not exist and the event property set type exists in the database, the service creates the user-defined event type with the name specified in the request URL. The configuration values for severity, status, and code of the user-defined event type will be same as that defined for the standard event type `com.sap.appiot.eventtypes:StandardEventType`. The event property set type provided in the request URL will be associated with the newly created user-defined event type. The service then migrates the standard or pre-defined events to the newly created user-defined event type.

Event Data Values and Event Type Configuration Values

The following table describes the outcome of the migration based on the standard or pre-defined event data values (such as severity and status) and the user-defined event type configuration values (such as severity and status):

Values of severity, and status, and code affecting the migration of events

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
<code>_severity</code>	<code>_status</code>	<code>_code</code>	<code>EventSeverity</code>	<code>EventStatus</code>	<code>EventCode</code>	

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1	Open	EC	No value	No value	No value	Migrate events to the existing user-defined even type. i Note If the user-defined event type does not exist in the database, the service creates user-defined event type with configuration values same as standard event type <code>com.sap.appiot.eventtypes:StandardEventTy</code> and then migrate the events.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1	Open	EC	1	No value	No value	Migrate events to the existing user-defined event type. i Note If the user-defined event type does not exist in the database, the service creates user-defined event type with configuration values same as standard event type <code>com.sap.appiot.eventtypes:StandardEventType</code> and then migrate the events.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 3, 4	Open	EC	1, 3, 4	Open	EC	Migrate events to the existing user-defined even type. i Note If the user-defined event type does not exist in the database, migration is not possible. The service fails with HTTPS status code 400.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 2	Open	No value	1, 2, 3	Open, InProcess, Completed	No value	Migrate events to the existing user-defined event type.

i Note

If the user-defined event type does not exist in the database, the service creates user-defined event type with configuration values same as standard event type `com.sap.appiot.eventtypes:StandardEventTypeInfo` and then migrate the events.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 3, 4	Open	EC	1, 3	Open	EC	One or more event severities do not match with severity configured for the user-defined event type. Migration of events is not possible.

i Note

If the user-defined event type does not exist in the database, migration is not possible. The service fails with HTTPS status code 400.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 3, 4	Open	EC	1, 3, 4	Open1	EC	One or more event statuses do not match with statuses configured for the user-defined event type. Migration of events is not possible.

i Note

If the user-defined event type does not exist in the database, migration is not possible. The service fails with HTTPS status code 400.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 3, 4	Open	EC	1, 3, 4	Open	EC1	One or more event codes do not match with codes configured for the user-defined event type. Migration of event type is not possible.

i Note
 If the user-defined event type does not exist in the database, migration is not possible. The service fails with HTTPS status code 400.

Event data of standard or pre-defined events			Configuration values of user-defined event type			Result
1, 2, 3	Open	No value	1, 2, 4	Open, InProcess, Completed	No value	One or more event severity, status do not match with the user-defined event type configuration. Migration of event type is not possible.

i Note

If the user-defined event type does not exist in the database, the service creates user-defined event type with configuration values same as standard event type `com.sap.apptot.eventtypes:StandardEventTy` and then migrate the events.

Verifying the Migration

You can verify if the migration of events was completed successfully by retrieving the count of events before and after migration ([Read Events and Event Data \[page 1221\]](#)). The following table illustrates the method to retrieve the count and its result before and after migration:

API	Before migration	After successful migration
GET GET /ES/EventType/ com.sap.appiot.eventtypes: StandardEventType/v1/ Events? \$inlinecount=allpages	250	0
GET GET /ES/EventType/ <<user-defined event type name>>/v1/Events? \$inlinecount=allpages	n	250+n

- After you initiate the migration, ensure that you do not create any events until the migration is complete.
- After migration, the standard or pre-defined events will belong to a user-defined event type, and you can retrieve them only using the `events-sap` application ([Read Events and Event Data \[page 1221\]](#)). You cannot retrieve the migrated events using the `appiot-mds` application.
- After migrating all the standard or pre-defined events, if you happen to create events of event type `com.sap.appiot.eventtypes:StandardEventType`, you will have to run the migration again.
- We therefore highly recommend to create events using the OData service [OData service \[page 1211\]](#).

Request

URI: /ES/v1/MigrateEvents

Operation Type: CRUD

HTTP Method: [POST](#)

Permissions: <td>.c

Request Headers

None

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
EventType	Yes	String	Unique identifier of the event type	Path
EventPropertySetName	Yes	String	Unique name of the event property set type	Path

Request Example

```
/ES/v1/MigrateEvents?
PropertySetName='core.automobiles:wheelPST'&EventType='core.automobiles:ExceedTemp'
```

Response

Response Status and Error Codes

Code	Description
204	The status code indicates that the events are migrated successfully. • You can try retrieving the standard events using the service (Read Events and Event Data [page 1221]). As the standard or pre-defined events are migrated, the result should be empty. • You can use the service Read Events and Event Data [page 1221], to retrieve events of the user-defined event type you provided in the request parameter. The service retrieves the list of migrated events as well.

22 File

The File services allow you to store files or documents for a thing.

Base URI

Formal description: `http://<server address>[:<port number>][<path>]/Files`

Example for a base URI in a cloud foundry environment: `https://apiot-fs.cfapps.eu10.hana.ondemand.com/Files`

Note

App name is `<apiot-fs>`.

You cannot use the following special characters in the filename or the path name:

Ampersand (&)	Dollar (\$)	'At' symbol (@)	Equals (=)
Colon (:)	Plus (+)	Semicolon (;)	Comma (,)
Question mark (?)	Backslash (\)	Left curly brace { }	Right curly brace { }
Caret (^)	Percent character (%)	Grave accent / back tick (`)	Left square bracket ([)
Right square bracket (])	'Greater Than' symbol (>)	'Less Than' symbol (<)	'Pound' character (#)
Tilde (~)	Vertical bar / pipe ()	Double quotes (")	Double forward slash (//)

Methods

HTTP Method	Action	URI	Scopes
<i>PUT</i>	Upload a File [page 1298]	<code>/Files/Things/<thing id>/<path>/<filename></code>	<code><File>.c</code>
<i>GET</i>	Read a File [page 1300]	<code>/Files/Things/<thing id>/<path>/<filename></code>	<code><File>.r</code>
<i>GET</i>	Read Metadata [page 1302]	<code>/Files/Things/<thing id>/<path>/</code>	<code><File>.r</code>
<i>DELETE</i>	Delete a File [page 1303]	<code>/Files/Things/<thing id>/<path>/<filename></code>	<code><File>.d</code>

HTTP Method	Action	URI	Scopes
GET	Read Version Information of File Service [page 1305]	/Version	<File>.r

Note

<File> refers to the file application name.

22.1 Upload a File

This file service allows you to upload a file in a folder or a particular path.

When you upload a file, the service scans the file using the **Malware Scanning** service provided by Cloud Foundry. After scanning, the scanner service alerts the user for the presence of malware, if any.

- If the scanning service fails to scan the file, the file service continues to upload the file with a warning message about the failed scan. The warning message is available in the response header. The files that are not scanned are not retrieved using the GET call.
- If the scanning succeeds, the file service uploads the file only if it is malware free and if it belongs to one of the following mime-types:

application/gzip	application/	audio/wav
application/msexcel	vnd.openxmlformats-officedocument.wordprocess	image/gif
application/mspowerpoint	ingml.document	image/jpeg
application/msword	application/	image/png
application/octet-stream	vnd.openxmlformats-officedocument.spreadsheet	text/plain
application/pdf	ml.sheet	text/richtext
application/plain	application/	video/avi
application/rtf	vnd.openxmlformats-officedocument.presentationml.presentation	video/mpeg
application/vnd.ms-outlook	application/zip	
	audio/mpeg	
	audio/midi	

Note

- If the file is of a mime-type that is not supported, the file upload operation is terminated.
- If you need to upload a file of mime-type that is not supported, please raise a support ticket under the component IOT-BSV-TS.

You can assign the predefined annotations `com.sap.appiot.security:pii` and `com.sap.appiot.security:spi` while creating a file. As a result, the content of the file is considered as personal data or sensitive data based on the annotation defined. For such files, whenever the content is retrieved, the content is created or updated, or the content is deleted, the system generates audit logs. After creating the file with predefined annotation, you cannot remove or change the annotation.

Note

- Filename is mandatory.
- Path is optional.
- URL must not end with '/'. A URL that ends with a '/' is considered a folder.
- You can only upload a file of size less than or equal to 20MB.

Request

URI: `/Files/Things/<thing id>/<path>/<filename>`

HTTP Method: `PUT` or `POST`

Note

You can create a file using the `PUT` or the `POST` method. We recommend to use the `POST` method to create a file.

Permissions:

`<File>.c`

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for a thing.
path	No	string	Path where the file exists.
name	Yes	string	Name of the file.

Request Headers

Header	Required	Values
Content-Type	Yes	binary/octet-stream
sap-iot-audit-log	No	You can assign one of the following values: • <code>com.sap.appiot.security:pii</code> • <code>com.sap.appiot.security:spi</code>

Request Example

- File upload request with folder details

```
/Files/Things/0023A6329DE5491699ADF9E00EF431FB/myfolder1/myfolder2/myfile.txt
```

- File upload request without folder details

```
/Files/Things/0023A6329DE5491699ADF9E00EF431FB/myfile.txt
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
201	File uploaded successfully

22.2 Read a File

This file service is used to read the content of a file.

If the file was scanned seven days ago or not scanned earlier, the system triggers the scanning. As a result, if the file contains malware or does not belong to the supported mime-type, the system deletes the file and displays an appropriate error message.

Note

- Filename is mandatory. You must provide the same extension used during the uploading of the file.
- Path is optional.
- URL must not end with '/'. A URL that ends with a '/' is considered a folder.

Request

URI: /Files/Things/<thing id>/<path>/<filename>

HTTP Method: *GET*

Permissions:

<File>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header <code>CONTENT-ENCODING</code> with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.
Cache-Control: max-age	No	Time duration in seconds Indicates the maximum amount of time in seconds for which the fetched responses can be reused (from the time the request is triggered). For example, <code>max-age=120</code> indicates that fetched response can be reused (remains in the browser cache) for the next 120 seconds.

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for a thing.
path	No	string	Path where the file exists.
name	Yes	string	Name of the file.

Request Example

- Read the content of a file from a folder

```
/Files/Things/123/myfolder1/myfolder2/myfile.txt
```

- Read a file

```
/Files/Things/123/myfile.txt
```

Response

Format: [JSON](#)

Response Status and Error Codes

Code	Description
200	File retrieved successfully

Response Example

```
My First File
```

22.3 Read Metadata

This service is used to read the metadata of all files and folders within a folder or within a specified path.

Note

- Path is optional.
- URL must end with '/'. A URL without a '/' is considered a request to read the file content.

Request

URI: /Files/Things/<thing id>/<path>/

HTTP Method: [GET](#)

Permissions:

<File>.r

Request Headers

Parameter	Required	Description
Accept-Encoding	No	Retrieve compressed response Only if you specify the value gzip or gzip,deflate for this parameter, the system returns the compressed response with an additional response header CONTENT-ENCODING with value gzip . If you specify an invalid value or do not use this header parameter, the system returns the uncompressed response.

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for a thing.
path	No	string	Path where the file exists.

Request Example

```
/Files/Things/123/myfolder1/myfolder2/?$top=10
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Only media type *JSON* is supported. The *JSON* for this method has the following structure:

```
[{
  "name": "myfile.txt",
  "length": 13,
  "mimeType": "binary/octet-stream",
  "user": "allpermission01@gmail.com",
  "isDirectory": false,
  "lastUpdateTime": "2016-02-26T04:42:00.743Z"
}, {
  "name": "myfolder2",
  "isDirectory": true
}]
```

22.4 Delete a File

This file service is used to delete a file.

Note

- Filename is mandatory.

- Path is optional.
- You can only delete one file at a given point in time. You cannot delete a folder, and the URL must not end with a '/'.

Request

URI: /Files/Things/<Thing ID>/<Path>/<Filename>

HTTP Method: *DELETE*

Permissions:

<File>.d

Request Parameter

Parameter	Required	Data Type	Description
id	Yes	string	Internal identifier for a thing.
path	No	string	Path where the file exists.
name	Yes	string	Name of the file.

Request Example

- Delete a file from a specific folder

```
/Files/Things/123/myfolder1/myfolder2/myfile.txt
```

- Delete a file

```
/Files/Things/123/myfile.txt
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
204	File deleted successfully

22.5 Read Version Information of File Service

This service is used to retrieve the version information of the file service.

Request

URI: `/Version`

HTTP Method: *GET*

Permissions:

`<File>.r`

Request Parameters

None

Request Example

```
/Version
```

Response

Format: *JSON*

Response Status and Error Codes

Code	Description
200	Version information retrieved successfully.

Response Example

```
{
  "version" : "1.10"
}
```

22.6 HTTP Status Codes for File Services

List of status codes for file services

In the following table, you find the list of HTTP status codes that are used by the file services:

Put	Delete	Get	Description
201	204	200	Success
404	404	404	Capabilities not assigned to read a file that belongs to a specific thing.
201	204	404	Read capability not assigned to read a file that belongs to a specific thing. However, the user is assigned with the capabilities to perform operations such as create, update, and delete.
404	404	200	Read capability assigned to read a file that belongs to a specific thing. However, the user is not assigned with capabilities to perform operations such as create, update, and delete.
201	404	404	Not found. The requested file is not found.
403	403	403	Forbidden (scope(s) not assigned for the user)
400	400	400	Bad request (for example: header field missing, validation failed)
500	500	500	Internal server error

23 Composites

The composite services are used to retrieve a combination of data by joining multiple tables and filter, select, page, and sort the retrieved data according to the criteria provided.

Related Information

[Composite Things: REST Service \[page 1307\]](#)

[Composite Things: OData Service \[page 1312\]](#)

[Composite Events: OData Service \[page 1326\]](#)

[Composite Thing Configuration for a Specific Thing Hierarchy: OData Service \[page 1357\]](#)

[Thing Detail \[page 1385\]](#)

[Advanced Thing List \[page 1400\]](#)

[Advanced Event List \[page 1437\]](#)

[Event List: OData Service \[page 1455\]](#)

23.1 Composite Things: REST Service

You can use a thing service (GET <Composite Things Application URL>/Composite/Things/PropertySet/propertySetType name) to return the things with the most recent property data (such as time series) for the specified property set type. However, this service does not retrieve data about things, customers, and events in a single request.

i Note

The composite service only retrieves data for property set type of type *MasterData*.

Base URI: `http://<server address>[:<port number>][/path]/Composite/Things/PropertySet`

Example for a base URI in a cloud foundry environment: `https://appiot-composite-things.cfapps.eu10.hana.ondemand.com/Composite/Things/PropertySet`

Methods

HTTP Method	Action	URI	Scopes
GET	Read Thing Details with Property Set Type Data [page 1308]	/Composite/Things/PropertySet/<propertySetType name>/<property set>	<ct>.r
GET	Read Version Information of Composite Service [page 1310]	/Version	<ct>.r

i Note

<ct> refers to the composite application name.

23.1.1 Read Thing Details with Property Set Type Data

This service is used to retrieve the complete information of a thing for a specific property set type and a property set. The retrieved information includes the basic details (ID, external ID, thing type, and object group), customer details (customer name and contact), location details (address, country, longitude, and latitude), and event details (event count and event severity count).

i Note

The result set does not contain the fields longitude and latitude as part of thing location details, –

- If you did not specify values for these fields while creating a **Location**.
- If you did not specify the location of a thing while creating a **Thing**.

In addition, this service retrieves information about the usage of the properties and its latest value.

i Note

Retrieving number of objects more than the recommended limits with only one collective GET request can lead to high system load and a significant increase of response times.

To avoid performance decline, the system in future versions will automatically limit collective GET requests to a maximum of 100 objects that can be retrieved with one single call.

Use of \$count as well degrades performance. Hence, a use of \$count must also be judiciously chosen.

Therefore, for use cases where it is crucial for you to ensure that objects more than 100 have to be retrieved, you need to use paging options such as \$top and \$skip.

Request

URI: /Composite/Things/PropertySet/<property set type name>/<property set ID>

HTTP Method: [GET](#)

Permissions:

<ct>.r

Request Parameter

Parameter	Required	Data Type	Description
name	Yes	string	Name of the property set type.
id	Yes	string	Property set identifier.

Query String Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of records to exclude from the result set.
\$count	No	Boolean	Total number of things based on the calling user's authorizations; permissible values are true and false . If this is used in conjunction with the \$top and \$skip parameters, the result contains the total count of data available.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; All the fields in the result set are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select	No	String	Select condition for the data fields to be included in the result set; All the fields in the result set are valid.
\$filter	No	String	Filter condition to be applied; All the fields in the result set are valid. The filter operators supported are eq , lt , gt , le , ge , and ne . You can use the string functions such as substringof , startswith , and endswith to search data using \$filter .

Request Example

```
/Composite/Things/PropertySet/core.automobiles:car/car
```

Response

Format: JSON

Response Status and Error Codes

Code	Description
200	List of things with customer, location, event count, and event severity count along with the details of the specific master data property set type is retrieved.

Payload

```
{
  "value": [{
    "_id": "<thingID>",
    "_externalId": "ABCXSeries001",
    "_name": "ABCXSeries",
    "_thingType": "core.automobiles:ABCXSeries",
    "_description": {
      "en": "Car Model ABC xSeries 001"
    },
    "_objectGroup": "473BB1AFC4A4415791543C3F2CFDD295",
    "customer.name": "customer-test001",
    "customer.landlinePhoneNumber": "<customerLandlinePhoneNumber>",
    "customer.mobilePhoneNumber": "<customermobilePhoneNumber>",
    "customer.id": " 4D622E3DA6A14C4D87CDEC935B000002",
    "location.country.name": "country1",
    "location.country.id": "CNT1",
    "location.address": "Building1, Street Name",
    "location.id": "CD622E3DA6A14C4D87CDEC935B000001",
    "location.latitude": "53.545968",
    "location.longitude": "9.970724",
    "event.count": 100,
    "event.severity1count": 20,
    "event.severity2count": 30,
    "event.severity3count": 40,
    "propertySet": [{
      "_time": "2005-01-06T00:00:00.000Z",
      "Capacity": 1000,
      "Torque": 90,
      "Transmission": "Manual"
    }]
  }]
}
```

23.1.2 Read Version Information of Composite Service

This service is used to retrieve the version information of the composite service.

Request

URI: /Version

HTTP Method: [GET](#)

Permissions:

<ct>.r

Request Parameters

None

Request Example

```
/Version
```

Response

Response Status and Error Codes

Code	Description
200	Version information retrieved successfully.

Response Example

```
{  
  "version" : "1.10"  
}
```

23.1.3 HTTP Status Codes for Composites

List of status codes for composite services

In the following table, you find the list of HTTP status codes that are used by the composite services:

Code	Description
200	Success
400	Bad request (for example: header field missing, wrong filter, validation failed)
403	Forbidden (scope(s) not assigned for the user)
404	Not found (for example, data category of the property set type is not of type Master Data)
500	Internal server error

23.2 Composite Things: OData Service

Overview

The composite things OData service is used to retrieve the complete information of a thing for a specific property set type and a property set. The retrieved information includes the basic details (ID, external ID, thing type, and object group), customer details (customer name and contact), and location details (address, country, longitude, and latitude). In addition, this service retrieves information about the usage of the properties and its latest value. This service only supports the data category *MasterData*.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/CompositeThings/v1`

Example for a Root URI in a cloud foundry environment: `https://composite-things-odata.cfapps.eu10.hana.ondemand.com/CompositeThings`

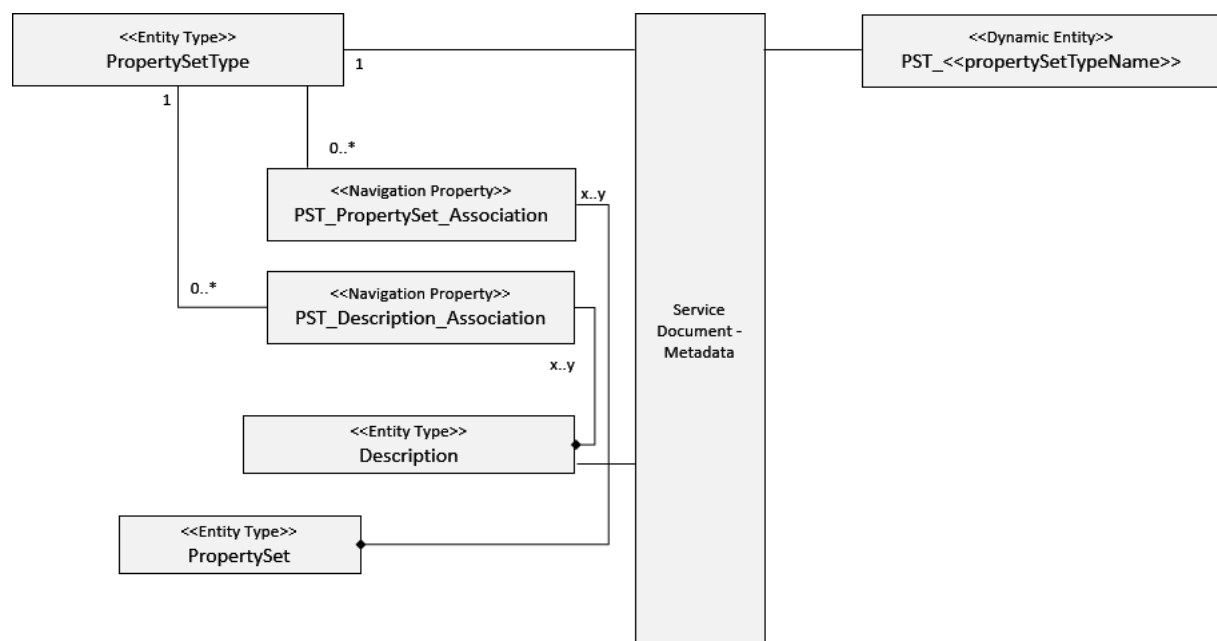
Permissions:

`<ctodata>.SysAdmin`

`<ctodata>.r`

Entity Data Model

The following diagram shows the EDM of Composite Things:



Service Metadata URI: `http://<server address>[:<port number>]/CompositeThings/v1/$metadata`

Related Information

[Read Metadata of Composite Things \[page 1313\]](#)

[Read all Property Set Types \[page 1318\]](#)

[Read all Property Sets for a Property Set Type \[page 1320\]](#)

[Read Things for Property Set of a Property Set Type \[page 1322\]](#)

23.2.1 Read Metadata of Composite Things

Retrieves metadata of composite things

Note

The result set does not contain the fields longitude and latitude as part of thing location details, –

- If you did not specify values for these fields while creating a **Location**.
- If you did not specify the location of a thing while creating a **Thing**.

Request

URI: `/CompositeThings/v1/$metadata`

Operation Type: CRUD

HTTP Method: *GET*

Permissions:

`<ctodata>.SysAdmin`

`<ctodata>.r`

Request Parameters

None

Request Example

```
/CompositeThings/v1/$metadata
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

```
<EntityType Name="PropertySetType">
  <Key>
    <PropertyRef Name="PropertySetType"></PropertyRef>
  </Key>
  <Property Name="PropertySetType" Type="Edm.String" Nullable="false"></Property>
</EntityType>
<EntityType Name="PropertySet">
  <Key>
    <PropertyRef Name="PropertySet"></PropertyRef>
    <PropertyRef Name="PropertySetType"></PropertyRef>
    <PropertyRef Name="ThingType"></PropertyRef>
  </Key>
  <Property Name="PropertySet" Type="Edm.String" Nullable="false"></Property>
  <Property Name="PropertySetType" Type="Edm.String" Nullable="false"></Property>
</EntityType>
<EntityType Name="Description">
  <Key>
    <PropertyRef Name="Language"></PropertyRef>
  </Key>
  <Property Name="Language" Type="Edm.String"></Property>
  <Property Name="Description" Type="Edm.String"></Property>
</EntityType>
<EntityType Name="PST_core_bbautomobiles__style">
  <Key>
    <PropertyRef Name="ThingId"></PropertyRef>
  </Key>
  <Property Name="ThingId" Type="Edm.String" Nullable="false"></Property>
  <Property Name="Path" Type="Edm.String"></Property>
  <Property Name="Timestamp" Type="Edm.String" Nullable="false"></Property>
  <Property Name="ThingISOCODE" Type="Edm.String"></Property>
  <Property Name="ThingDescription" Type="Edm.String"></Property>
</EntityType>
```



```

    <Property Name="ThingName" Type="Edm.String"></Property>
    <Property Name="ThingExternalId" Type="Edm.String"></Property>
    <Property Name="ThingType" Type="Edm.String"></Property>
    <Property Name="ObjectGroup" Type="Edm.String"></Property>
    <Property Name="BPName" Type="Edm.String"></Property>
    <Property Name="BPLandlinePhoneNumber" Type="Edm.String"></Property>
    <Property Name="BPMobilePhoneNumber" Type="Edm.String"></Property>
    <Property Name="ThingCustomerId" Type="Edm.String"></Property>
    <Property Name="ThingRegionDescription" Type="Edm.String"></Property>
    <Property Name="ThingCityName" Type="Edm.String"></Property>
    <Property Name="ThingCountryDescription" Type="Edm.String"></Property>
    <Property Name="ThingCountryId" Type="Edm.String"></Property>
    <Property Name="ThingAddressRepresentation" Type="Edm.String"></Property>
    <Property Name="ThingLocationID" Type="Edm.String"></Property>
    <Property Name="Latitude" Type="Edm.Double"></Property>
    <Property Name="Longitude" Type="Edm.Double"></Property>
    <Property Name="AlternateId" Type="Edm.String"></Property>
    <Property Name="CarColor" Type="Edm.String"></Property>
</EntityType>
<ComplexType Name="Description">
    <Property Name="Language" Type="Edm.String"></Property>
    <Property Name="Description" Type="Edm.String"></Property>
</ComplexType>
<Association Name="PST_PropertySet_Association">
    <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
    Role="PropertySetTypeEntities"></End>
    <End Type="com.sap.apptot.PropertySet" Multiplicity="*"
    Role="PropertySetEntities"></End>
</Association>
<Association Name="PST_Description_Association">
    <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
    Role="PropertySetTypeEntities"></End>
    <End Type="com.sap.apptot.Description" Multiplicity="*"
    Role="DescriptionEntities"></End>
</Association>
<Association Name="PS_Description_Association">
    <End Type="com.sap.apptot.PropertySet" Multiplicity="1"
    Role="PropertySetEntities"></End>
    <End Type="com.sap.apptot.Description" Multiplicity="*"
    Role="DescriptionEntities"></End>
</Association>
<Association Name="PST_PropertySet_Association">
    <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
    Role="PropertySetTypeEntities"></End>
    <End Type="com.sap.apptot.PropertySet" Multiplicity="*"
    Role="PropertySetEntities"></End>
</Association>
<Association Name="PST_Description_Association">
    <End Type="com.sap.apptot.PropertySetType" Multiplicity="1"
    Role="PropertySetTypeEntities"></End>
    <End Type="com.sap.apptot.Description" Multiplicity="*"
    Role="DescriptionEntities"></End>
</Association>
<Association Name="PS_Description_Association">
    <End Type="com.sap.apptot.PropertySet" Multiplicity="1"
    Role="PropertySetEntities"></End>
    <End Type="com.sap.apptot.Description" Multiplicity="*"
    Role="DescriptionEntities"></End>
</Association>
<EntityContainer Name="CompositeThings" m:IsDefaultEntityContainer="true">
    <EntitySet Name="PropertySetTypes"
    EntityType="com.sap.apptot.PropertySetType"></EntitySet>
    <EntitySet Name="PropertySets" EntityType="com.sap.apptot.PropertySet"></
    EntitySet>
    <EntitySet Name="Descriptions" EntityType="com.sap.apptot.Description"></
    EntitySet>
    <EntitySet Name="PST_core_bbautomobiles_styles"
    EntityType="com.sap.apptot.PST_core_bbautomobiles__style"></EntitySet>

```

```

<AssociationSet Name="PST_PropertySet_Association"
Association="com.sap.apptot.PST_PropertySet_Association">
    <End EntitySet="PropertySetTypes" Role="PropertySetTypeEntities"></End>
    <End EntitySet="PropertySets" Role="PropertySetEntities"></End>
</AssociationSet>
<AssociationSet Name="PST_Description_Association"
Association="com.sap.apptot.PST_Description_Association">
    <End EntitySet="PropertySetTypes" Role="PropertySetTypeEntities"></End>
    <End EntitySet="Descriptions" Role="DescriptionEntities"></End>
</AssociationSet>
<AssociationSet Name="PS_Description_Association"
Association="com.sap.apptot.PS_Description_Association">
    <End EntitySet="PropertySets" Role="PropertySetEntities"></End>
    <End EntitySet="Descriptions" Role="DescriptionEntities"></End>
</AssociationSet>
<AssociationSet Name="PST_PropertySet_Association"
Association="com.sap.apptot.PST_PropertySet_Association">
    <End EntitySet="PropertySetTypes" Role="PropertySetTypeEntities"></End>
    <End EntitySet="PropertySets" Role="PropertySetEntities"></End>
</AssociationSet>
<AssociationSet Name="PST_Description_Association"
Association="com.sap.apptot.PST_Description_Association">
    <End EntitySet="PropertySetTypes" Role="PropertySetTypeEntities"></End>
    <End EntitySet="Descriptions" Role="DescriptionEntities"></End>
</AssociationSet>
<AssociationSet Name="PS_Description_Association"
Association="com.sap.apptot.PS_Description_Association">
    <End EntitySet="PropertySets" Role="PropertySetEntities"></End>
    <End EntitySet="Descriptions" Role="DescriptionEntities"></End>
</AssociationSet>
</EntityContainer>

```

Related Information

[Composite Things: OData Service \[page 1312\]](#)

23.2.2 Read Details of a Property Set Type

Retrieves details of a specific property set type

Request

URI: /CompositeThings/v1/PropertySetTypes('<property set type name>')

Operation Type: CRUD

HTTP Method: *GET*

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
Property set type name	Yes	String	Name of the property set type

Request Example

```
/CompositeThings/v1/PropertySetTypes('core.automobiles:style')
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<link href="PropertySetTypes('core.automobiles%3Astyle')" rel="edit"
title="PropertySetType"></link>
<link href="PropertySetTypes('core.automobiles%3Astyle')/PropertySets"
rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/PropertySets"
title="PropertySets" type="application/atom+xml;type=feed"></link>
<link href="PropertySetTypes('core.automobiles%3Astyle')/Descriptions"
rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/Descriptions"
title="Descriptions" type="application/atom+xml;type=feed"></link>
<content type="application/xml">
  <m:properties>
    <d:PropertySetType>core.automobiles:style</d:PropertySetType>
    <d:DataCategory>MasterData</d:DataCategory>
    <d:ISOCODE>en_US</d:ISOCODE>
    <d:Description m:null="true"></d:Description>
  </m:properties>
</content>
</entry>
```

Related Information

[Composite Things: OData Service \[page 1312\]](#)

23.2.3 Read all Property Set Types

Retrieves all property set types

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/CompositeThings/v1/PropertySetTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

`<ctodata>.SysAdmin`

`<ctodata>.r`

Request Parameters

None

Request Example

```
/CompositeThings/v1/PropertySetTypes
```

Query String Parameters

Parameter	Required	Data Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.
<code>\$orderby</code>	No	String	Field name to be used for sorting the result set in ascending order; only valid field is the PropertySetType . To sort the result set, use asc for the ascending order and desc for the descending order.

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; the only valid field is PropertySetType . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<link href="PropertySetTypes('core.autobomobiles%3Astyle')" rel="edit"
title="PropertySetType"></link>
<link href="PropertySetTypes('core.autobomobiles%3Astyle')/PropertySets"
rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/PropertySets"
title="PropertySets" type="application/atom+xml;type=feed"></link>
<link href="PropertySetTypes('core.autobomobiles%3Astyle')/Descriptions"
rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/Descriptions"
title="Descriptions" type="application/atom+xml;type=feed"></link>
<content type="application/xml">
  <m:properties>
    <d:PropertySetType>core.autobomobiles:style</d:PropertySetType>
    <d:DataCategory>MasterData</d:DataCategory>
    <d:ISOCODE>en_US</d:ISOCODE>
    <d:Description m:null="true"></d:Description>
  </m:properties>
</content>
</entry>
<entry>
  <link href="PropertySetTypes('core.autobomobiles%3ACarInfo')" rel="edit"
title="PropertySetType"></link>
  <link href="PropertySetTypes('core.autobomobiles%3ACarInfo')/
PropertySets" rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/
PropertySets" title="PropertySets" type="application/atom+xml;type=feed"></link>
  <link href="PropertySetTypes('core.autobomobiles%3ACarInfo')/
Descriptions" rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/
Descriptions" title="Descriptions" type="application/atom+xml;type=feed"></link>
  <content type="application/xml">
    <m:properties>
      <d:PropertySetType>core.autobomobiles:CarInfo</d:PropertySetType>
      <d:DataCategory>MasterData</d:DataCategory>
      <d:ISOCODE>en_US</d:ISOCODE>
    </m:properties>
  </content>
</entry>
```

```
<d:Description m:null="true"></d:Description>
</m:properties>
</content>
</entry>
```

Related Information

[Composite Things: OData Service \[page 1312\]](#)

23.2.4 Read all Property Sets for a Property Set Type

Retrieves all property sets for the specified property set type

Request

URI: /CompositeThings/v1/PropertySetTypes('<property set type name>')/PropertySets

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
property set type name	Yes	String	Name of the property set type

Request Example

```
/CompositeThings/v1/PropertySetTypes('core.automobiles:style')/PropertySets
```

Query String Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set

Parameter	Required	Data Type	Description
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; only valid field is the property set type name . To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid field is name . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. Only valid field is property set type name .

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<link href="PropertySets(PropertySet='carstyle',PropertySetType='core.automobiles%3Astyle',ThingType='core.automobiles%3ABCXSeries') " rel="edit" title="PropertySet"></link>
<link href="PropertySets(PropertySet='carstyle',PropertySetType='core.automobiles%3Astyle',ThingType='core.automobiles%3ABCXSeries')/Descriptions" rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/Descriptions" title="Descriptions" type="application/atom+xml;type=feed"></link>
<content type="application/xml">
  <m:properties>
    <d:PropertySet>carstyle</d:PropertySet>
    <d:PropertySetType>core.automobiles:style</d:PropertySetType>
    <d:ThingType>core.automobiles:ABCXSeries</d:ThingType>
    <d:ISOCODE>en</d:ISOCODE>
    <d:Description>Description of the property set type</d:Description>
    <d:CompositeURL>PST_core_automobiles__style?$filter=Path eq 'carstyle'</d:CompositeURL>
  </m:properties>
</content>
```

```
</m:properties>
</content>
```

Related Information

[Composite Things: OData Service \[page 1312\]](#)

23.2.5 Read Things for Property Set of a Property Set Type

Retrieves a list of unique things that uses property set of the specified property set type

Note

The result set does not contain the fields longitude and latitude as part of thing location details, –

- If you did not specify values for these fields while creating a **Location**.
- If you did not specify the location of a thing while creating a **Thing**.

Request

URI: /CompositeThings/v1/<property set type name>?\$filter=Path eq '<property set ID>'

Operation Type: CRUD

HTTP Method: *GET*

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
Property set type name	Yes	String	Entity set name of the property set type (you can retrieve this from the metadata)
Property set ID	Yes	String	Unique identifier of the property type (that belongs to the property set type) defined in a thing type

Request Example

```
/CompositeThings/v1/PST_core_automobiles__style?$filter=Path eq 'carstyle'
```


Query String Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; Valid fields are <i>thing ID</i>, <i>thing name</i>, <i>external ID</i>, and <i>timestamp</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; Valid fields are <i>thing ID</i>, <i>thing name</i>, <i>external ID</i>, and <i>timestamp</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid field is name. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the <i>AND</i> separator. Valid fields are <i>thingID</i>, <i>thing name</i>, <i>external ID</i>, and <i>timestamp</i>.
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid.

Note

The date functions such as *day*, *hour*, *minute*, *second*, *month*, and *year* are supported in *\$filter* query. For more information, see [Filter Conditions \(\\$filter\)](#) [page 1550].

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *XML*

Media types supported are *JSON* and *XML*. The *XML* for this method has the following structure:

```
<link href="PST_core_automobiles__styles" rel="self"
title="PST_core_automobiles__styles" />
  <entry>
    <id>https://composite-things-odata-ci.cfapps.staging.sic.ondemand.com:443/
CompositeThings/v1/
PST_core_automobiles__carstyles('E601CF9BC9B6479281E3628B08DABE42')</id>
    <title type="text">PST_core_automobiles__styles</title>
    <updated>2016-11-19T09:38:16.614Z</updated>
    <category term="com.sap.apptot.PST_core_automobiles__style" scheme="http://
schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
    <link
href="PST_core_automobiles__styles('E601CF9BC9B6479281E3628B08DABE42')"
rel="edit" title="PST_core_automobiles__style" />
    <link
href="PST_core_automobiles__styles('E601CF9BC9B6479281E3628B08DABE42')/
Descriptions" rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/
Descriptions" title="Descriptions" type="application/atom+xml;type=feed" />
    <content type="application/xml">
      <m:properties>
        <d:ThingId>E601CF9BC9B6479281E3628B08DABE42</d:ThingId>
        <d:Path>/carstyle</d:Path>
        <d:Timestamp>1970-01-01T00:00:00.000Z</d:Timestamp>
        <d:ThingISOCODE>en</d:ThingISOCODE>
        <d:ThingDescription>car thing 1 description</d:ThingDescription>
        <d:ThingName>carthing1</d:ThingName>
        <d:ThingExternalId>carthingextid </d:ThingExternalId>
        <d:ThingType>core.automobiles:ABCXSeries</d:ThingType>
        <d:ObjectGroup>3F2EE14BEF184BE7A1BDEBC12CC7409B</d:ObjectGroup>
        <d:BPName m:null="true" />
        <d:BPLandlinePhoneNumber m:null="true" />
        <d:BPMobilePhoneNumber m:null="true" />
        <d:ThingCustomerId m:null="true" />
        <d:ThingRegionDescription m:null="true" />
        <d:ThingCityName m:null="true" />
        <d:ThingCountryDescription m:null="true" />
        <d:ThingCountryId m:null="true" />
        <d:ThingAddressRepresentation m:null="true" />
        <d:ThingLocationID m:null="true" />
        <d:AlternateId>carthinglaltid</d:AlternateId>
        <d:Latitude>0.0</d:Latitude>
        <d:Longitude>0.0</d:Longitude>
        <d:color>blue</d:color>
        <d:model>HZ1021</d:model>
      </m:properties>
    </content>
  </entry>
</entry>
```

```

    <id>https://composite-things-odata-ci.cfapps.staging.sic.ondemand.com:443/
CompositeThings/v1/
PST_core_automobiles__styles('B165AC277A85444DB29BF7FED08AAE08')</id>
    <title type="text">PST_core_automobiles__styles</title>
    <updated>2016-11-19T09:38:16.614Z</updated>
    <category term="com.sap.apptot.PST_core_automobiles__style" scheme="http://
schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
    <link
href="PST_core_automobiles__styles('B165AC277A85444DB29BF7FED08AAE08') "
rel="edit" title="PST_core_automobiles__style" />
    <link
href="PST_core_automobiles__styles('B165AC277A85444DB29BF7FED08AAE08')/
Descriptions" rel="http://schemas.microsoft.com/ado/2007/08/dataservices/related/
Descriptions" title="Descriptions" type="application/atom+xml;type=feed" />
    <content type="application/xml">
      <m:properties>
        <d:ThingId>B165AC277A85444DB29BF7FED08AAE08</d:ThingId>
        <d:Path m:null="true" />
        <d:Timestamp>1970-01-01T00:00:00.000Z</d:Timestamp>
        <d:ThingISOCODE>en</d:ThingISOCODE>
        <d:ThingDescription>car thing 2 description</d:ThingDescription>
        <d:ThingName>carthing2</d:ThingName>
        <d:ThingExternalId>carthingextid </d:ThingExternalId>
        <d:ThingType>core.automobiles:ABCXSeries</d:ThingType>
        <d:ObjectGroup>3F2EE14BEF184BE7A1BDEBC12CC7409B</d:ObjectGroup>
        <d:BPName m:null="true" />
        <d:BPLandlinePhoneNumber m:null="true" />
        <d:BPMobilePhoneNumber m:null="true" />
        <d:ThingCustomerId m:null="true" />
        <d:ThingRegionDescription m:null="true" />
        <d:ThingCityName m:null="true" />
        <d:ThingCountryDescription m:null="true" />
        <d:ThingCountryId m:null="true" />
        <d:ThingAddressRepresentation m:null="true" />
        <d:ThingLocationID m:null="true" />
        <d:AlternateId>carthing2altid</d:AlternateId>
        <d:Latitude>0.0</d:Latitude>
        <d:Longitude>0.0</d:Longitude>
        <d:color m:null="true" />
        <d:model m:null="true" />
      </m:properties>
    </content>
  </entry>

```

Related Information

[Composite Things: OData Service \[page 1312\]](#)

23.3 Composite Events: OData Service

Overview

The composite events OData service is used to retrieve all user-defined event details for the specified event type. In addition, the service also retrieves the event data.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/CompositeEvents/v1`

Example for a Root URI in a cloud foundry environment: `https://composite-events-odata.cfapps.eu10.hana.ondemand.com/CompositeEvents`

Permissions:

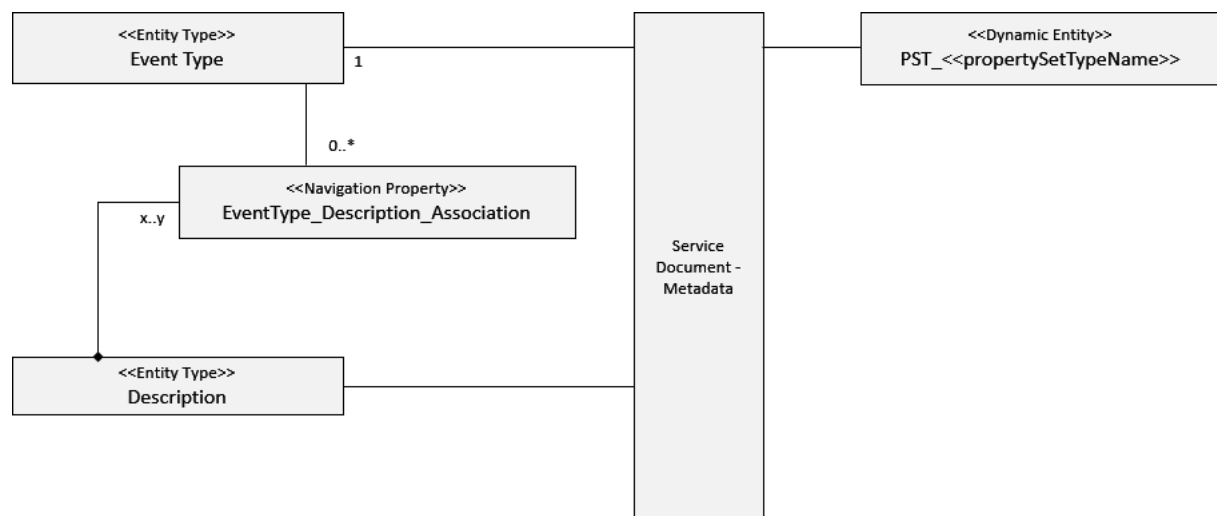
`<ctodata>.SysAdmin`

`<ctodata>.r`

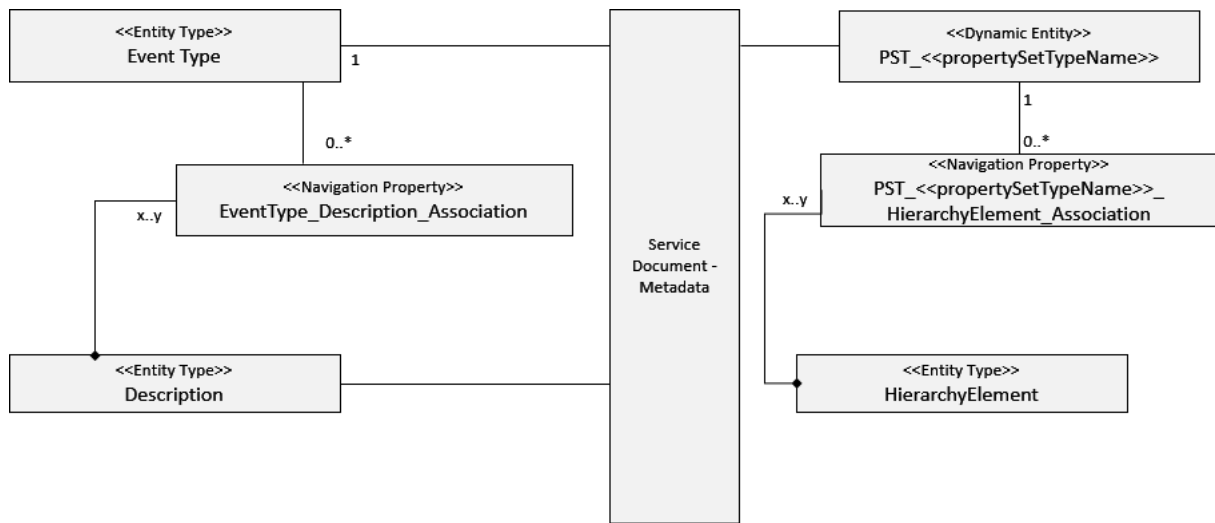
Entity Data Model

The following diagrams illustrate the EDM of composite events OData services for different versions:

Version 1



Version 2



Service Metadata URI: `http://<server address>[:<port number>]/CompositeEvents/v1/$metadata`

Related Information

[Read Metadata of Composite Events \[page 1327\]](#)

[Read Details of all Event Types \[page 1331\]](#)

[Read Details of an Event Type \[page 1335\]](#)

[Read Events and Event Data for Property Set of a Property Set Type \[page 1337\]](#)

[Read Details of all Events for an Event Type \[page 1344\]](#)

[Read Details of an Event for an Event Type \[page 1353\]](#)

23.3.1 Read Metadata of Composite Events

With this method, you can retrieve metadata of composite events.

Request

URI:

Version	URI
v1	<code>/CompositeEvents/v1/\$metadata</code>
v2	<code>/CompositeEvents/v2/\$metadata</code>

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Parameters

None

Request Example

```
/CompositeEvents/v1/$metadata
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the structure as depicted in the following examples:

The request `GET /CompositeEvents/v1/$metadata` retrieves the following example:

```
<EntityType Name="EventType">
  <Key>
    <PropertyRef Name="EventType"/>
  </Key>
  <Property Name="EventType" Type="Edm.String" Nullable="false"/>
  <Property Name="EventTypeDescription" Type="Edm.String"/>
  <Property Name="PropertySet" Type="Edm.String"/>
  <Property Name="PropertySetType" Type="Edm.String"/>
  <Property Name="CompositeURL" Type="Edm.String"/>
  <NavigationProperty Name="Descriptions"
Relationship="com.abc.apptot.EventType_Description_Association"
FromRole="EventTypeEntities" ToRole="DescriptionEntities"/>
</EntityType>
<EntityType Name="PST_com_abc_core__ExceededTemperature">
  <Key>
    <PropertyRef Name="EventId"/>
  </Key>
  <Property Name="EventId" Type="Edm.String" Nullable="false"/>
  <Property Name="Path" Type="Edm.String"/>
  <Property Name="CorrelationId" Type="Edm.String"/>
  <Property Name="BusinessTimestamp" Type="Edm.String"/>
  <Property Name="EventType" Type="Edm.String"/>
</EntityType>
```

```

    <Property Name="Status" Type="Edm.String"/>
    <Property Name="Severity" Type="Edm.String"/>
    <Property Name="Code" Type="Edm.String"/>
    <Property Name="ThingId" Type="Edm.String"/>
    <Property Name="ThingProperty" Type="Edm.String"/>
    <Property Name="ExternalId" Type="Edm.String"/>
    <Property Name="PropertySet" Type="Edm.String"/>
    <Property Name="Temperature" Type="Edm.Int64"/>
</EntityType>
<EntityType Name="PST_com_abc_core__ExceededPressure">
    <Key>
        <PropertyRef Name="EventId"/>
    </Key>
    <Property Name="EventId" Type="Edm.String" Nullable="false"/>
    <Property Name="Path" Type="Edm.String"/>
    <Property Name="CorrelationId" Type="Edm.String"/>
    <Property Name="BusinessTimestamp" Type="Edm.String"/>
    <Property Name="EventType" Type="Edm.String"/>
    <Property Name="Status" Type="Edm.String"/>
    <Property Name="Severity" Type="Edm.String"/>
    <Property Name="Code" Type="Edm.String"/>
    <Property Name="ThingId" Type="Edm.String"/>
    <Property Name="ThingProperty" Type="Edm.String"/>
    <Property Name="ExternalId" Type="Edm.String"/>
    <Property Name="PropertySet" Type="Edm.String"/>
    <Property Name="Pressure" Type="Edm.Int64"/>
</EntityType>
<EntityType Name="Description">
    <Key>
        <PropertyRef Name="FieldName"></PropertyRef>
    </Key>
    <Property Name="FieldName" Type="Edm.String"></Property>
    <Property Name="Value" Type="Edm.String"></Property>
</EntityType>

```

The request GET /CompositeEvents/v2/\$metadata retrieves the following example:

```

<EntityType Name="EventType">
    <Key>
        <PropertyRef Name="EventType"/>
    </Key>
    <Property Name="EventType" Type="Edm.String" Nullable="false"/>
    <Property Name="EventTypeDescription" Type="Edm.String"/>
    <Property Name="PropertySet" Type="Edm.String"/>
    <Property Name="PropertySetType" Type="Edm.String"/>
    <Property Name="CompositeURL" Type="Edm.String"/>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.apiot.EventType_Description_Association"
FromRole="EventTypeEntities" ToRole="DescriptionEntities"/>
</EntityType>

<EntityType Name="PST_com_sap_core__ExceededTemperature">
    <Key>
        <PropertyRef Name="EventId"></PropertyRef>
    </Key>
    <Property Name="EventId" Type="Edm.String" Nullable="false"></Property>
    <Property Name="ExternalId" Type="Edm.String"></Property>
    <Property Name="Path" Type="Edm.String"></Property>
    <Property Name="BusinessTimestamp" Type="Edm.DateTimeOffset"
Nullable="false"></Property>
    <Property Name="CorrelationId" Type="Edm.String"></Property>
    <Property Name="EventType" Type="Edm.String"></Property>
    <Property Name="Status" Type="Edm.String"></Property>
    <Property Name="Severity" Type="Edm.Int16"></Property>
    <Property Name="Code" Type="Edm.String"></Property>
    <Property Name="ThingId" Type="Edm.String"></Property>
    <Property Name="ThingExternalId" Type="Edm.String"></Property>

```

```

    <Property Name="ThingProperty" Type="Edm.String"></Property>
    <Property Name="ThingISOCODE" Type="Edm.String"></Property>
    <Property Name="ThingDescription" Type="Edm.String"></Property>
    <Property Name="ThingName" Type="Edm.String"></Property>
    <Property Name="ThingType" Type="Edm.String"></Property>
    <Property Name="BPName" Type="Edm.String"></Property>
    <Property Name="BPLandlinePhoneNumber" Type="Edm.String"></Property>
    <Property Name="BPMobilePhoneNumber" Type="Edm.String"></Property>
    <Property Name="ThingCustomerId" Type="Edm.String"></Property>
    <Property Name="ThingRegionDescription" Type="Edm.String"></Property>
    <Property Name="ThingCityName" Type="Edm.String"></Property>
    <Property Name="ThingCountryDescription" Type="Edm.String"></Property>
    <Property Name="ThingCountryId" Type="Edm.String"></Property>
    <Property Name="ThingAddressRepresentation" Type="Edm.String"></
Property>
    <Property Name="ThingLocationId" Type="Edm.String"></Property>
    <Property Name="Temperature" Type="Edm.Int64"/>
</EntityType>

<EntityType Name="PST_com_sap_core__ExceededPressure">
    <Key>
        <PropertyRef Name="EventId"></PropertyRef>
    </Key>
    <Property Name="EventId" Type="Edm.String" Nullable="false"></Property>
    <Property Name="ExternalId" Type="Edm.String"></Property>
    <Property Name="Path" Type="Edm.String"></Property>
    <Property Name="BusinessTimestamp" Type="Edm.DateTimeOffset"
Nullable="false"></Property>
    <Property Name="CorrelationId" Type="Edm.String"></Property>
    <Property Name="EventType" Type="Edm.String"></Property>
    <Property Name="Status" Type="Edm.String"></Property>
    <Property Name="Severity" Type="Edm.Int16"></Property>
    <Property Name="Code" Type="Edm.String"></Property>
    <Property Name="ThingId" Type="Edm.String"></Property>
    <Property Name="ThingExternalId" Type="Edm.String"></Property>
    <Property Name="ThingProperty" Type="Edm.String"></Property>
    <Property Name="ThingISOCODE" Type="Edm.String"></Property>
    <Property Name="ThingDescription" Type="Edm.String"></Property>
    <Property Name="ThingName" Type="Edm.String"></Property>
    <Property Name="ThingType" Type="Edm.String"></Property>
    <Property Name="BPName" Type="Edm.String"></Property>
    <Property Name="BPLandlinePhoneNumber" Type="Edm.String"></Property>
    <Property Name="BPMobilePhoneNumber" Type="Edm.String"></Property>
    <Property Name="ThingCustomerId" Type="Edm.String"></Property>
    <Property Name="ThingRegionDescription" Type="Edm.String"></Property>
    <Property Name="ThingCityName" Type="Edm.String"></Property>
    <Property Name="ThingCountryDescription" Type="Edm.String"></Property>
    <Property Name="ThingCountryId" Type="Edm.String"></Property>
    <Property Name="ThingAddressRepresentation" Type="Edm.String"></
Property>
    <Property Name="ThingLocationId" Type="Edm.String"></Property>
    <Property Name="Pressure" Type="Edm.Int64"/>
</EntityType>

<EntityType Name="Description">
    <Key>
        <PropertyRef Name="FieldName"></PropertyRef>
    </Key>
    <Property Name="FieldName" Type="Edm.String"></Property>
    <Property Name="Value" Type="Edm.String"></Property>
</EntityType>

```


Related Information

[Composite Events: OData Service \[page 1326\]](#)

23.3.2 Read Details of all Event Types

Request

URI:

Version	URI
v1	/CompositeEvents/v1/EventTypes
v2	/CompositeEvents/v2/EventTypes

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Operation Type: CRUD

HTTP Method: *GET*

Permissions:

`<ctodata>.SysAdmin`

`<ctodata>.r`

Request Parameters

None

Request Example

```
/CompositeEvents/v1/EventTypes
```

Query String Parameters

Parameter	Required	Data Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set

Parameter	Required	Data Type	Description
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are <i>event type name</i>, <i>property set type name</i>, and <i>property set ID</i>. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$filter	No	String	Filter condition to be applied; the only valid field is <i>name</i>. The filter operators supported are <i>eq</i>, <i>lt</i>, <i>gt</i>, <i>le</i>, <i>ge</i>, and <i>ne</i>. Multiple filters are supported using the <i>AND</i> separator. Valid fields are <i>event type name</i>, <i>property set type name</i>, and <i>property set ID</i>.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are <i>event type name</i>, <i>property set type name</i>, <i>property set ID</i>, and <i>composite URL</i>. Event type name is a mandatory field. However, if you specify composite URL in the select condition, you must specify both <i>property set type name</i> and <i>property set ID</i> along with the <i>event type name</i>.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *XML*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

The request `/CompositeEvents/v1/EventTypes` retrieves all event types to which the user has access to.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedSpeed')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedSpeed')",
          "type": "com.sap.apptot.EventType"
        },
        "EventType": "core.automobiles:exceedSpeed",
        "EventTypeDescription": "Event type for exceeded speed",
        "PropertySet": "wheelspeed",
        "PropertySetType": "core.automobiles:wheelEPST",
        "CompositeURL": "PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheelspeed'",
        "Descriptions": {
          "__deferred": {
            "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedSpeed')/Descriptions"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
          "type": "com.sap.apptot.EventType"
        },
        "EventType": "core.automobiles:exceedTemp",
        "EventTypeDescription": "Event type for exceeded temperature",
        "PropertySet": "wheeltemp",
        "PropertySetType": "core.automobiles:wheelEPST",
        "CompositeURL": "PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'",
        "Descriptions": {
          "__deferred": {
            "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')/Descriptions"
          }
        }
      }
    ]
  }
}
```

Example 2

The request `/CompositeEvents/v1/EventTypes?$expand=Descriptions` retrieves all event types to which the user has access to along with the expanded view of descriptions.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedSpeed')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedSpeed')",
          "type": "com.sap.apptot.EventType"
        },
        "EventType": "core.automobiles:exceedSpeed",
        "EventTypeDescription": "Event type for exceeded speed",
        "PropertySet": "wheelspeed",
        "PropertySetType": "core.automobiles:wheelEPST",
        "CompositeURL": "PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheelspeed'",
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "type": "com.sap.apptot.Description"
              },
              "Language": "en",
              "Description": "Event type for exceeded speed"
            }
          ]
        }
      },
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
          "type": "com.sap.apptot.EventType"
        },
        "EventType": "core.automobiles:exceedTemp",
        "EventTypeDescription": "Event type for exceeded temperature",
        "PropertySet": "wheeltemp",
        "PropertySetType": "core.automobiles:wheelEPST",
        "CompositeURL": "PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'",
        "Descriptions": {
          "results": [
            {
              "__metadata": {
                "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "type": "com.sap.apptot.Description"
              },
              "Language": "en",
              "Description": "Event type for exceeded temperature"
            }
          ]
        }
      }
    ]
  }
}
```

```

    "Description": "Event type for exceeded temperature"
  }
}
]
}
]
}
}

```

Related Information

[Composite Events: OData Service \[page 1326\]](#)

23.3.3 Read Details of an Event Type

Request

URI:

Version	URI
v1	/CompositeEvents/v1/EventTypes('<event type name>')
v2	/CompositeEvents/v2/EventTypes('<event type name>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
Event type name	Yes	String	Name of the event type

Request Example

```
/CompositeEvents/v1/EventTypes('core.automobiles:exceedTemp')
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *XML*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as shown in the following examples:

Example 1

The request `/CompositeEvents/v1/EventTypes('core.automobiles:exceedTemp')` retrieves the details of a specific event type.

```
{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
      "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
      "type": "com.sap.apptot.EventType"
    },
    "EventType": "core.automobiles:exceedTemp",
    "EventTypeDescription": "Event type for exceeded temperature",
    "PropertySet": "wheeltemp",
    "PropertySetType": "core.automobiles:wheelEPST",
    "CompositeURL": "PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'",
    "Descriptions": {
      "__deferred": {
        "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')/Descriptions"
      }
    }
  }
}
```

Example 2

The request `/CompositeEvents/v1/EventTypes('core.automobiles:exceedTemp')?$expand=Descriptions` retrieves the details of a specific event type.

```
{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/EventTypes('core.automobiles%3AexceedTemp')",
```

```

        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/
EventTypes('core.automobiles%3AexceedTemp')",
        "type": "com.sap.apptot.EventType"
    },
    "EventType": "core.automobiles:exceedTemp",
    "EventTypeDescription": "Event type for exceeded temperature",
    "PropertySet": "wheeltemp",
    "PropertySetType": "core.automobiles:wheelEPST",
    "CompositeURL": "PST_core_automobiles__wheelEPST1s?$filter=Path eq
'wheeltemp'",
    "Descriptions": {
        "results": [{
            "__metadata": {
                "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/Descriptions('en')",
                "type": "com.sap.apptot.Description"
            },
            "Language": "en",
            "Description": "Event type for exceeded temperature"
        }]
    }
}

```

Related Information

[Composite Events: OData Service \[page 1326\]](#)

23.3.4 Read Events and Event Data for Property Set of a Property Set Type

Retrieves all events and event data for the specified property set type and property set

Note

With this service, you can retrieve events (with same correlation ID or different correlation ID) with latest time stamp for every correlation ID.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI:

Version	URI
v1	/CompositeEvents/v1/CompositeURL
v2	/CompositeEvents/v2/CompositeURL

Note

You will find the value for the [CompositeURL](#) field in the response payload of /CompositeEvents/v1/EventTypes('core.automobiles:exceedTemp')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

<ctodata>.SysAdmin

<ctodata>.r

Request Example

```
/CompositeEvents/v1/PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'
```

Query String Parameters

Parameter	Required	Data Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all fields in the result set are valid. In addition, all dynamic columns are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; all fields in the result set are valid. However, for /v2 version, the field BusinessTimestamp is not supported. The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the and separator.

Parameter	Required	Data Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set; all fields in the result set are valid. In addition, all dynamic columns are valid.

Note

The date functions such as [day](#), [hour](#), [minute](#), [second](#), [month](#), and [year](#) are supported in `$filter` query. For more information, see [Filter Conditions \(\\$filter\)](#) [page 1550].

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types [JSON](#) and [XML](#) are supported. The [JSON](#) for this method has the structure as depicted in the following examples.

Example 1

The request `/CompositeEvents/v1/PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'`, retrieves the following result:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEBC337646CF9')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEBC337646CF9')",
          "type": "com.sap.apptot.PST_core_automobiles__wheelEPST"
        },
        "EventId": "2C0108673D43483B94AFEBC337646CF9",
        "Path": "wheeltemp",
        "BusinessTimestamp": "2018-08-05 09:00:00.000000000",
        "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Danger",
        "Status": "Open",
      }
    ]
  }
}
```

```

        "Severity": "1",
        "Code": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
        "ExternalId": "exceedtemp-extID",
        "Description": "Alert on exceeded temperature",
        "Source": null,
        "Data": null,
        "application": "exceeded temperature app",
        "temperature": "55",
        "message": "Alert on exceeded temperature"
    },
    {
        "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v1/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "type": "PST_core_automobiles__wheelEPST"
        },
        "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
        "Path": "wheeltemp",
        "BusinessTimestamp": "2018-06-05 09:00:00.000000000",
        "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Warning",
        "Status": "Open",
        "Severity": "2",
        "Code": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
        "ExternalId": "exceedtemp-extID",
        "Description": "Alert on exceeded temperature",
        "Source": null,
        "Data": null,
        "application": "exceeded temperature app",
        "temperature": "35",
        "message": "Alert on exceeded temperature"
    }
]
}
}

```

Example 2

The request `/CompositeEvents/v2/PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'`, retrieves the following result:

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "type": "com.sap.apptiot.PST_core_automobiles__wheelEPST"
        },
        "EventId": "2C0108673D43483B94AFEB337646CF9",
        "ExternalId": "exceedtemp-extID",
        "Path": "wheeltemp",
        "BusinessTimestamp": "/Date(1533459600000)/",

```

```

        "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Danger",
        "Status": "Open",
        "StatusDescription": "Open Status",
        "Severity": 1,
        "SeverityDescription": "High",
        "Code": null,
        "CodeDescription": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "ThingExternalId": "ABCXSeries-extID",
        "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
        "ThingISOCODE": "en",
        "ThingDescription": "ABCXSeries thing description",
        "ThingName": "ABCXSeries",
        "ThingType": "core.automobiles:ABCXSeries",
        "BPName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCityName": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingAddressRepresentation": null,
        "ThingLocationId": null,
        "EventInfo": "Alert on exceeded temperature",
        "application": "exceeded temperature app",
        "temperature": "55",
        "message": "Alert on exceeded temperature"
    },
    {
        "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "type": "com.sap.apptot.PST_core_automobiles__wheelEPST"
        },
        "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
        "ExternalId": "exceedtemp-extID",
        "Path": "wheeltemp",
        "BusinessTimestamp": "/Date(1528189200000)/",
        "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Warning",
        "Status": "Open",
        "StatusDescription": "Open Status",
        "Severity": 2,
        "SeverityDescription": "Medium",
        "Code": null,
        "CodeDescription": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "ThingExternalId": "ABCXSeries-extID",
        "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
        "ThingISOCODE": "en",
        "ThingDescription": "ABCXSeries thing description",
        "ThingName": "ABCXSeries",
        "ThingType": "core.automobiles:ABCXSeries",
        "BPName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCityName": null,
        "ThingCountryDescription": null,
    }
}

```

```

        "ThingCountryId": null,
        "ThingAddressRepresentation": null,
        "ThingLocationId": null,
        "EventInfo": "Alert on exceeded temperature",
        "appliication": "exceeded temperature app",
        "temperature": "35",
        "message": "Alert on exceeded temperature"
    }
  ]
}

```

Example 3

The request `/CompositeEvents/v2/PST_core_automobiles__wheelEPSTs?$filter=Path eq 'wheeltemp'&$expand=HierarchyElements` retrieves the following response in [JSON](#) format:

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/PST_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "type": "com.sap.apptot.PST_core_automobiles__wheelEPST"
        },
        "EventId": "2C0108673D43483B94AFEB337646CF9",
        "ExternalId": "exceedtemp-extID",
        "Path": "wheeltemp",
        "BusinessTimestamp": "/Date(1533459600000)/",
        "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Danger",
        "Status": "Open",
        "StatusDescription": "Open Status",
        "Severity": 1,
        "SeverityDescription": "High",
        "Code": null,
        "CodeDescription": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "ThingExternalId": "ABCXSeries-extID",
        "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
        "ThingISOCODE": "en",
        "ThingDescription": "ABCXSeries thing description",
        "ThingName": "ABCXSeries",
        "ThingType": "core.automobiles:ABCXSeries",
        "BPName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCityName": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingAddressRepresentation": null,
        "ThingLocationId": null,
        "EventInfo": "Alert on exceeded temperature",
        "appliication": "exceeded temperature app",
        "temperature": "55",
        "message": "Alert on exceeded temperature",
        "HierarchyElements": {
          "results": [
            {

```

```

        "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
HierarchyElements('2C0108673D43483B94AFEB337646CF9')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
HierarchyElements('2C0108673D43483B94AFEB337646CF9')",
            "type": "com.sap.apptot.HierarchyElement"
        },
        "EventId": "2C0108673D43483B94AFEB337646CF9",
        "HierarchyId": "D6B000D0588644571600B10292B22EE6",
        "RootThing": "71A184C1345C4DD68D46315181409738",
        "RootThingType": "core.automobiles:ABCXSeries",
        "RootThingName": "ABCXSeries",
        "RootThingDescription": "ABCXSeries thing
description",
        "RootThingExternalId": "ABCXSeries-extID",
        "HierarchyDescription": "Desccribes hierarchy of
units in the ABCXSeries"
    }
}
},
{
    "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
PST_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
        "type": "com.sap.apptot.PST_core_automobiles__wheelEPST"
    },
    "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
    "ExternalId": "exceedtemp-extID",
    "Path": "wheeltemp",
    "BusinessTimestamp": "/Date(1528189200000)/",
    "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Warning",
    "Status": "Open",
    "StatusDescription": "Open Status",
    "Severity": 2,
    "SeverityDescription": "Medium",
    "Code": null,
    "CodeDescription": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "ThingExternalId": "ABCXSeries-extID",
    "ThingProperty": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCode": "en",
    "ThingDescription": "ABCXSeries thing description",
    "ThingName": "ABCXSeries",
    "ThingType": "core.automobiles:ABCXSeries",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCityName": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingAddressRepresentation": null,
    "ThingLocationId": null,
    "EventInfo": "Alert on exceeded temperature",
    "application": "exceeded temperature app",
    "temperature": "35",
    "message": "Alert on exceeded temperature",
    "HierarchyElements": {

```

```

        "results": [
            {
                "__metadata": {
                    "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
HierarchyElements('2C9A8540B2A24560AA9CFB2EC209469D')",
                    "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/v2/
HierarchyElements('2C9A8540B2A24560AA9CFB2EC209469D')",
                    "type": "com.sap.apptot.HierarchyElement"
                },
                "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
                "HierarchyId": "D6B000D0588644571600B10292B22EE6",
                "RootThing": "71A184C1345C4DD68D46315181409738",
                "RootThingType": "core.automobiles:ABCXSeries",
                "RootThingName": "ABCXSeries",
                "RootThingDescription": "ABCXSeries thing
description",
                "RootThingExternalId": "ABCXSeries-extID",
                "HierarchyDescription": "Desccribes hierarchy of
units in the ABCXSeries"
            }
        ]
    }
}

```

Related Information

[Composite Events: OData Service \[page 1326\]](#)

23.3.5 Read Details of all Events for an Event Type

Retrieves all events for the specified event type

In addition, you can retrieve a subset of all events, according to the filter criteria provided. For a collective request for a set of events, you have these options:

- You can restrict the set of events to be retrieved by filter criteria based on the business timestamp, event type, type, property, and tenant.
- You can define that the set of matching events shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI:

Version	URI
v1	/CompositeEvents/EventType/v1/<event type name>/Events
v2	/CompositeEvents/EventType/v2/<event type name>/Events

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all fields in the result are valid. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied /v1 version: all fields in the result set are valid. However, the BusinessTimestamp field is not supported. /v2 version: all fields in the result set are valid, except for the fields BusinessTimestamp , EventType , Type , Property , and Tenant . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator.

Parameter	Required	Data Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set. /v1 version: all fields in the result set are valid. /v2 version: all fields in the result set are valid, except for the fields <i>EventType</i>, <i>Type</i>, <i>Property</i>, and <i>Tenant</i>.

Request Example

/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events

Response

Response Status and Error Codes

Code	Description
200	Events of a specific event type retrieved successfully

Payload

Format: *XML*

Media types *JSON* and *XML* are supported. The *JSON* for this method has the structure as depicted in the following examples:

Example 1

Request /CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events retrieves the following response:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEBC337646CF9')",
          "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEBC337646CF9')",
          "type": "com.sap.apptot.Event"
        },
        "EventId": "2C0108673D43483B94AFEBC337646CF9",
        "ExternalId": "exceedtemp-extID",
        "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
        "BusinessTimestamp": "/Date(1533459600000)/",
        "Status": "Open",

```



```

        "EventType": "core.automobiles:exceedTemp",
        "Type": "Danger",
        "Severity": 1,
        "Source": null,
        "Code": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "Property": "core.automobiles:ABCXSeries/frwheel",
        "Tenant": "com-abc",
        "Description": "Alert on exceeded temperature",
        "DYN_ENT_core_automobiles__wheelEPST": {
            "__deferred": {
                "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')/
DYN_ENT_core_automobiles__wheelEPST"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
            "type": "com.sap.apptot.Event"
        },
        "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
        "ExternalId": "exceedtemp-extID",
        "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
        "BusinessTimestamp": "/Date(1528189200000)/",
        "Status": "Open",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Warning",
        "Severity": 2,
        "Source": null,
        "Code": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "Property": "core.automobiles:ABCXSeries/frwheel",
        "Tenant": "com-abc",
        "Description": "Alert on exceeded temperature",
        "DYN_ENT_core_automobiles__wheelEPST": {
            "__deferred": {
                "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')/
DYN_ENT_core_automobiles__wheelEPST"
            }
        }
    }
]
}

```

Example 2

Request `/CompositeEvents/EventType/v2/core.automobiles:exceedTemp/Events` retrieves the following response:

```

{
  "d": {
    "results": [
      {
        "__metadata": {

```

```

        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
        "type": "com.sap.apptot.Event"
    },
    "EventId": "2C0108673D43483B94AFEB337646CF9",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
    "BusinessTimestamp": "/Date(1533459600000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Danger",
    "Severity": 1,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCODE": "en",
    "ThingDescription": "ABCXSeries thing description",
    "ThingName": "ABCXSeries",
    "ThingExternalId": "ABCXSeries-extID",
    "ThingType": "core.automobiles:ABCXSeries",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCityName": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingAddressRepresentation": null,
    "ThingLocationId": null,
    "Tenant": "com-abc",
    "DYN_ENT_core_automobiles__wheelEPST": {
        "__deferred": {
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')/
DYN_ENT_core_automobiles__wheelEPST"
        }
    }
},
{
    "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
        "type": "com.sap.apptot.Event"
    },
    "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
    "BusinessTimestamp": "/Date(1528189200000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Warning",
    "Severity": 2,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCODE": "en",

```

```

        "ThingDescription": "ABCXSeries thing description",
        "ThingName": "ABCXSeries",
        "ThingExternalId": "ABCXSeries-extID",
        "ThingType": "core.automobiles:ABCXSeries",
        "BPName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCityName": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingAddressRepresentation": null,
        "ThingLocationId": null,
        "Tenant": "com-abc",
        "DYN_ENT_core_automobiles__wheelEPST": {
            "__deferred": {
                "__uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')/
DYN_ENT_core_automobiles__wheelEPST"
            }
        }
    }
}

```

Example 3

Request `/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events?`
`$expand=DYN_ENT_core_automobiles__wheelEPST` retrieves the following response:

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
          "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
          "type": "com.sap.apptot.Event"
        },
        "EventId": "2C0108673D43483B94AFEB337646CF9",
        "ExternalId": "exceedtemp-extID",
        "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
        "BusinessTimestamp": "/Date(1533459600000)/",
        "Status": "Open",
        "EventType": "core.automobiles:exceedTemp",
        "Type": "Danger",
        "Severity": 1,
        "Source": null,
        "Code": null,
        "ThingId": "71A184C1345C4DD68D46315181409738",
        "Property": "core.automobiles:ABCXSeries/frwheel",
        "Tenant": "iotae-citest1",
        "DYN_ENT_core_automobiles__wheelEPST": {
          "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/

```

```

core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
    "type":
    "com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
    },
    "ObjectId": "2C0108673D43483B94AFEB337646CF9",
    "wheeltemp.temperature": "55",
    "wheeltemp.appliction": "exceeded temperature app",
    "wheeltemp.message": "Alert on exceeded temperature",
    "Path": "wheeltemp",
    "Timestamp": "/Date(1536147665246)/"
  }
},
{
  "__metadata": {
    "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
    "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
    "type": "com.sap.apptot.Event"
  },
  "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
  "ExternalId": "exceedtemp-extID",
  "CorrelationId": "a836f37ef69c4b75a49769bf17ec560f",
  "BusinessTimestamp": "/Date(1528189200000)/",
  "Status": "Open",
  "EventType": "core.automobiles:exceedTemp",
  "Type": "Warning",
  "Severity": 2,
  "Source": null,
  "Code": null,
  "ThingId": "71A184C1345C4DD68D46315181409738",
  "Property": "core.automobiles:ABCXSeries/frwheel",
  "Tenant": "iotae-citest1",
  "DYN_ENT_core_automobiles__wheelEPST": {
    "__metadata": {
      "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
      "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
      "type":
      "com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
    },
    "ObjectId": "2C9A8540B2A24560AA9CFB2EC209469D",
    "wheeltemp.temperature": "35",
    "wheeltemp.appliction": "exceeded temperature app",
    "wheeltemp.message": "Alert on exceeded temperature",
    "Path": "wheeltemp",
    "Timestamp": "/Date(1536144468081)/"
  }
}
]
}
}

```

Example 4

Request /CompositeEvents/EventType/v2/core.automobiles:exceedTemp/Events?
 \$expand=DYN_ENT_core_automobiles__wheelEPST retrieves the following response:

```
{
```

```

"d": {
  "results": [
    {
      "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
        "type": "com.sap.apptot.Event"
      },
      "EventId": "2C0108673D43483B94AFEB337646CF9",
      "ExternalId": "exceedtemp-extID",
      "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
      "BusinessTimestamp": "/Date(1533459600000)/",
      "Status": "Open",
      "EventType": "core.automobiles:exceedTemp",
      "Type": "Danger",
      "Severity": 1,
      "Source": null,
      "Code": null,
      "ThingId": "71A184C1345C4DD68D46315181409738",
      "Property": "core.automobiles:ABCXSeries/frwheel",
      "ThingISOCode": "en",
      "ThingDescription": "ABCXSeries thing description",
      "ThingName": "ABCXSeries",
      "ThingExternalId": "ABCXSeries-extID",
      "ThingType": "core.automobiles:ABCXSeries",
      "BPName": null,
      "BPLandlinePhoneNumber": null,
      "BPMobilePhoneNumber": null,
      "ThingCustomerId": null,
      "ThingRegionDescription": null,
      "ThingCityName": null,
      "ThingCountryDescription": null,
      "ThingCountryId": null,
      "ThingAddressRepresentation": null,
      "ThingLocationId": null,
      "Tenant": "com-abc",
      "DYN_ENT_core_automobiles__wheelEPST": {
        "__metadata": {
          "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
          "type":
"com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
        },
        "ObjectId": "2C0108673D43483B94AFEB337646CF9",
        "wheeltemp.temperature": "55",
        "wheeltemp.appliction": "exceeded temperature app",
        "wheeltemp.message": "Alert on exceeded temperature",
        "Path": "wheeltemp",
        "Timestamp": "/Date(1536147665246)/"
      }
    },
    {
      "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",

```

```

        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C9A8540B2A24560AA9CFB2EC209469D')",
        "type": "com.sap.apptot.Event"
    },
    "EventId": "2C9A8540B2A24560AA9CFB2EC209469D",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "a836f37ef69c4b75a49769bfl7ec560f",
    "BusinessTimestamp": "/Date(1528189200000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Warning",
    "Severity": 2,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCODE": "en",
    "ThingDescription": "ABCXSeries thing description",
    "ThingName": "ABCXSeries",
    "ThingExternalId": "ABCXSeries-extID",
    "ThingType": "core.automobiles:ABCXSeries",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCityName": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingAddressRepresentation": null,
    "ThingLocationId": null,
    "Tenant": "com-abc",
    "DYN_ENT_core_automobiles__wheelEPST": {
        "__metadata": {
            "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C9A8540B2A24560AA9CFB2EC209469D')",
            "type":
"com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
        },
        "ObjectId": "2C9A8540B2A24560AA9CFB2EC209469D",
        "wheeltemp.temperature": "35",
        "wheeltemp.applcation": "exceeded temperature app",
        "wheeltemp.message": "Alert on exceeded temperature",
        "Path": "wheeltemp",
        "Timestamp": "/Date(1536144468081)/"
    }
}
    ]
}
}

```

Related Information

[Composite Events: OData Service \[page 1326\]](#)

23.3.6 Read Details of an Event for an Event Type

Retrieves details of an event that belongs to a specific event type

Request

URI:

Version	URI
v1	/CompositeEvents/EventType/v1/<event type name>/Events('<event ID>')
v2	/CompositeEvents/EventType/v2/<event type name>/Events('<event ID>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type
event ID	Yes	String	Unique identifier of the event

Request Example

```
/CompositeEvents/EventType/v2/iotae.citest1.core.bbodataeventpkg:TempExceed/  
Events('2C0108673D43483B94AFEBBC337646CF9')
```

Response

Response Status and Error Codes

Code	Description
200	Event details of a specific event type retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples:

Example 1

Request `/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')` retrieves the following response:

```
{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "type": "com.sap.apptot.Event"
    },
    "EventId": "2C0108673D43483B94AFEB337646CF9",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
    "BusinessTimestamp": "/Date(1533459600000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Danger",
    "Severity": 1,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "Tenant": "com-abc",
    "Description": "Alert on exceeded temperature",
    "DYN_ENT_core_automobiles__wheelEPST": {
      "__deferred": {
        "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v1/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')/DYN_ENT_core_automobiles__wheelEPSTs"
      }
    }
  }
}
```

Request `/CompositeEvents/EventType/v2/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')` retrieves the following response:

```
{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "uri": "https://composite-events-odata-ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "type": "com.sap.apptot.Event"
    },
    "EventId": "2C0108673D43483B94AFEB337646CF9",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
    "BusinessTimestamp": "/Date(1533459600000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Danger",
  }
}
```



```

    "Severity": 1,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCode": "en",
    "ThingDescription": "ABCXSeries thing description",
    "ThingName": "ABCXSeries",
    "ThingExternalId": "ABCXSeries-extID",
    "ThingType": "core.automobiles:ABCXSeries",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCityName": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingAddressRepresentation": null,
    "ThingLocationId": null,
    "Tenant": "com-abc",
    "DYN_ENT_core_automobiles__wheelEPST": {
      "__deferred": {
        "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEBC337646CF9')/
DYN_ENT_core_automobiles__wheelEPSTs"
      }
    }
  }
}

```

Request /CompositeEvents/EventType/v1/core.automobiles:exceedTemp/
Events('2C0108673D43483B94AFEBC337646CF9')?

\$expand=DYN_ENT_core_automobiles__wheelEPST retrieves the following response:

```

{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEBC337646CF9')",
      "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEBC337646CF9')",
      "type": "com.sap.apptot.Event"
    },
    "EventId": "2C0108673D43483B94AFEBC337646CF9",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
    "BusinessTimestamp": "/Date(1533459600000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Danger",
    "Severity": 1,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "Description": "Alert on exceeded temperature",
    "Tenant": "com-abc",
    "DYN_ENT_core_automobiles__wheelEPST": {
      "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/

```

```

core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
    "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEB337646CF9')",
    "type": "com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
  },
  "ObjectId": "2C0108673D43483B94AFEB337646CF9",
  "wheeltemp.temperature": "55",
  "wheeltemp.appliction": "exceeded temperature app",
  "wheeltemp.message": "Alert on exceeded temperature",
  "Path": "wheeltemp",
  "Timestamp": "/Date(1536147665246)/"
}
}
}

```

Request /CompositeEvents/EventType/v2/core.automobiles:exceedTemp/
Events('2C0108673D43483B94AFEB337646CF9')?

\$expand=DYN_ENT_core_automobiles__wheelEPST retrieves the following response:

```

{
  "d": {
    "__metadata": {
      "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/Events('2C0108673D43483B94AFEB337646CF9')",
      "type": "com.sap.apptot.Event"
    },
    "EventId": "2C0108673D43483B94AFEB337646CF9",
    "ExternalId": "exceedtemp-extID",
    "CorrelationId": "946978c7dfe04d7e88bc61fccb47d9ec",
    "BusinessTimestamp": "/Date(1533459600000)/",
    "Status": "Open",
    "EventType": "core.automobiles:exceedTemp",
    "Type": "Danger",
    "Severity": 1,
    "Source": null,
    "Code": null,
    "ThingId": "71A184C1345C4DD68D46315181409738",
    "Property": "core.automobiles:ABCXSeries/frwheel",
    "ThingISOCode": "en",
    "ThingDescription": "ABCXSeries thing description",
    "ThingName": "ABCXSeries",
    "ThingExternalId": "ABCXSeries-extID",
    "ThingType": "core.automobiles:ABCXSeries",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCityName": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingAddressRepresentation": null,
    "ThingLocationId": null,
    "Tenant": "com-abc",
    "DYN_ENT_core_automobiles__wheelEPST": {
      "__metadata": {
        "id": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/

```

```

core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEBC337646CF9')",
    "uri": "https://composite-events-odata-
ci.cfapps.sap.hana.ondemand.com:443/CompositeEvents/EventType/v2/
core.automobiles:exceedTemp/
DYN_ENT_core_automobiles__wheelEPSTs('2C0108673D43483B94AFEBC337646CF9')",
    "type": "com.sap.apptot.DYN_ENT_core_automobiles__wheelEPST"
  },
  "ObjectId": "2C0108673D43483B94AFEBC337646CF9",
  "wheeltemp.temperature": "55",
  "wheeltemp.application": "exceeded temperature app",
  "wheeltemp.message": "Alert on exceeded temperature",
  "Path": "wheeltemp",
  "Timestamp": "/Date(1536147665246) /"
}
}
}

```

23.4 Composite Thing Configuration for a Specific Thing Hierarchy: OData Service

Overview

With this method, you can retrieve the thing configuration details for the specified thing hierarchy. The result set includes the following:

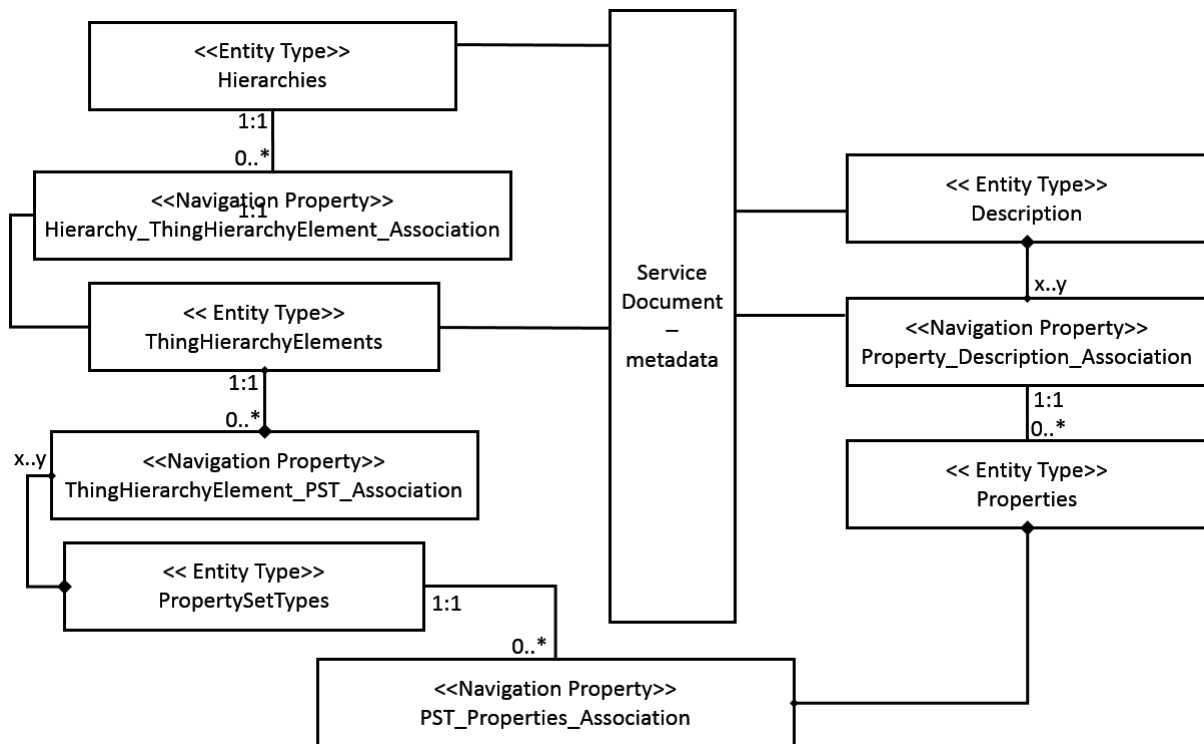
- Details of the specified thing hierarchy.
- All things that belong to the specified thing hierarchy.
- Property set types and properties associated with things that belong to the specified thing hierarchy.

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/CompositesThingHierarchy/v1`

Example for a Root URI in a cloud foundry environment: `https://cs-hierarchy-meta-sap.cfapps.eu10.hana.ondemand.com/CompositesThingHierarchy`

Entity Data Model



Service Metadata URI: `http://<server address>[:<port number>]/CompositesThingHierarchy/v1/$metadata`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
GET	Read Metadata [page 1359]	/ CompositesThingHierarchy/v1/\$metadata	<ctodata>.r
GET	Read all Hierarchies [page 1362]	/ CompositesThingHierarchy/v1/Hierarchies	<ctodata>.r
GET	Read Details of a Thing Hierarchy [page 1364]	/ CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')	<ctodata>.r

HTTP Method	Operation	URI	Scope
GET	Read Thing Hierarchy Elements [page 1365]	/CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')/ThingHierarchyElements	<ctodata>.r
GET	Read Thing Hierarchy Elements and Property Set Types [page 1369]	/CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')?\$expand=ThingHierarchyElements/PropertySetTypes	<ctodata>.r
GET	Read Thing Hierarchy Elements, Property Set Types, and Properties [page 1373]	/CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')?\$expand=ThingHierarchyElements/PropertySetTypes/Properties	<ctodata>.r

23.4.1 Read Metadata

With this method, you can retrieve metadata of composite things along with thing hierarchy details.

Request

URI: /CompositesThingHierarchy/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ctodata>.r

Request Parameters

None

Request Example

/CompositesThingHierarchy/v1/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format:

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<EntityType Name="Hierarchy">
  <Key>
    <PropertyRef Name="HierarchyId"/>
  </Key>
  <Property Name="HierarchyId" Type="Edm.String" Nullable="false"/>
  <Property Name="HierarchyName" Type="Edm.String"/>
  <Property Name="HierarchyExternalId" Type="Edm.String"/>
  <Property Name="ISOCODE" Type="Edm.String"/>
  <Property Name="HierarchyDescription" Type="Edm.String"/>
  <NavigationProperty Name="ThingHierarchyElements"
Relationship="com.sap.apptot.cs.hierarchy.ThingHierarchyElements"
FromRole="Hierarchies" ToRole="ThingHierarchyElements"/>
</EntityType>

<EntityType Name="ThingHierarchyElement">
  <Key>
    <PropertyRef Name="HierarchyId"/>
    <PropertyRef Name="ThingId"/>
  </Key>
  <Property Name="HierarchyId" Type="Edm.String" Nullable="false"/>
  <Property Name="ThingId" Type="Edm.String" Nullable="false"/>
  <Property Name="ThingName" Type="Edm.String"/>
  <Property Name="ISOCODE" Type="Edm.String"/>
  <Property Name="ThingDescription" Type="Edm.String"/>
  <Property Name="ParentThing" Type="Edm.String"/>
  <Property Name="ParentThingName" Type="Edm.String"/>
  <Property Name="ParentThingDescription" Type="Edm.String"/>
  <NavigationProperty Name="PropertySetTypes"
Relationship="com.sap.apptot.cs.hierarchy.PropertySetTypes"
FromRole="ThingHierarchyElements" ToRole="PropertySetTypes"/>
</EntityType>

<EntityType Name="PropertySetType">
  <Key>
    <PropertyRef Name="ThingId"/>
    <PropertyRef Name="ThingType"/>
    <PropertyRef Name="PropertySetId"/>
  </Key>
  <Property Name="ThingId" Type="Edm.String" Nullable="false"/>
  <Property Name="ThingType" Type="Edm.String" Nullable="false"/>
  <Property Name="PropertySetId" Type="Edm.String" Nullable="false"/>
  <Property Name="PropertySetType" Type="Edm.String"/>
  <Property Name="ISOCODE" Type="Edm.String"/>
  <Property Name="PropertySetTypeDescription" Type="Edm.String"/>
  <Property Name="DataCategory" Type="Edm.String"/>
</EntityType>
```

```

        <NavigationProperty Name="Properties"
Relationship="com.sap.appiot.cs.hierarchy.Properties"
FromRole="PropertySetTypes" ToRole="Properties">
        <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.cs.hierarchy.Description" FromRole="EventTypes"
ToRole="Descriptions">
</EntityType>

<EntityType Name="Property">
    <Key>
        <PropertyRef Name="PropertyName"/>
        <PropertyRef Name="PropertySetType"/>
    </Key>
    <Property Name="PropertyName" Type="Edm.String" Nullable="false"/>
    <Property Name="PropertyDescription" Type="Edm.String" Nullable="false"/>
    <Property Name="PropertySetType" Type="Edm.String" Nullable="false"/>
    <Property Name="Position" Type="Edm.Int16"/>
    <Property Name="PropertyDataType" Type="Edm.String"/>
    <Property Name="PropertyDataTypeLength" Type="Edm.String"/>
    <Property Name="PropertyHasQualityCode" Type="Edm.String"/>
    <Property Name="UoM" Type="Edm.String"/>
    <Property Name="Annotation" Type="Edm.String"/>
    <NavigationProperty Name="Descriptions"
Relationship="com.sap.appiot.cs.hierarchy.Description" FromRole="Properties"
ToRole="Descriptions">
</EntityType>

<EntityType Name="Description">
    <Property Name="Language" Type="Edm.String"/>
    <Property Name="Description" Type="Edm.String"/>
</EntityType>

<EntityContainer Name="CSThingHierarchy" m:IsDefaultEntityContainer="true">
    <EntitySet Name="Hierarchies"
EntityType="com.sap.appiot.cs.hierarchy.Hierarchy"/>
    <EntitySet Name="ThingHierarchyElements"
EntityType="com.sap.appiot.cs.hierarchy.ThingHierarchyElement"/>
    <EntitySet Name="PropertySetTypes"
EntityType="com.sap.appiot.cs.hierarchy.PropertySetType"/>
    <EntitySet Name="Properties"
EntityType="com.sap.appiot.cs.hierarchy.Property"/>
    <EntitySet Name="Descriptions"
EntityType="com.sap.appiot.cs.hierarchy.Description"/>
</EntityContainer>

```

Related Information

[Composite Thing Configuration for a Specific Thing Hierarchy: OData Service \[page 1357\]](#)

23.4.2 Read all Hierarchies

With this method, you can retrieve details of all hierarchies.

You can retrieve a subset of all hierarchies, according to the filter criteria provided. For a collective request for a set of hierarchies, you have these options:

- You can restrict the set of hierarchies to be retrieved by filter criteria based on the hierarchy ID and hierarchy external ID.
- You can define that the set of matching hierarchies shall not be transmitted all at once, but in a paged manner so that only a small number of results is transmitted, thereby reducing the server load.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/CompositesThingHierarchy/v1/Hierarchies`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<ctodata>.r`

Request Parameters

None

Request Example

`/CompositesThingHierarchy/v1/Hierarchies`

Query String Parameters

Parameter	Required	Data Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.

Parameter	Required	Data Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are HierarchyId and HierarchyExternalId . To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are HierarchyId and HierarchyExternalId . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. Only valid field is PropertySet Type .
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are HierarchyId and HierarchyExternalId .

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [{
      "metadata": {
        "id": "https://cs-hierarchy-meta-sap-perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
        "uri": "https://cs-hierarchy-meta-sap-perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
        "type": "com.sap.applot.hierarchymeta.Hierarchies"
      },

```

```

    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "HierarchyName": "H_Baseplate_000505",
    "HierarchyDescription": "Component Hierarchy for Baseplate_000505",
    "HierarchyExternalId": "H_Baseplate_000505",
    "ISOCODE": "en",
    "ThingHierarchyElements": {
      "__deferred": {
        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')/ThingHierarchyElements"
      }
    }
  }
}

```

Related Information

[Composite Thing Configuration for a Specific Thing Hierarchy: OData Service \[page 1357\]](#)

23.4.3 Read Details of a Thing Hierarchy

With this method, you can retrieve details of a thing hierarchy with a specific thing hierarchy ID

Request

URI: /CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
HierarchyId	Yes	String	Unique thing hierarchy identifier

Request Example

/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')

Retrieves details of the thing hierarchy with the ID E90000901EDA39E31500ED02BBE5CEF0.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "type": "com.sap.apptot.hierarchymeta.Hierarchies"
    },
    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "HierarchyName": "H_Baseplate_000505",
    "HierarchyDescription": "Component Hierarchy for Baseplate_000505",
    "HierarchyExternalId": "H_Baseplate_000505",
    "ISOCODE": "en",
    "ThingHierarchyElements": {
      "__deferred": {
        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')/ThingHierarchyElements"
      }
    }
  }
}
```

Related Information

[Composite Thing Configuration for a Specific Thing Hierarchy: OData Service \[page 1357\]](#)

23.4.4 Read Thing Hierarchy Elements

With this method, you can retrieve thing hierarchy elements for a specific thing hierarchy ID.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records

retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')/ThingHierarchyElements`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<ctodata>.r`

Request Parameters

Parameter	Required	Data Type	Description
<code>HierarchyId</code>	Yes	String	Unique thing hierarchy identifier

Parameter	Required	Data Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set. Default value is 20.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set. Default value is 20.
<code>\$orderby</code>	No	String	Field name to be used for sorting the result set in ascending order; valid fields are HierarchyId , ThingId , ThingName , ThingType , ParentThing , and ParentThingName . To sort the result set, use asc for the ascending order and desc for the descending order.
<code>\$filter</code>	No	String	Filter condition to be applied; valid fields are HierarchyId , ThingId , ThingName , ThingType , ParentThing , and ParentThingName . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. Only valid field is property set type name .

Parameter	Required	Data Type	Description
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are HierarchyId , ThingId , ThingName , ThingType , ParentThing , and ParentThingName .

Request Example

```
/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0') /
ThingHierarchyElements
```

Retrieves thing hierarchy elements for the specified thing hierarchy ID E90000901EDA39E31500ED02BBE5CEF0.

You can also use the query parameter `$expand` to retrieve thing hierarchy elements for the specified thing hierarchy ID. However, you cannot use query parameters `$top`, `$skip`, `$orderby`, and `$select` along with `$expand`.

```
/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0') ?
$expand=ThingHierarchyElements
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples:

Example 1

```
/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0') /
ThingHierarchyElements
```

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
```

```

        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
        "type": "com.sap.apptot.hierarchymeta.ThingHierarchyElements"
    },
    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingName": "Component Hierarchy for Baseplate_000505",
    "ThingDescription": "Baseplate 000505",
    "ParentThing": "",
    "ParentThingName": "",
    "ParentThingDescription": "",
    "PropertySetTypes": {
        "__deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')/PropertySetTypes"
        }
    }
}
]
}
}

```

Example 2

/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')?
\$expand=ThingHierarchyElements

```

{
  "d": {
    "__metadata": {
      "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "type": "com.sap.apptot.hierarchymeta.Hierarchies"
    },
    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "HierarchyName": "H_Baseplate_000505",
    "HierarchyDescription": "Component Hierarchy for Baseplate_000505",
    "HierarchyExternalId": "H_Baseplate_000505",
    "ISOCODE": "en",
    "ThingHierarchyElements": {
      "results": [
        {
          "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
          "ThingId": "07DA3C0D259242248FDCF15413552D76",
          "ThingName": "Baseplate_000505",
          "ThingDescription": "Baseplate 000505",
          "ParentThing": "",
          "ParentThingName": "",
          "ParentThingDescription": ""
        }
      ]
    }
  }
}

```

Related Information

[Composite Thing Configuration for a Specific Thing Hierarchy: OData Service \[page 1357\]](#)

23.4.5 Read Thing Hierarchy Elements and Property Set Types

With this method, you can retrieve the following for the specified thing hierarchy ID:

- Thing hierarchy elements
- Property set types associated with the thing that belongs to the specified thing hierarchy

Request

URI: `/CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')?$expand=ThingHierarchyElements/PropertySetTypes`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<ctodata>.r`

Request Parameters

Parameter	Required	Data Type	Description
<code>HierarchyId</code>	Yes	String	Unique thing hierarchy identifier

Query String Parameters

Parameter	Required	Data Type	Description
<code>\$filter</code>	No	String	Filter condition to be applied; valid fields are HierarchyId , HierarchyExternalId , ThingId , ThingName , ThingType , ParentThing , ParentThingName , PropertySetId , PropertySetType , and DataCategory . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. Only valid field is PropertySetType .

Request Example

```
/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')?
$expand=ThingHierarchyElements/PropertySetTypes
```

Retrieves thing hierarchy elements for the specified thing hierarchy ID
E90000901EDA39E31500ED02BBE5CEF0 along with the property set types.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "type": "com.sap.apptot.hierarchymeta.Hierarchies"
    },
    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "HierarchyName": "H_Baseplate_000505",
    "HierarchyDescription": "Compönent Hierarchy for Baseplate_000505",
    "HierarchyExternalId": "H_Baseplate_000505",
    "ISOCODE": "en",
    "ThingHierarchyElements": {
      "results": [
        {
          "__metadata": {
            "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
            "type":
"com.sap.apptot.hierarchymeta.ThingHierarchyElements"
          },
          "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
          "ThingId": "07DA3C0D259242248FDCF15413552D76",
          "ThingName": "Baseplate_000505",
          "ThingDescription": "Baseplate 000505",
          "ParentThing": "",
          "ParentThingName": "",

```



```

        "ParentThingDescription": "",
        "PropertySetTypes": {
            "results": [
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
                    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:SVM",
                    "PropertySetType": "svm_score",
                    "ISOCODE": "en",
                    "PropertySetTypeDescription": "Centrifugal Pump
SVM Score for MLE",
                    "DataCategory": "TimeSeriesData"
                },
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
                    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:PAM",
                    "PropertySetType": "pam_score",
                    "ISOCODE": "en",
                    "PropertySetTypeDescription": "Centrifugal Pump
PAM Score for MLE",
                    "DataCategory": "TimeSeriesData"
                },
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
                    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:MAR",
                    "PropertySetType": "mar_score",
                    "ISOCODE": "en",
                    "PropertySetTypeDescription": "Centrifugal Pump
MAR Score for MLE",
                    "DataCategory": "TimeSeriesData"
                },
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
                    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:TEC",
                    "PropertySetType": "tec_score",
                    "ISOCODE": "en",
                    "PropertySetTypeDescription": "Centrifugal Pump
TEC Score for MLE",
                    "DataCategory": "TimeSeriesData"
                },
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
                    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:RUL",
                    "PropertySetType": "rul_score",
                    "ISOCODE": "en",
                    "PropertySetTypeDescription": "Centrifugal Pump
RUL Score for MLE",
                    "DataCategory": "TimeSeriesData"
                },
                {
                    "ThingId": "07DA3C0D259242248FDCF15413552D76",
                    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",

```


23.4.6 Read Thing Hierarchy Elements, Property Set Types, and Properties

This method retrieves the following for the specified thing hierarchy ID:

- Thing hierarchy elements
- Property set types associated with the thing that belongs to the specified thing hierarchy
- Properties of property set types

Request

URI: /CompositesThingHierarchy/v1/Hierarchies('<thing hierarchy ID>')?
\$expand=ThingHierarchyElements/PropertySetTypes/Properties

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ctodata>.r

Request Parameters

Parameter	Required	Data Type	Description
HierarchyId	Yes	String	Unique thing hierarchy identifier

Query String Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; valid fields are HierarchyId , HierarchyExternalId , ThingId , ThingName , ThingType , ParentThing , ParentThingName , PropertySetId , PropertySetType , DataCategory , and PropertyName . The filter operators supported are eq , lt , gt , le , ge , and ne . Multiple filters are supported using the AND separator. Only valid field is PropertySetType .

Request Example

/CompositesThingHierarchy/v1/Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')?
\$expand=ThingHierarchyElements/PropertySetTypes/Properties&\$format=json

Retrieves thing hierarchy elements for the specified thing hierarchy ID
E90000901EDA39E31500ED02BBE5CEF0.

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
Hierarchies('E90000901EDA39E31500ED02BBE5CEF0')",
      "type": "com.sap.apptot.hierarchymeta.Hierarchies"
    },
    "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
    "HierarchyName": "H_Baseplate_000505",
    "HierarchyDescription": "Component Hierarchy for Baseplate_000505",
    "HierarchyExternalId": "H_Baseplate_000505",
    "ISOCODE": "en",
    "ThingHierarchyElements": {
      "results": [
        {
          "__metadata": {
            "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
ThingHierarchyElements('E90000901EDA39E31500ED02BBE5CEF0')",
            "type":
"com.sap.apptot.hierarchymeta.ThingHierarchyElements"
          },
          "HierarchyId": "E90000901EDA39E31500ED02BBE5CEF0",
          "ThingId": "07DA3C0D259242248FDCF15413552D76",
          "ThingName": "Baseplate_000505",
          "ThingDescription": "Baseplate 000505",
          "ParentThing": "",
          "ParentThingName": "",
          "ParentThingDescription": "",
          "PropertySetTypes": {
            "results": [
              {
                "__metadata": {
```

```

        "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ASVM')",
        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ASVM')",
        "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:SVM",
    "PropertySetType": "svm_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
SVM Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "__deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ASVM')/
Descriptions"
        }
    },
    "Properties": {
        "results": [
            {
                "PropertySetType": "svm_score",
                "PropertyName": "score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "SVM score"
            },
            {
                "PropertySetType": "svm_score",
                "PropertyName": "normalised_score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "Normalized
SVM score"
            }
        ]
    }
},
{
    "__metadata": {

```

```

        "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APAM')",
        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APAM')",
        "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:PAM",
    "PropertySetType": "pam_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
PAM Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "__deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APAM')/
Descriptions"
        }
    },
    "Properties": {
        "results": [
            {
                "PropertySetType": "pam_score",
                "PropertyName": "score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "Score"
            },
            {
                "PropertySetType": "pam_score",
                "PropertyName": "PredictedValues",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "Score"
            }
        ]
    }
},
{
    "__metadata": {
        "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/

```

```

PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AMAR')",
    "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AMAR')",
    "type":
"com.sap.apiot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:MAR",
    "PropertySetType": "mar_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
MAR Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "_deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AMAR')/
Descriptions"
        }
    },
    "Properties": {
        "results": [
            {
                "PropertySetType": "mar_score",
                "PropertyName": "score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "MAR Score"
            },
            {
                "PropertySetType": "mar_score",
                "PropertyName": "normalised_score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "Normalised
MAR Score"
            }
        ]
    },
    {
        "_metadata": {
            "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.

```

```

pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ATEC')",
    "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ATEC')",
    "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:TEC",
    "PropertySetType": "tec_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
TEC Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "__deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ATEC')/
Descriptions"
        }
    },
    "Properties": {
        "results": [
            {
                "PropertySetType": "tec_score",
                "PropertyName": "score",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "TEC Score"
            },
            {
                "PropertySetType": "tec_score",
                "PropertyName": "predicted_class",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "TEC
Predicted Class"
            }
        ]
    }
},
{
    "__metadata": {
        "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.

```



```

pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ARUL')",
    "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ARUL')",
    "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:RUL",
    "PropertySetType": "rul_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
RUL Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "__deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3ARUL')/
Descriptions"
        }
    },
    "Properties": {
        "results": [
            {
                "PropertySetType": "rul_score",
                "PropertyName": "survival_curve",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "survival
curve"
            },
            {
                "PropertySetType": "rul_score",
                "PropertyName":
"remaining_useful_life",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",
                "UOM": "",
                "Annotation": "",
                "PropertyDataTypeLength": "",
                "PropertyHasQualityCode": false,
                "ISOCODE": "en",
                "PropertyDescription": "remaining
useful life"
            },
            {
                "PropertySetType": "rul_score",
                "PropertyName":
"failure_probability",
                "Position": "0",
                "PropertyDataType":
"NumericFlexible",

```

```

    "UOM": "",
    "Annotation": "",
    "PropertyDataTypeLength": "",
    "PropertyHasQualityCode": false,
    "ISOCODE": "en",
    "PropertyDescription": "probability
of failure"
  },
  {
    "PropertySetType": "rul_score",
    "PropertyName": "age",
    "Position": "0",
    "PropertyDataType":
      "NumericFlexible",
      "UOM": "",
      "Annotation": "",
      "PropertyDataTypeLength": "",
      "PropertyHasQualityCode": false,
      "ISOCODE": "en",
      "PropertyDescription": "EMD Score"
    }
  ]
},
{
  "metadata": {
    "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AEMD')",
    "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AEMD')",
    "type":
      "com.sap.apptot.hierarchymeta.PropertySetTypes"
  },
  "ThingId": "07DA3C0D259242248FDCF15413552D76",
  "ThingType":
    "pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
      "pdms.test.com.sap.pdms.datascience.scoring:EMD",
      "PropertySetType": "emd_score",
      "ISOCODE": "en",
      "PropertySetTypeDescription": "Centrifugal Pump
EMD Score for MLE",
      "DataCategory": "TimeSeriesData",
      "Descriptions": {
        "deferred": {
          "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3AEMD')/
Descriptions"
        }
      },
      "Properties": {
        "results": [
          {
            "PropertySetType": "emd_score",
            "PropertyName": "normalised_score",
            "Position": "0",
            "PropertyDataType":
              "NumericFlexible",
              "UOM": "",

```

```

        "Annotation": "",
        "PropertyDataTypeLength": "",
        "PropertyHasQualityCode": false,
        "ISOCODE": "en",
        "PropertyDescription": "Normalised
EMD Score"
    },
    {
        "PropertySetType": "emd_score",
        "PropertyName": "reading_count",
        "Position": "0",
        "PropertyDataType":
"NumericFlexible",
        "UOM": "",
        "Annotation": "",
        "PropertyDataTypeLength": "",
        "PropertyHasQualityCode": false,
        "ISOCODE": "en",
        "PropertyDescription": "Number of
readings contributing to score"
    },
    {
        "PropertySetType": "emd_score",
        "PropertyName": "score",
        "Position": "0",
        "PropertyDataType":
"NumericFlexible",
        "UOM": "",
        "Annotation": "",
        "PropertyDataTypeLength": "",
        "PropertyHasQualityCode": false,
        "ISOCODE": "en",
        "PropertyDescription": "EMD Score"
    }
]
}
},
{
    "_metadata": {
        "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APCA')",
        "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps
%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APCA')",
        "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
    "PropertySetId":
"pdms.test.com.sap.pdms.datascience.scoring:PCA",
    "PropertySetType": "pca_score",
    "ISOCODE": "en",
    "PropertySetTypeDescription": "Centrifugal Pump
PCA Score for MLE",
    "DataCategory": "TimeSeriesData",
    "Descriptions": {
        "_deferred": {
            "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps

```

```

%3ABaseplate',PropertySetId='pdms.test.com.sap.pdms.datascience.scoring%3APCA')/
Descriptions"
    }
  },
  "Properties": {
    "results": [
      {
        "PropertySetType": "pca_score",
        "PropertyName": "score",
        "Position": "0",
        "PropertyDataType":
"NumericFlexible",
        "UOM": "",
        "Annotation": "",
        "PropertyDataTypeLength": "",
        "PropertyHasQualityCode": false,
        "ISOCODE": "en",
        "PropertyDescription": "PCA Score"
      },
      {
        "PropertySetType": "pca_score",
        "PropertyName": "normalised_score",
        "Position": "0",
        "PropertyDataType":
"NumericFlexible",
        "UOM": "",
        "Annotation": "",
        "PropertyDataTypeLength": "",
        "PropertyHasQualityCode": false,
        "ISOCODE": "en",
        "PropertyDescription": "Normalised
PCA Score"
      }
    ]
  }
},
{
  "__metadata": {
    "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate',PropertySetId='pdms.test.pdms.assets.pumps
%3AMLEPumpProperties')",
    "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate',PropertySetId='pdms.test.pdms.assets.pumps
%3AMLEPumpProperties')",
    "type":
"com.sap.apptot.hierarchymeta.PropertySetTypes"
  },
  "ThingId": "07DA3C0D259242248FDCF15413552D76",
  "ThingType":
"pdms.test.pdms.assets.pumps:Baseplate",
  "PropertySetId":
"pdms.test.pdms.assets.pumps:MLEPumpProperties",
  "PropertySetType": "mlePumpProperties",
  "ISOCODE": "en",
  "PropertySetTypeDescription": "Pump Properties
for MLE",
  "DataCategory": "TimeSeriesData",
  "Descriptions": {
    "deferred": {
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate',PropertySetId='pdms.test.pdms.assets.pumps
%3AMLEPumpProperties')/Descriptions"
    }
  }
}
}
}

```

```

    },
    "Properties": {
      "results": [
        {
          "PropertySetType":
            "mlePumpProperties",
          "PropertyName": "FAILURES",
          "Position": "0",
          "PropertyDataType": "Numeric",
          "UOM": "",
          "Annotation": "",
          "PropertyDataTypeLength": "",
          "PropertyHasQualityCode": false,
          "ISOCODE": "en",
          "PropertyDescription": "Failures in
0 or 1"
        },
        {
          "PropertySetType":
            "mlePumpProperties",
          "PropertyName": "PRESSURE",
          "Position": "0",
          "PropertyDataType":
            "NumericFlexible",
          "UOM": "Bar",
          "Annotation": "",
          "PropertyDataTypeLength": "",
          "PropertyHasQualityCode": false,
          "ISOCODE": "en",
          "PropertyDescription": "Pressue"
        },
        {
          "PropertySetType":
            "mlePumpProperties",
          "PropertyName": "TEMPERATURE",
          "Position": "0",
          "PropertyDataType":
            "NumericFlexible",
          "UOM": "°C",
          "Annotation": "",
          "PropertyDataTypeLength": "",
          "PropertyHasQualityCode": false,
          "ISOCODE": "en",
          "PropertyDescription": "Temperature"
        }
      ]
    }
  },
  {
    "_metadata": {
      "id": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76', ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate', PropertySetId='pdms.test.pdms.assets.pumps
%3AHealth')",
      "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76', ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate', PropertySetId='pdms.test.pdms.assets.pumps
%3AHealth')",
      "type":
        "com.sap.apiot.hierarchymeta.PropertySetTypes"
    },
    "ThingId": "07DA3C0D259242248FDCF15413552D76",
    "ThingType":
      "pdms.test.pdms.assets.pumps:Baseplate",

```

```

    "PropertySetId":
      "pdms.test.pdms.assets.pumps:Health",
      "PropertySetType": "healthState",
      "ISOCODE": "en",
      "PropertySetTypeDescription": "Baseplate Health
State",
      "DataCategory": "TimeSeriesData",
      "Descriptions": {
        "__deferred": {
          "uri": "https://cs-hierarchy-meta-sap-
perf.cfapps.sap.hana.ondemand.com:443/CompositesThingHierarchy/v1/
PropertySetTypes(ThingId='07DA3C0D259242248FDCF15413552D76',ThingType='pdms.test.
pdms.assets.pumps%3ABaseplate',PropertySetId='pdms.test.pdms.assets.pumps
%3AHealth')/Descriptions"
        }
      },
      "Properties": {
        "results": [
          {
            "PropertySetType": "healthState",
            "PropertyName": "SCORE",
            "Position": "0",
            "PropertyDataType":
              "NumericFlexible",
            "UOM": "%",
            "Annotation":
              "pdms.test.pdms.assets.pumps:Discrete",
            "PropertyDataTypeLength": "",
            "PropertyHasQualityCode": false,
            "ISOCODE": "en",
            "PropertyDescription": "Raw Health
Score"
          },
          {
            "PropertySetType": "healthState",
            "PropertyName": "STATUS",
            "Position": "0",
            "PropertyDataType":
              "NumericFlexible",
            "UOM": "",
            "Annotation": "",
            "PropertyDataTypeLength": "",
            "PropertyHasQualityCode": false,
            "ISOCODE": "en",
            "PropertyDescription": "Health
Status"
          }
        ]
      }
    }
  }
}

```

Related Information

Composite Thing Configuration for a Specific Thing Hierarchy: OData Service [page 1357]

23.5 Thing Detail

Service retrieves details of the specified thing

Overview

The service retrieves thing entity details and snapshot data across all property set types that has usage within the specified thing type. In addition, the service retrieves reference property details.

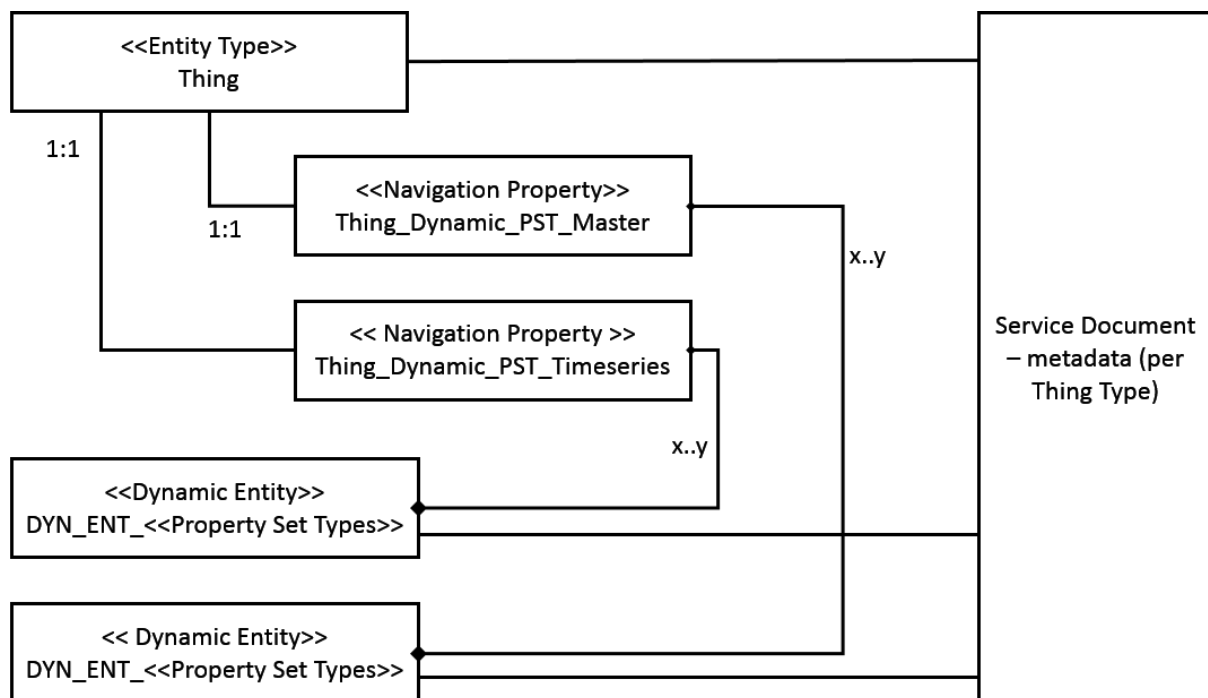
OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/CompositeThings/ThingType/v1/<thing type name>`

Example for a base URI in a cloud foundry environment: `https://details-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings/v1/<thing type name>`

Entity Data Model

The following diagram illustrates the EDM of Thing Detail OData services:



Related Information

[Read Metadata of Thing Detail \[page 1386\]](#)

[Read Details of a Thing \[page 1393\]](#)

[Read Property Set Data for a Thing \[page 1396\]](#)

23.5.1 Read Metadata of Thing Detail

Retrieves metadata of thing detail OData service

The metadata contains an annotation for the dynamic property set type entity. The annotation `sap:semantics="timeseries"` indicates that the property set type belongs to the data category *TimeSeriesData* or *DerivedData*. Any property set type without an annotation indicates that it belongs to the data category *MasterData* or *Parameters*.

Request

URI: `/CompositeThings/ThingType/v1/<thing type name>/$metadata`

Operation Type: CRUD

HTTP Method: *GET*

Permissions: `<thngdtl.r>`

Request Header Parameters

Header	Required	Description
<code>sap-iot-issync</code>	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

Request Parameters

Parameter	Required	Data Type	Description
<code>thing type name</code>	Yes	String	Name of the thing type

Request Example

`/CompositeThings/ThingType/v1/test.sandbox.devxperf.package:BMW6Series/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

The following response payload contains the property `SyncedTimestamp` only when the request header parameter `sap-iot-issync` is set **true**.

```
URI:<EntityType Name="DYN_ENT_core_automobiles__Engine"
sap:semantics="timeseries">
    <Key>
        <PropertyRef Name="ThingId"></PropertyRef>
    </Key>
    <Property Name="ThingId" Type="Edm.String" Nullable="false"></
Property>
    <Property Name="engine.RPM" Type="Edm.Int32"></Property>
    <Property Name="engine.RPM.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    <Property Name="engine.Temperature" Type="Edm.Int32"></Property>
    <Property Name="engine.Temperature.Timestamp"
Type="Edm.DateTimeOffset"></Property>
</EntityType>
<EntityType Name="DYN_ENT_core_automobiles__Model">
    <Key>
        <PropertyRef Name="ThingId"></PropertyRef>
    </Key>
    <Property Name="ThingId" Type="Edm.String" Nullable="false"></
Property>
    <Property Name="modelData.Color" Type="Edm.String"></Property>
    <Property Name="modelData.Color.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    <Property Name="modelData.Make" Type="Edm.String"></Property>
    <Property Name="modelData.Make.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    <Property Name="modelData.Registration" Type="Edm.String"></
Property>
    <Property Name="modelData.Registration.Timestamp"
Type="Edm.DateTimeOffset"></Property>
</EntityType>
<EntityType Name="DYN_ENT_core_automobiles__LocationMaster">
    <Key>
        <PropertyRef Name="ThingId"></PropertyRef>
    </Key>
    <Property Name="ThingId" Type="Edm.String" Nullable="false"></
Property>
    <Property Name="locationData.Country" Type="Edm.String"></
Property>
    <Property Name="locationData.Country.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    <Property Name="locationData.OriginPlace" Type="Edm.String"></
Property>
    <Property Name="locationData.OriginPlace.Timestamp"
Type="Edm.DateTimeOffset"></Property>
</EntityType>
<EntityType Name="Thing">
```

```

        <Key>
          <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String" Nullable="false">
          <Documentation>
            <LongDescription>Thing unique ID</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingISOCODE" Type="Edm.String">
          <Documentation>
            <LongDescription>Thing Language code</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingDescription" Type="Edm.String">
          <Documentation>
            <LongDescription>Thing description</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingName" Type="Edm.String" Nullable="false">
          <Documentation>
            <LongDescription>Thing name</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingExternalId" Type="Edm.String">
          <Documentation>
            <LongDescription>Thing external id</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingType" Type="Edm.String">
          <Documentation>
            <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ObjectGroup" Type="Edm.String">
          <Documentation>
            <LongDescription>Object group used to create the Thing</
LongDescription>
          </Documentation>
        </Property>
        <Property Name="BPName" Type="Edm.String">
          <Documentation>
            <LongDescription>Business partner name associated for
the Thing</LongDescription>
          </Documentation>
        </Property>
        <Property Name="BPLandlinePhoneNumber" Type="Edm.String">
          <Documentation>
            <LongDescription>Landline phone number of Business
partner</LongDescription>
          </Documentation>
        </Property>
        <Property Name="BPMobilePhoneNumber" Type="Edm.String">
          <Documentation>
            <LongDescription>Mobile phone number of Business
partner</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingCustomerId" Type="Edm.String">
          <Documentation>
            <LongDescription>Business partner ID associated for the
Thing</LongDescription>
          </Documentation>
        </Property>
        <Property Name="ThingRegionDescription" Type="Edm.String">
          <Documentation>
            <LongDescription>Region where Thing is located</
LongDescription>
          </Documentation>
        </Property>

```

```

        </Documentation>
    </Property>
    <Property Name="ThingCountryDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Country where the Thing is located</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCountryId" Type="Edm.String">
        <Documentation>
            <LongDescription>Country code where the Thing is
located</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCommunicationData" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing address details</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingLocationId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing location ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="AlternateId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing alternate ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="SyncedTimestamp" Type="Edm.String">
        <Documentation>
            <LongDescription>Synced TimeStamp</LongDescription>
        </Documentation>
    </Property>
    <NavigationProperty Name="DYN_ENT_core_automobiles__Model"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__Model"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__ModelEntities"></
NavigationProperty>
    <NavigationProperty Name="DYN_ENT_core_automobiles__Wheel"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__WheelEntities"></
NavigationProperty>
    <NavigationProperty Name="DYN_ENT_core_automobiles__Engine"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__Engine"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__EngineEntities"></
NavigationProperty>
    <NavigationProperty Name="DYN_ENT_core_automobiles__DriveUnit"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__DriveUnit"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__DriveUnitEntities"></
NavigationProperty>
    <NavigationProperty
Name="DYN_ENT_core_automobiles__LocationMaster"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__LocationMaster"
FromRole="ThingEntities"
ToRole="DYN_ENT_core_automobiles__LocationMasterEntities"></NavigationProperty>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__DriveUnit"
sap:semantics="timeseries">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="leftDriveUnit.Acceleration" Type="Edm.Int32"></
Property>
        <Property Name="leftDriveUnit.Acceleration.Timestamp"
Type="Edm.DateTimeOffset"></Property>

```

```

        <Property Name="leftDriveUnit.Rotation" Type="Edm.Int32"></
Property>
        <Property Name="leftDriveUnit.Rotation.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__Wheel"
sap:semantics="timeseries">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String" Nullable="false"></
Property>
        <Property Name="flWheel.PSI" Type="Edm.Int32"></Property>
        <Property Name="flWheel.PSI.PressureUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="flWheel.PSI.PressureLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="flWheel.PSI.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="flWheel.PSI.PressureLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="flWheel.PSI.PressureUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="flWheel.Rotation" Type="Edm.Int32"></Property>
        <Property Name="flWheel.Rotation.RotationUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="flWheel.Rotation.RotationLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="flWheel.Rotation.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="flWheel.Rotation.RotationLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="flWheel.Rotation.RotationUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="frWheel.PSI" Type="Edm.Int32"></Property>
        <Property Name="frWheel.PSI.PressureUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="frWheel.PSI.PressureLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="frWheel.PSI.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="frWheel.PSI.PressureUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="frWheel.PSI.PressureLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="frWheel.Rotation" Type="Edm.Int32"></Property>
        <Property Name="frWheel.Rotation.RotationUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="frWheel.Rotation.RotationLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="frWheel.Rotation.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="frWheel.Rotation.RotationUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="frWheel.Rotation.RotationLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rlWheel.PSI" Type="Edm.Int32"></Property>
        <Property Name="rlWheel.PSI.PressureUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="rlWheel.PSI.PressureLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="rlWheel.PSI.Timestamp"
Type="Edm.DateTimeOffset"></Property>

```

```

        <Property Name="rlWheel.PSI.PressureUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rlWheel.PSI.PressureLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rlWheel.Rotation" Type="Edm.Int32"></Property>
        <Property Name="rlWheel.Rotation.RotationLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="rlWheel.Rotation.RotationUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="rlWheel.Rotation.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="rlWheel.Rotation.RotationUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="rlWheel.Rotation.RotationLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rrWheel.PSI" Type="Edm.Int32"></Property>
        <Property Name="rrWheel.PSI.PressureUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="rrWheel.PSI.PressureLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="rrWheel.PSI.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rrWheel.PSI.PressureLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rrWheel.PSI.PressureUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="rrWheel.Rotation" Type="Edm.Int32"></Property>
        <Property Name="rrWheel.Rotation.RotationUnitOfMeasure"
Type="Edm.String" AttributeType="com.sap.iot.core.UoM"></Property>
        <Property Name="rrWheel.Rotation.RotationLowerThreshold"
Type="Edm.Int32" AttributeType="com.sap.iot.core.LowerThreshold"></Property>
        <Property Name="rrWheel.Rotation.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="rrWheel.Rotation.RotationLowerThreshold.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property
Name="rrWheel.Rotation.RotationUnitOfMeasure.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <Association Name="DYN_ENT_core_automobiles_Model">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles_Model"
Multiplicity="1" Role="DYN_ENT_core_automobiles__ModelEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles_Wheel">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles_Wheel"
Multiplicity="1" Role="DYN_ENT_core_automobiles__WheelEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles_Engine">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles_Engine"
Multiplicity="1" Role="DYN_ENT_core_automobiles__EngineEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles_DriveUnit">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles_DriveUnit"
Multiplicity="1" Role="DYN_ENT_core_automobiles__DriveUnitEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles_LocationMaster">

```

```

        <End Type="com.sap.appiot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
    <End
Type="com.sap.appiot.DYN_ENT_core_automobiles_LocationMaster" Multiplicity="1"
Role="DYN_ENT_core_automobiles__LocationMasterEntities"></End>
    </Association>
    <EntityContainer Name="CompositeThingsThingType"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="DYN_ENT_core_automobiles_Engines"
EntityType="com.sap.appiot.DYN_ENT_core_automobiles__Engine"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles_Models"
EntityType="com.sap.appiot.DYN_ENT_core_automobiles__Model"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles_LocationMasters"
EntityType="com.sap.appiot.DYN_ENT_core_automobiles_LocationMaster"></EntitySet>
        <EntitySet Name="Things" EntityType="com.sap.appiot.Thing"></
EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles_DriveUnits"
EntityType="com.sap.appiot.DYN_ENT_core_automobiles__DriveUnit"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles_Wheels"
EntityType="com.sap.appiot.DYN_ENT_core_automobiles__Wheel"></EntitySet>
        <AssociationSet Name="DYN_ENT_core_automobiles__Model"
Association="com.sap.appiot.DYN_ENT_core_automobiles__Model">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="DYN_ENT_core_automobiles_Models"
Role="DYN_ENT_core_automobiles__ModelEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__Wheel"
Association="com.sap.appiot.DYN_ENT_core_automobiles__Wheel">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="DYN_ENT_core_automobiles_Wheels"
Role="DYN_ENT_core_automobiles__WheelEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__Engine"
Association="com.sap.appiot.DYN_ENT_core_automobiles__Engine">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="DYN_ENT_core_automobiles_Engines"
Role="DYN_ENT_core_automobiles__EngineEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__DriveUnit"
Association="com.sap.appiot.DYN_ENT_core_automobiles__DriveUnit">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="DYN_ENT_core_automobiles_DriveUnits"
Role="DYN_ENT_core_automobiles__DriveUnitEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles_LocationMaster"
Association="com.sap.appiot.DYN_ENT_core_automobiles__LocationMaster">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="DYN_ENT_core_automobiles_LocationMasters"
Role="DYN_ENT_core_automobiles__LocationMasterEntities"></End>
        </AssociationSet>
    </EntityContainer>

```

Related Information

[Thing Detail \[page 1385\]](#)

23.5.2 Read Details of a Thing

Retrieves details of the specified thing

Request

URI: /CompositeThings/ThingType/v1/<thing type name>/Things(<thing ID>)

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <thngdtl.r>

Request Header Parameters

Header	Required	Description
sap-iot-issync	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

Request Parameters

Parameter	Required	Data Type	Description
thing type name	Yes	String	Name of the thing type
thing ID	Yes	String	Unique identifier of a thing

Request Example

```
/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/  
Things(0BCDD3EB71DB4935BAF9603577BF73F4)
```

Response

Response Status and Error Codes

Code	Description
200	Details retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure as depicted in the following examples.

Example 1

/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things(0BCDD3EB71DB4935BAF9603577BF73F4)

Retrieves details of the thing 0BCDD3EB71DB4935BAF9603577BF73F4

```
{
  "d": {
    "__metadata": {
      "id": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
      "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
    "ThingISOCODE": null,
    "ThingDescription": "English",
    "ThingName": "advlistThing1",
    "ThingExternalId": null,
    "ThingType": "test.sandbox.devxperf.package:BMW6Series",
    "ObjectGroup": "FC132A31F78949C4809CE525841A06ED",
    "BPName": null,
    "BPLandlinePhoneNumber": "34343434",
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": "671B285CCCCB42DE8241532745AD62E6",
    "ThingRegionDescription": "Baden-Wuerttemberg",
    "ThingCountryDescription": "Germany",
    "ThingCountryId": "DE",
    "ThingCommunicationData": "StreetName095 7, 69190 Walldorf",
    "ThingLocationId": "4463FF2442C245369025582FE9AB0FDF",
    "AlternateId": "advlistThing1_altId",
    "DYN_ENT_core_automobiles__Model": {
      "__deferred": {
        "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/DYN_ENT_core_automobiles__Model"
      }
    },
    "DYN_ENT_core_automobiles__Wheel": {
      "__deferred": {
        "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/DYN_ENT_core_automobiles__Wheel"
      }
    },
    "DYN_ENT_core_automobiles__Engine": {
      "__deferred": {
        "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/DYN_ENT_core_automobiles__Engine"
      }
    }
  }
}
```



```

    },
    "DYN_ENT_core_automobiles__DriveUnit": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__DriveUnit"
      }
    },
    "DYN_ENT_core_automobiles__LocationMaster": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__LocationMaster"
      }
    }
  }
}

```

Example 2

/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things(0BCDD3EB71DB4935BAF9603577BF73F4)

Request header parameter `sap-iot-issync` set to **true** and hence, the result set contains the last sync date of the thing.

Retrieves details of the thing 0BCDD3EB71DB4935BAF9603577BF73F4

```

{
  "d": {
    "__metadata": {
      "id": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
      "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
      "type": "com.sap.apiot.Thing"
    },
    "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
    "ThingISOCODE": null,
    "ThingDescription": "English",
    "ThingName": "advlistThing1",
    "ThingExternalId": null,
    "ThingType": "test.sandbox.devxperf.package:BMW6Series",
    "ObjectGroup": "FC132A31F78949C4809CE525841A06ED",
    "BPName": null,
    "BPLandlinePhoneNumber": "34343434",
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": "671B285CCCCB42DE8241532745AD62E6",
    "ThingRegionDescription": "Baden-Wuerttemberg",
    "ThingCountryDescription": "Germany",
    "ThingCountryId": "DE",
    "ThingCommunicationData": "StreetName095 7, 69190 Walldorf",
    "ThingLocationId": "4463FF2442C245369025582FE9AB0FDF",
    "AlternateId": "advlistThing1_altId",
    "SyncedTimestamp": "2018-11-13T09:57:33.921Z",
    "DYN_ENT_core_automobiles__Model": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__Model"
      }
    }
  }
}

```

```

    },
    "DYN_ENT_core_automobiles__Wheel": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__Wheel"
      }
    },
    "DYN_ENT_core_automobiles__Engine": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__Engine"
      }
    },
    "DYN_ENT_core_automobiles__DriveUnit": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__DriveUnit"
      }
    },
    "DYN_ENT_core_automobiles__LocationMaster": {
      "__deferred": {
        "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__LocationMaster"
      }
    }
  }
}

```

Related Information

[Thing Detail \[page 1385\]](#)

[Read Metadata of Thing Detail \[page 1386\]](#)

23.5.3 Read Property Set Data for a Thing

Retrieves property set data for the specified thing ID

Request

URI: /CompositeThings/ThingType/v1/<thing type name>/Things(<thing ID>)

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <thngdtl.r>

Request Header Parameters

Header	Required	Description
sap-iot-issync	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

Request Parameters

Parameter	Required	Data Type	Description
thing type name	Yes	String	Name of the thing type
thing ID	Yes	String	Unique identifier of the thing

Request Example

```
/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/  
Things(0BCDD3EB71DB4935BAF9603577BF73F4)?  
$expand=DYN_ENT_core_automobiles__Wheel,DYN_ENT_core_automobiles__Model
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the structure in the following examples.

Example 1

```
/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/  
Things(0BCDD3EB71DB4935BAF9603577BF73F4)?  
$expand=DYN_ENT_core_automobiles__Wheel,DYN_ENT_core_automobiles__Model
```

```
{  
  "d": {  
    "__metadata": {
```

```

        "id": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
        "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
    "ThingISOCode": null,
    "ThingDescription": "English",
    "ThingName": "thing_AWS_OBJ0045_095",
    "ThingExternalId": null,
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "FC132A31F78949C4809CE525841A06ED",
    "BPName": null,
    "BPLandlinePhoneNumber": "34343434",
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": "671B285CCCCB42DE8241532745AD62E6",
    "ThingRegionDescription": "Baden-Wuerttemberg",
    "ThingCountryDescription": "Germany",
    "ThingCountryId": "DE",
    "ThingCommunicationData": "StreetName095 7, 69190 Walldorf",
    "ThingLocationId": "4463FF2442C245369025582FE9AB0FDF",
    "AlternateId": "thing_AWS_OBJ0045_095_altId",
    "DYN_ENT_core_automobiles_Model": {
        "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
        "modelData.Color": "Grey",
        "modelData.Color.Timestamp": "/Date(1489449600000)/",
        "modelData.Make": "Make2",
        "modelData.Make.Timestamp": "/Date(1489449600000)/",
        "modelData.Registration": "MYN 625",
        "modelData.Registration.Timestamp": "/Date(1489449600000)/"
    },
    "DYN_ENT_core_automobiles_Wheel": {
        "ThingId": "0BCDD3EB71DB4935BAF9603577BF73F4",
        "flWheel.PSI": 338,
        "flWheel.PSI.PressureUnitOfMeasure": null,
        "flWheel.PSI.PressureLowerThreshold": null,
        "flWheel.PSI.Timestamp": "/Date(1489622399000)/",
        "flWheel.PSI.PressureLowerThreshold.Timestamp": null,
        "flWheel.PSI.PressureUnitOfMeasure.Timestamp": null,
        "flWheel.Rotation": 234,
        "flWheel.Rotation.RotationUnitOfMeasure": null,
        "flWheel.Rotation.RotationLowerThreshold": null,
        "flWheel.Rotation.Timestamp": "/Date(1489622399000)/",
        "flWheel.Rotation.RotationUnitOfMeasure.Timestamp": null,
        "flWheel.Rotation.RotationLowerThreshold.Timestamp": null,
        "frWheel.PSI": 338,
        "frWheel.PSI.PressureUnitOfMeasure": null,
        "frWheel.PSI.PressureLowerThreshold": null,
        "frWheel.PSI.Timestamp": "/Date(1489622399000)/",
        "frWheel.PSI.PressureLowerThreshold.Timestamp": null,
        "frWheel.PSI.PressureUnitOfMeasure.Timestamp": null,
        "frWheel.Rotation": 234,
        "frWheel.Rotation.RotationUnitOfMeasure": null,
        "frWheel.Rotation.RotationLowerThreshold": null,
        "frWheel.Rotation.Timestamp": "/Date(1489622399000)/",
        "frWheel.Rotation.RotationUnitOfMeasure.Timestamp": null,
        "frWheel.Rotation.RotationLowerThreshold.Timestamp": null,
        "rlWheel.PSI": 338,
        "rlWheel.PSI.PressureUnitOfMeasure": null,
        "rlWheel.PSI.PressureLowerThreshold": null,
        "rlWheel.PSI.Timestamp": "/Date(1489622399000)/",
        "rlWheel.PSI.PressureUnitOfMeasure.Timestamp": null,
        "rlWheel.PSI.PressureLowerThreshold.Timestamp": null,
        "rlWheel.Rotation": 234,
        "rlWheel.Rotation.RotationLowerThreshold": null,
    }
}

```

```

        "rlWheel.Rotation.RotationUnitOfMeasure": null,
        "rlWheel.Rotation.Timestamp": "/Date(1489622399000)/",
        "rlWheel.Rotation.RotationUnitOfMeasure.Timestamp": null,
        "rlWheel.Rotation.RotationLowerThreshold.Timestamp": null,
        "rrWheel.PSI": 338,
        "rrWheel.PSI.PressureUnitOfMeasure": null,
        "rrWheel.PSI.PressureLowerThreshold": null,
        "rrWheel.PSI.Timestamp": "/Date(1489622399000)/",
        "rrWheel.PSI.PressureUnitOfMeasure.Timestamp": null,
        "rrWheel.PSI.PressureLowerThreshold.Timestamp": null,
        "rrWheel.Rotation": 234,
        "rrWheel.Rotation.RotationLowerThreshold": null,
        "rrWheel.Rotation.RotationUnitOfMeasure": null,
        "rrWheel.Rotation.Timestamp": "/Date(1489622399000)/",
        "rrWheel.Rotation.RotationUnitOfMeasure.Timestamp": null,
        "rrWheel.Rotation.RotationLowerThreshold.Timestamp": null
    },
    "DYN_ENT_core_automobiles__Engine": {
        "__deferred": {
            "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__Engine"
        }
    },
    "DYN_ENT_core_automobiles__DriveUnit": {
        "__deferred": {
            "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__DriveUnit"
        }
    },
    "DYN_ENT_core_automobiles__LocationMaster": {
        "__deferred": {
            "uri": "https://details-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/ThingType/v1/
core.automobiles:ABCXSeries/Things('0BCDD3EB71DB4935BAF9603577BF73F4')/
DYN_ENT_core_automobiles__LocationMaster"
        }
    }
}
}
}

```

Example 2

/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things(C5D30DAAB52C4F01B14C169199BFE0CF)?\$expand=DYN_ENT_core_automobiles__Wheel

Request header parameter `sap-iot-issync` is set **true** and hence, the result set contains the last sync date of the thing.

```

{
  "d": {
    "__metadata": {
      "id": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/
CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things('C5D30DAAB52C4F01B14C169199BFE0CF')",
      "uri": "https://details-thing-sap-ci.cfapps.sap.hana.ondemand.com:
443/CompositeThings/ThingType/v1/core.automobiles:ABCXSeries/
Things('C5D30DAAB52C4F01B14C169199BFE0CF')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "C5D30DAAB52C4F01B14C169199BFE0CF",
    "ThingISOCODE": null,
    "ThingDescription": "vehicle thing description",
  }
}

```

```

    "ThingName": "aggreTextId1",
    "ThingExternalId": "aggreTextId1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BPName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "AlternateId": "aggreTextId1-altId",
    "SyncedTimestamp": "2018-11-13T09:57:33.921Z",
    "DYN_ENT_core_automobiles_Wheel": {
      "ThingId": "C5D30DAAB52C4F01B14C169199BFE0CF",
      "aggrepropset.pressure": 28,
      "aggrepropset.pressure.Timestamp": "/Date(1541475746000)/",
      "aggrepropset.speed": 108,
      "aggrepropset.speed.Timestamp": "/Date(1541475746000)/"
    }
  }
}

```

Related Information

[Thing Detail \[page 1385\]](#)

[Read Metadata of Thing Detail \[page 1386\]](#)

[Read Details of a Thing \[page 1393\]](#)

23.6 Advanced Thing List

Overview

The service retrieves list of things along with their location and customer details, based on thing types, property set types, and the event type specified in the request header. The service retrieves metadata and data for property set types common across specified thing types along with the aggregate of events for the specified event type.

→ Recommendation

For performance reasons, we recommend to request not more than two property set types of each data category – *MasterData* and *TimeSeriesData* – while using this service.

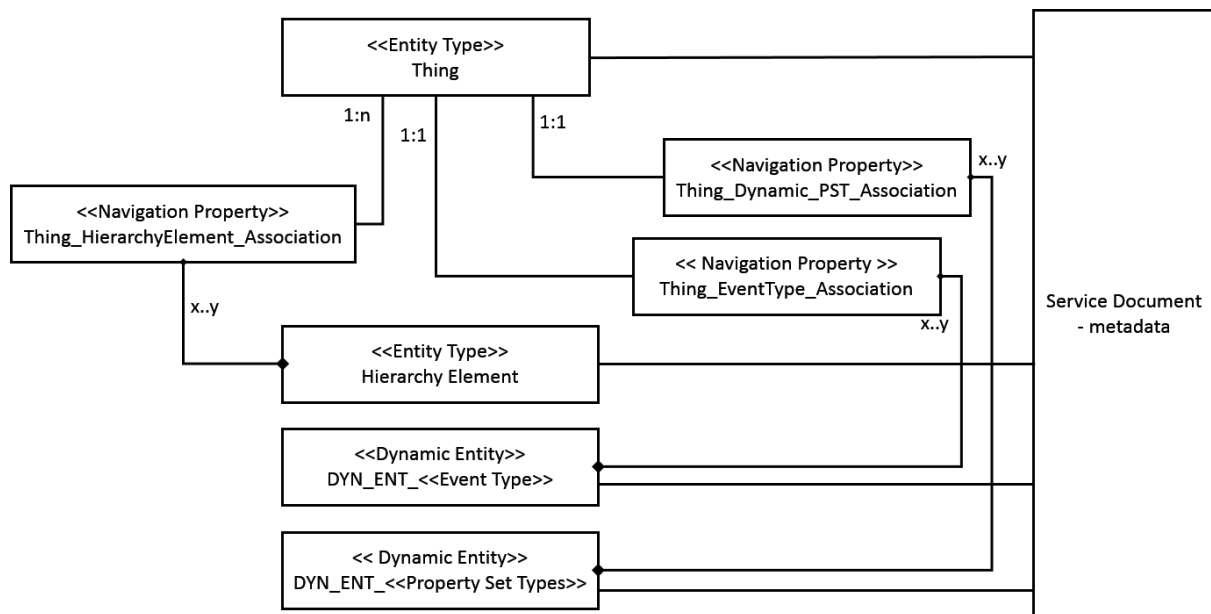
OData Version: 2.0

Root URI:http://<server address>[:<port number>]/CompositeThings/v1

Example for a base URI in a cloud foundry environment: https://advancedlist-thing-sap.cfapps.eu10.hana.ondemand.com/CompositeThings

Entity Data Model

The following diagram shows the EDM of Thing List service:



Related Information

[Read Metadata of Thing List \[page 1401\]](#)

[Read List of Things \[page 1412\]](#)

[Read Property Set Data and Events for a Thing \[page 1426\]](#)

23.6.1 Read Metadata of Thing List

Retrieves metadata of the thing list service

i Note

The service retrieves metadata for property set types common across specified thing types along with the aggregate of events for the specified event type.

- If you do not specify header parameters, the service retrieves only thing entity.

- If you specify both thing types and property set types in the header, the service retrieves metadata based only on the specified property set types.

The result set contains an annotation for the dynamic property set type entity. The annotation `sap:semantics="timeseries"` indicates that the property set type belongs to the data category *TimeSeriesData* or *DerivedData*. Any property set type without an annotation indicates that it belongs to the data category *MasterData* or *Parameters*. In addition, the result set contains hierarchy details.

Request

URI: `/CompositeThings/v1/$metadata`

Operation Type: CRUD

HTTP Method: *GET*

Permissions:

`<advlist>.r`

Request Headers

Header	Required	Values
<code>sap-iot-thingtype</code>	No	Thing types separated by comma ",".
<code>sap-iot-pst</code>	No	Property set types separated by comma ",".
<code>sap-iot-eventtype</code>	No	Name of the event type
<i>i</i> Note Only one event type is supported.		
<code>sap-iot-issync</code>	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

Request Parameters

None

Request Example

`/CompositeThings/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Payload

Only media type supported is [XML](#). The [XML](#) for this method has the structure as shown in the following examples:

Example 1: `/CompositeThings/v1/$metadata`

Request header parameter `sap-iot-issync` with value **true**

The result set contains the property `SyncedTimestamp` along with other relevant metadata.

```
<EntityType Name="HierarchyElement">
  <Key>
    <PropertyRef Name="HierarchyId"></PropertyRef>
    <PropertyRef Name="RootThingId"></PropertyRef>
  </Key>
  <Property Name="HierarchyId" Type="Edm.String"></Property>
  <Property Name="HierarchyName" Type="Edm.String"></Property>
  <Property Name="RootThingId" Type="Edm.String"></Property>
  <Property Name="RootThingName" Type="Edm.String"></Property>
  <Property Name="RootThingType" Type="Edm.String"></Property>
  <Property Name="RootThingDescription" Type="Edm.String"></
Property>
  <Property Name="RootThingExternalId" Type="Edm.String"></
Property>
  <Property Name="HierarchyDescription" Type="Edm.String"></
Property>
  <Property Name="HierarchyExternalId" Type="Edm.String"></
Property>
</EntityType>
<EntityType Name="Thing">
  <Key>
    <PropertyRef Name="ThingId"></PropertyRef>
  </Key>
  <Property Name="ThingId" Type="Edm.String" Nullable="false">
    <Documentation>
      <LongDescription>Thing unique ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="ISOCCode" Type="Edm.String">
    <Documentation>
      <LongDescription>Thing Language code</LongDescription>
    </Documentation>
  </Property>
  <Property Name="ThingDescription" Type="Edm.String">
    <Documentation>
      <LongDescription>Thing description</LongDescription>
    </Documentation>
  </Property>
  <Property Name="ThingName" Type="Edm.String" Nullable="false">
    <Documentation>
      <LongDescription>Thing name</LongDescription>
    </Documentation>
  </Property>
</EntityType>
```

```

        </Documentation>
    </Property>
    <Property Name="ThingExternalId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing external id</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingType" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ObjectGroup" Type="Edm.String">
        <Documentation>
            <LongDescription>Object group used to create the Thing</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="BusinessPartnerName" Type="Edm.String">
        <Documentation>
            <LongDescription>Business partner name associated for
the Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="BPLandlinePhoneNumber" Type="Edm.String">
        <Documentation>
            <LongDescription>Landline phone number of Business
partner</LongDescription>
        </Documentation>
    </Property>
    <Property Name="BPMobilePhoneNumber" Type="Edm.String">
        <Documentation>
            <LongDescription>Mobile phone number of Business
partner</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCustomerId" Type="Edm.String">
        <Documentation>
            <LongDescription>Business partner ID associated for the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingRegionDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Region where Thing is located</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCountryDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Country where the Thing is located</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCountryId" Type="Edm.String">
        <Documentation>
            <LongDescription>Country code where the Thing is
located</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCommunicationData" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing address details</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingLocationId" Type="Edm.String">
        <Documentation>

```

```

        <LongDescription>Thing location ID</LongDescription>
      </Documentation>
    </Property>
    <Property Name="Latitude" Type="Edm.Double">
      <Documentation>
        <LongDescription>Latitude coordinates</LongDescription>
      </Documentation>
    </Property>
    <Property Name="Longitude" Type="Edm.Double">
      <Documentation>
        <LongDescription>Longitude coordinates</LongDescription>
      </Documentation>
    </Property>
    <Property Name="AlternateId" Type="Edm.String">
      <Documentation>
        <LongDescription>Thing AlternateId</LongDescription>
      </Documentation>
    </Property>
    <Property Name="SyncedTimestamp" Type="Edm.String">
      <Documentation>
        <LongDescription>Synced TimeStamp</LongDescription>
      </Documentation>
    </Property>
    <NavigationProperty Name="HierarchyElements"
Relationship="com.sap.apptot.HierarchyElements" FromRole="ThingEntities"
ToRole="HierarchyElementsEntities"></NavigationProperty>
  </EntityType>
  <Association Name="HierarchyElements">
    <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
    <End Type="com.sap.apptot.HierarchyElement" Multiplicity="*"
Role="HierarchyElementsEntities"></End>
  </Association>
  <EntityContainer Name="CompositeThingsAnalytics"
m:IsDefaultEntityContainer="true">
    <EntitySet Name="HierarchyElements"
EntityType="com.sap.apptot.HierarchyElement"></EntitySet>
    <EntitySet Name="Things" EntityType="com.sap.apptot.Thing"></
EntitySet>
    <AssociationSet Name="HierarchyElements"
Association="com.sap.apptot.HierarchyElements">
      <End EntitySet="Things" Role="ThingEntities"></End>
      <End EntitySet="HierarchyElements"
Role="HierarchyElementsEntities"></End>
    </AssociationSet>
  </EntityContainer>

```

Example 2: /CompositeThings/v1/\$metadata

Request header parameter sap-iot-thingtype with value core.automobiles:ABCXSeries

The result set contains the property set type details associated with the specified thing type.

```

<EntityType Name="HierarchyElement">
  <Key>
    <PropertyRef Name="HierarchyId"></PropertyRef>
    <PropertyRef Name="RootThingId"></PropertyRef>
  </Key>
  <Property Name="HierarchyId" Type="Edm.String"></Property>
  <Property Name="HierarchyName" Type="Edm.String"></Property>
  <Property Name="RootThingId" Type="Edm.String"></Property>
  <Property Name="RootThingName" Type="Edm.String"></Property>
  <Property Name="RootThingType" Type="Edm.String"></Property>
  <Property Name="RootThingDescription" Type="Edm.String"></
Property>
  <Property Name="RootThingExternalId" Type="Edm.String"></
Property>

```

```

Property>      <Property Name="HierarchyDescription" Type="Edm.String"></
Property>      <Property Name="HierarchyExternalId" Type="Edm.String"></
Property>      </EntityType>
                <EntityType Name="Thing">
                    <Key>
                        <PropertyRef Name="ThingId"></PropertyRef>
                    </Key>
                    <Property Name="ThingId" Type="Edm.String" Nullable="false">
                        <Documentation>
                            <LongDescription>Thing unique ID</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ISOCODE" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Thing Language code</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ThingDescription" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Thing description</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ThingName" Type="Edm.String" Nullable="false">
                        <Documentation>
                            <LongDescription>Thing name</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ThingExternalId" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Thing external id</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ThingType" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ObjectGroup" Type="Edm.String"> with value
                        <LongDescription>Object group used to create the Thing</
LongDescription>
                    </Documentation>
                    </Property>
                    <Property Name="BusinessPartnerName" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Business partner name associated for
the Thing</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="BPLandlinePhoneNumber" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Landline phone number of Business
partner</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="BPMobilePhoneNumber" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Mobile phone number of Business
partner</LongDescription>
                        </Documentation>
                    </Property>
                    <Property Name="ThingCustomerId" Type="Edm.String">
                        <Documentation>
                            <LongDescription>Business partner ID associated for the
Thing</LongDescription>
                        </Documentation>

```

```

        </Property>
        <Property Name="ThingRegionDescription" Type="Edm.String">
            <Documentation>
                <LongDescription>Region where Thing is located</
LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingCountryDescription" Type="Edm.String">
            <Documentation>
                <LongDescription>Country where the Thing is located</
LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingCountryId" Type="Edm.String">
            <Documentation>
                <LongDescription>Country code where the Thing is
located</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingCommunicationData" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing address details</LongDescription>
            </Documentation>
        </Property>
        <Property Name="ThingLocationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing location ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Latitude" Type="Edm.Double">
            <Documentation>
                <LongDescription>Latitude coordinates</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Longitude" Type="Edm.Double">
            <Documentation>
                <LongDescription>Longitude coordinates</LongDescription>
            </Documentation>
        </Property>
        <Property Name="AlternateId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing AlternateId</LongDescription>
            </Documentation>
        </Property>
        <NavigationProperty Name="HierarchyElements"
Relationship="com.sap.apptot.HierarchyElements" FromRole="ThingEntities"
ToRole="HierarchyElementsEntities"></NavigationProperty>
        <NavigationProperty Name="DYN_ENT_core_automobiles__CarStyle"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__CarStyle"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__CarStyleEntities"></
NavigationProperty>
        <NavigationProperty Name="DYN_ENT_core_automobiles__CarInfo"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__CarInfo"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__CarInfoEntities"></
NavigationProperty>
        <NavigationProperty Name="DYN_ENT_core_automobiles__Wheel"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__WheelEntities"></
NavigationProperty>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__Wheel"
sap:semantics="timeseries">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="wheeltemp.temperature" Type="Edm.Int32"></
Property>

```

```

        <Property Name="wheeltemp.temperature.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__CarStyle">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="carModel.Model" Type="Edm.Int32"></Property>
        <Property Name="carModel.Model.Timestamp"
Type="Edm.DateTimeOffset"></Property>
        <Property Name="carModel.color" Type="Edm.String"></Property>
        <Property Name="carModel.color.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__CarInfo">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="carYear.year" Type="Edm.DateTime"></Property>
        <Property Name="carYear.year.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <Association Name="HierarchyElements">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.HierarchyElement" Multiplicity="*"
Role="HierarchyElementsEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles__CarInfo">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles__CarInfo"
Multiplicity="1" Role="DYN_ENT_core_automobiles__CarInfoEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles__CarStyle">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles__CarStyle"
Multiplicity="1" Role="DYN_ENT_core_automobiles__CarStyleEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles__Wheel">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"
Multiplicity="1" Role="DYN_ENT_core_automobiles__WheelEntities"></End>
    </Association>
    <EntityContainer Name="CompositeThingsAnalytics"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="HierarchyElements"
EntityType="com.sap.apptot.HierarchyElement"></EntitySet>
        <EntitySet Name="Things" EntityType="com.sap.apptot.Thing"></
EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__Wheels"
EntityType="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__CarInfos"
EntityType="com.sap.apptot.DYN_ENT_core_automobiles__CarInfo"></EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__CarStyles"
EntityType="com.sap.apptot.DYN_ENT_core_automobiles__CarStyle"></EntitySet>
        <AssociationSet Name="HierarchyElements"
Association="com.sap.apptot.HierarchyElements">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="HierarchyElements"
Role="HierarchyElementsEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__CarInfo"
Association="com.sap.apptot.DYN_ENT_core_automobiles__CarInfo">

```

```

        <End EntitySet="Things" Role="ThingEntities"></End>
        <End EntitySet="DYN_ENT_core_automobiles__CarInfos"
Role="DYN_ENT_core_automobiles__CarInfoEntities"></End>
    </AssociationSet>
    <AssociationSet Name="DYN_ENT_core_automobiles__CarStyle"
Association="com.sap.apptot.DYN_ENT_core_automobiles__CarStyle">
        <End EntitySet="Things" Role="ThingEntities"></End>
        <End EntitySet="DYN_ENT_core_automobiles__CarStyles"
Role="DYN_ENT_core_automobiles__CarStyleEntities"></End>
    </AssociationSet>
    <AssociationSet Name="DYN_ENT_core_automobiles__Wheel"
Association="com.sap.apptot.DYN_ENT_core_automobiles__Wheel">
        <End EntitySet="Things" Role="ThingEntities"></End>
        <End EntitySet="DYN_ENT_core_automobiles__Wheels"
Role="DYN_ENT_core_automobiles__WheelEntities"></End>
    </AssociationSet>
</EntityContainer>

```

Example 3: /CompositeThings/v1/\$metadata

Request header parameters sap-iot-thingtypecore.automobiles:ABCXSeries and sap-iot-pst with value core.automobiles:Wheel

The result set contains the property set type details specified in the request header. The ting type name specified in the request header is not considered.

```

Property Name="ObjectGroup" Type="Edm.String" <EntityType
Name="HierarchyElement">
    <Key>
        <PropertyRef Name="HierarchyId"></PropertyRef>
        <PropertyRef Name="RootThingId"></PropertyRef>
    </Key>
    <Property Name="HierarchyId" Type="Edm.String"></Property>
    <Property Name="HierarchyName" Type="Edm.String"></Property>
    <Property Name="RootThingId" Type="Edm.String"></Property>
    <Property Name="RootThingName" Type="Edm.String"></Property>
    <Property Name="RootThingType" Type="Edm.String"></Property>
    <Property Name="RootThingDescription" Type="Edm.String"></
Property>
    <Property Name="RootThingExternalId" Type="Edm.String"></
Property>
    <Property Name="HierarchyDescription" Type="Edm.String"></
Property>
    <Property Name="HierarchyExternalId" Type="Edm.String"></
Property>
</EntityType>
<EntityType Name="Thing">
    <Key>
        <PropertyRef Name="ThingId"></PropertyRef>
    </Key>
    <Property Name="ThingId" Type="Edm.String" Nullable="false">
        <Documentation>
            <LongDescription>Thing unique ID</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ISOCODE" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing Language code</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing description</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingName" Type="Edm.String" Nullable="false">

```

```

        <Documentation>
            <LongDescription>Thing name</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingExternalId" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing external id</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingType" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing Type ID associated with the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ObjectGroup" Type="Edm.String">
        <Documentation>
            <LongDescription>Object group used to create the Thing</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="BusinessPartnerName" Type="Edm.String">
        <Documentation>
            <LongDescription>Business partner name associated for
the Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="BPLandlinePhoneNumber" Type="Edm.String">
        <Documentation>
            <LongDescription>Landline phone number of Business
partner</LongDescription>
        </Documentation>
    </Property>
    <Property Name="BPMobilePhoneNumber" Type="Edm.String">
        <Documentation>
            <LongDescription>Mobile phone number of Business
partner</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCustomerId" Type="Edm.String">
        <Documentation>
            <LongDescription>Business partner ID associated for the
Thing</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingRegionDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Region where Thing is located</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCountryDescription" Type="Edm.String">
        <Documentation>
            <LongDescription>Country where the Thing is located</
LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCountryId" Type="Edm.String">
        <Documentation>
            <LongDescription>Country code where the Thing is
located</LongDescription>
        </Documentation>
    </Property>
    <Property Name="ThingCommunicationData" Type="Edm.String">
        <Documentation>
            <LongDescription>Thing address details</LongDescription>
        </Documentation>
    </Property>

```



```

        <Property Name="ThingLocationId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing location ID</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Latitude" Type="Edm.Double">
            <Documentation>
                <LongDescription>Latitude coordinates</LongDescription>
            </Documentation>
        </Property>
        <Property Name="Longitude" Type="Edm.Double">
            <Documentation>
                <LongDescription>Longitude coordinates</LongDescription>
            </Documentation>
        </Property>
        <Property Name="AlternateId" Type="Edm.String">
            <Documentation>
                <LongDescription>Thing AlternateId</LongDescription>
            </Documentation>
        </Property>
        <NavigationProperty Name="HierarchyElements"
Relationship="com.sap.apptot.HierarchyElements" FromRole="ThingEntities"
ToRole="HierarchyElementsEntities"></NavigationProperty>
        <NavigationProperty Name="DYN_ENT_core_automobiles__Wheel"
Relationship="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"
FromRole="ThingEntities" ToRole="DYN_ENT_core_automobiles__WheelEntities"></
NavigationProperty>
    </EntityType>
    <EntityType Name="DYN_ENT_core_automobiles__Wheel"
sap:semantics="timeseries">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="wheeltemp.temperature" Type="Edm.Int32"></
Property>
        <Property Name="wheeltemp.temperature.Timestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <Association Name="HierarchyElements">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.HierarchyElement" Multiplicity="*"
Role="HierarchyElementsEntities"></End>
    </Association>
    <Association Name="DYN_ENT_core_automobiles__Wheel">
        <End Type="com.sap.apptot.Thing" Multiplicity="1"
Role="ThingEntities"></End>
        <End Type="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"
Multiplicity="1" Role="DYN_ENT_core_automobiles__WheelEntities"></End>
    </Association>
    <EntityContainer Name="CompositeThingsAnalytics"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="HierarchyElements"
EntityType="com.sap.apptot.HierarchyElement"></EntitySet>
        <EntitySet Name="Things" EntityType="com.sap.apptot.Thing"></
EntitySet>
        <EntitySet Name="DYN_ENT_core_automobiles__Wheels"
EntityType="com.sap.apptot.DYN_ENT_core_automobiles__Wheel"></EntitySet>
        <AssociationSet Name="HierarchyElements"
Association="com.sap.apptot.HierarchyElements">
            <End EntitySet="Things" Role="ThingEntities"></End>
            <End EntitySet="HierarchyElements"
Role="HierarchyElementsEntities"></End>
        </AssociationSet>
        <AssociationSet Name="DYN_ENT_core_automobiles__Wheel"
Association="com.sap.apptot.DYN_ENT_core_automobiles__Wheel">
            <End EntitySet="Things" Role="ThingEntities"></End>

```

```

        <End EntitySet="DYN_ENT_core_automobiles__Wheels"
Role="DYN_ENT_core_automobiles__WheelEntities"></End>
    </AssociationSet>
</EntityContainer>

```

23.6.2 Read List of Things

Retrieves list of things for the specified property set types and thing types.

With this service, you can retrieve list of things based on the following request header parameters:

- Thing type – You can list one or more thing types separated by comma.
Service retrieves all things that belong to the listed thing types.
- Property set type – You can list one or more property set types separated by comma.
Service retrieves all things of thing type that uses the specified property set types.
- Event type – You can specify only one event type.
Service retrieves all things for which events are created for the specified event type.

By default, the service displays a maximum of 100 records per response. You can navigate to the next set of results, if available, using the `__next` link at the end in the response payload. However, the number of records retrieved depends on the query parameter `$top`, if provided in the request URL. For more information, see [Retrieving List of Records \[page 1557\]](#).

Request

URI: `/CompositeThings/v1/Things`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions:

`<advlist>.r`

Request Headers

Header	Required	Values
<code>sap-iot-thingtype</code>	No	Thing types separated by comma ",".
<code>sap-iot-pst</code>	No	Property set types separated by comma ",".
<code>sap-iot-eventtype</code>	No	Name of the event Type

Note

Only one event type is supported.

Header	Required	Values
sap-iot-issync	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

The request header parameters are optional. You can specify values for one or more, or none of these parameters. In addition, the service also supports `$expand` query parameter in the request URL with which you can refine your result set. However, when the values provided in the request header parameter and in the `$expand` query parameter differ, the values specified in the `$expand` query parameter takes the precedence and result set is retrieved only based on them. The request header parameters are ignored in such cases.

The following table illustrates the available things, thing types, and property set types:

Things	Thing Type	Property Set Type
T1, T2	TT1	PST1
		PST2
T3, T4	TT2	PST2
		PST3
		PST4
T5	TT3	PST1
		PST2
		PST4

The following table illustrates how data is retrieved for a given combination of request header parameters and `$expand` query parameters:

Request	Request Header Parameters	Result set contains...	Based on the...
/things	TT1, TT2	T1, T2, T3, T4	Request header parameters
/things? \$expand=PST1	TT1	T1, T2, T5	\$expand query parameters (request header parameters are ignored)
/things? \$expand=PST2	TT1, TT2	T1, T2, T3, T4, T5	\$expand query parameters (request header parameters are ignored)
/things	PST1, PST2	T1, T2	Request header parameters
/things? \$expand=PST2	PST1, PST2	T1, T2, T3, T4, T5	\$expand query parameters (request header parameters are ignored)
/things? \$expand=PST1, PST2	PST1, PST2	T1, T2	Request header parameters and \$expand query parameters are same

Request Parameters

None

Query Request Parameters

Parameter	Required	Type	Description
<code>\$top</code>	No	Integer	Number of records to include in the result set.
<code>\$skip</code>	No	Integer	Number of the first n records to be excluded from the result set.
<code>\$inlinecount</code>	No	String	Total number of things available; permissible values are allpages and none. The following results apply if this parameter is used in conjunction with the other query parameters: • If you use this with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of things available. • If you use this with <code>\$filter</code> parameter, the result contains the total count of things based on the defined filter condition.
<code>\$count</code>	No	Boolean	Total number of things available based on the current user's authorizations; permissible values are true and false. If this is used in conjunction with the <code>\$top</code> and <code>\$skip</code> parameters, the result contains the total count of things available.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; all thing entity fields are valid. To sort the result set, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$select		String	Select condition for the thing entity fields to be included in the result set.
\$filter		String	Filter condition to be applied; all thing entity fields are valid. Multiple filters are supported using the <i>and</i> separator. You can use the string functions such as <i>substringof</i> , <i>startswith</i> , and <i>endswith</i> to search data using \$filter.
sap-apptot-es			Predefined query parameter used to filter events based on the event status. The only supported field is status. As the status field is not included in the metadata, you can use this parameter to filter events based on status. For example, sap-apptot-es=Status eq 'inprocess'

Request Example

/CompositeThings/v1/Things

Assume, there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records.

/CompositeThings/v1/Things?\$top=500

Assume, there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records until top 500 records are retrieved.

/CompositeThings/v1/Things?\$select=Latitude, Longitude, ThingId

Assume, there are 1000 records in the database. Due to performance reasons, the method retrieves the first 100 records and displays a next link to navigate to the next set of records. The response payload contains only the fields specified in the `$select` query parameter.

```
/CompositeThings/v1/Things?$select=Latitude, Longitude, ThingId&$top=100
```

Assume, there are 1000 records in the database. The method retrieves top 100 records and displays only those fields specified in the `$select` query parameter.

Response

Response Status and Error Codes

Code	Reason
200	Thing list retrieved successfully.

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples.

Example 1

Request header parameter `sap-iot-thingtype` with value `core.automobiles:ABCXSeries`

The result set contains all things that belong to the thing type specified in the request header.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 1 description",
        "ThingName": "advlistThing1",
        "ThingExternalId": "advlistThing1",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
      }
    ]
  }
}
```

```

        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing1-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__CarStyle"
            }
        },
        "DYN_ENT_core_automobiles__Wheel": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__Wheel"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId": "BBA340F5CC264347ACFCFD6B66F049EA",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 12 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing12",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing12-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {

```

```

        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')/DYN_ENT_core_automobiles__CarStyle"
    },
    "DYN_ENT_core_automobiles__Wheel": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')/DYN_ENT_core_automobiles__Wheel"
        }
    }
}
]
}
}

```

Example 2

Request header parameters `sap-iot-thingtype` with values `core.automobiles:ABCXSeries` and `core.automobiles:ABCXSeries2`

The result set contains all things that belong to the thing types specified in the request header.

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
          "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
        "ISOCCode": "en",
        "ThingDescription": "advanced list thing 1 description",
        "ThingName": "advlistThing1",
        "ThingExternalId": "advlistThing1",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing1-altId",
        "HierarchyElements": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
          }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
          "__deferred": {

```



```

        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__CarStyle"
    }
    },
    {
        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId": "B354E59948B6486ABA70734ED15F793A",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 1 description",
        "ThingName": "advlistThing2",
        "ThingExternalId": "advlistThing2",
        "ThingType": "core.automobiles:ABCXSeries2",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing2-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/DYN_ENT_core_automobiles__CarStyle"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId": "BBA340F5CC264347ACFCFD6B66F049EA",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 12 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing12",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,

```

```

        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing12-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BBA340F5CC264347ACFCFD6B66F049EA')/DYN_ENT_core_automobiles__CarStyle"
            }
        }
    },
    {
        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId": "BE2639D6E7EE4C9D8073C30B5A33BAA1",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 22 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing22",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing22-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/DYN_ENT_core_automobiles__CarStyle"
            }
        }
    }
]

```

```

    }
  ]
}

```

Example 3

Request header parameters `sap-iot-thingtype` with value `core.automobiles:ABCXSeries2`

Request URL with `$expand` query parameter: `/CompositeThings/v1/Things?`

`$expand=DYN_ENT_core_automobiles__Wheel`

The result set contains things that belong to thing types using the property set type specified in the `$expand` query parameter in the request URL. The thing type specified in the request header is ignored.

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "9922491EB8A94A77B2FF1ACAE00C28C4",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 3 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing3",
        "ThingType": "core.automobiles:ABCXSeries3",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing3-altId",
        "HierarchyElements": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')/HierarchyElements"
          }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')/DYN_ENT_core_automobiles__CarStyle"
          }
        },
        "DYN_ENT_core_automobiles__CarInfo": {
          "__deferred": {

```

```

        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('9922491EB8A94A77B2FF1ACAE00C28C4')/DYN_ENT_core_automobiles__CarInfo"
    },
    "DYN_ENT_core_automobiles__Wheel": {
        "ThingId": "9922491EB8A94A77B2FF1ACAE00C28C4",
        "wheeltemp.temperature": null,
        "wheeltemp.temperature.Timestamp": null
    }
},
{
    "__metadata": {
        "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
        "type": "com.sap.apiot.Thing"
    },
    "ThingId": "B354E59948B6486ABA70734ED15F793A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing2",
    "ThingExternalId": "advlistThing2",
    "ThingType": "core.automobiles:ABCXSeries32",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing2-altId",
    "HierarchyElements": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/HierarchyElements"
        }
    },
    "DYN_ENT_core_automobiles__CarStyle": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/DYN_ENT_core_automobiles__CarStyle"
        }
    },
    "DYN_ENT_core_automobiles__CarInfo": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/DYN_ENT_core_automobiles__CarInfo"
        }
    },
    "DYN_ENT_core_automobiles__Wheel": {
        "ThingId": "B354E59948B6486ABA70734ED15F793A",
        "wheeltemp.temperature": null,
        "wheeltemp.temperature.Timestamp": null
    }
},
{

```

```

        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
            "type": "com.sap.apptot.Thing"
        },
        "ThingId": "BE2639D6E7EE4C9D8073C30B5A33BAA1",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 22 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing22",
        "ThingType": "iotae.citest1.core.advlistpkg:advlistTT2",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing22-altId",
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/DYN_ENT_core_automobiles__CarStyle"
            }
        },
        "DYN_ENT_core_automobiles__CarInfo": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/DYN_ENT_core_automobiles__CarInfo"
            }
        },
        "DYN_ENT_core_automobiles__Wheel": {
            "ThingId": "BE2639D6E7EE4C9D8073C30B5A33BAA1",
            "wheeltemp.temperature": null,
            "wheeltemp.temperature.Timestamp": null
        }
    }
}
]
}
}

```

Example 4

Request header parameters `sap-iot-thingtype` with value `core.automobiles:ABCXSeries2` and `sap-iot-issync` with value **true**

Request URL with `$expand` query parameter: `/CompositeThings/v1/Things?`
`$expand=DYN_ENT_core_automobiles__Wheel`

The result set contains things that belong to thing types using the property set type specified in the \$expand query parameter in the request URL. The thing type specified in the request header is ignored. The last sync time is included in the result set as the request parameter sap-iot-issync is set **true**.

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')",
          "type": "com.sap.appiot.Thing"
        },
        "ThingId": "9922491EB8A94A77B2FF1ACAE00C28C4",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 3 description",
        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing3",
        "ThingType": "core.automobiles:ABCXSeries3",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing3-altId",
        "SyncedTimestamp": "2018-11-13T09:57:33.921Z",
        "HierarchyElements": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')/HierarchyElements"
          }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')/DYN_ENT_core_automobiles__CarStyle"
          }
        },
        "DYN_ENT_core_automobiles__CarInfo": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('9922491EB8A94A77B2FF1ACAE00C28C4')/DYN_ENT_core_automobiles__CarInfo"
          }
        },
        "DYN_ENT_core_automobiles__Wheel": {
          "ThingId": "9922491EB8A94A77B2FF1ACAE00C28C4",
          "wheeltemp.temperature": 66,
          "wheeltemp.temperature.Timestamp": "/Date(1541475746000)/"
        }
      },
      {
        "__metadata": {
```

```

        "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "B354E59948B6486ABA70734ED15F793A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing2",
    "ThingExternalId": "advlistThing2",
    "ThingType": "core.automobiles:ABCXSeries32",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing2-altId",
    "SyncedTimestamp": null,
    "HierarchyElements": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/HierarchyElements"
        }
    },
    "DYN_ENT_core_automobiles__CarStyle": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/DYN_ENT_core_automobiles__CarStyle"
        }
    },
    "DYN_ENT_core_automobiles__CarInfo": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('B354E59948B6486ABA70734ED15F793A')/DYN_ENT_core_automobiles__CarInfo"
        }
    },
    "DYN_ENT_core_automobiles__Wheel": {
        "ThingId": "B354E59948B6486ABA70734ED15F793A",
        "wheeltemp.temperature": 45,
        "wheeltemp.temperature.Timestamp": "/Date(1541475746000)/"
    }
},
{
    "__metadata": {
        "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "BE2639D6E7EE4C9D8073C30B5A33BAA1",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 22 description",

```

```

        "ThingName": "advlistThing3",
        "ThingExternalId": "advlistThing22",
        "ThingType": "iotae.citest1.core.advlistpkg:advlistTT2",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing22-altId",
        "SyncedTimestamp": null,
        "HierarchyElements": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/HierarchyElements"
            }
        },
        "DYN_ENT_core_automobiles__CarStyle": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/DYN_ENT_core_automobiles__CarStyle"
            }
        },
        "DYN_ENT_core_automobiles__CarInfo": {
            "__deferred": {
                "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('BE2639D6E7EE4C9D8073C30B5A33BAA1')/DYN_ENT_core_automobiles__CarInfo"
            }
        },
        "DYN_ENT_core_automobiles__Wheel": {
            "ThingId": "BE2639D6E7EE4C9D8073C30B5A33BAA1",
            "wheeltemp.temperature": 60,
            "wheeltemp.temperature.Timestamp": "/Date(1541475746000)/"
        }
    }
}
]
}
}

```

23.6.3 Read Property Set Data and Events for a Thing

Retrieves property set data and aggregate of events for the specified thing

You can use this service to retrieve the details of the specified thing that has a usage of the specified property set type. The result set includes details of the specified thing along with its property set data and aggregate of events. You can also retrieve the details of the hierarchy to which the thing belongs.

Request

URI: /CompositeThings/v1/Things('<thing ID>')

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <advlist>.r

Request Headers

Header	Required	Values
sap-iot-thingtype	No	Thing types separated by comma ","
sap-iot-pst	No	Property set types separated by comma ","
sap-iot-eventtype	No	Name of the event type
i Note Only one event type is supported.		
sap-iot-issync	No	Indicates whether the service retrieves the latest data creation time for the specified thing ID. Permissible values are true or false

For more information on the various combination usage of the header parameters, see the **Request Headers** section in the topic [Read List of Things \[page 1412\]](#).

Request Parameters

Parameter	Required	Data Type	Description
thing ID	Yes	String	Unique identifier of a thing

Request Example

```
/CompositeThings/v1/Things('00045BA79B50488781EBBA3BC1C8D384')
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the structure as depicted in the following examples:

Example 1

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')

Request Header Parameter	Value
none	None

```
{
  "d": {
    "__metadata": {
      "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
      "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCCode": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
      }
    }
  }
}
```

Example 2

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')

Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1

```
{
  "d": {
    "__metadata": {
      "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
      "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
      }
    },
    "DYN_ENT_core_automobiles__advlistET1": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__advlistET1"
      }
    }
  }
}
```

Example 3

```
/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')?
$expand=DYN_ENT_core_automobiles__advlistET1
```

Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1

```
{
  "d": {
    "__metadata": {
```

```

        "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
        "__deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
        }
    },
    "DYN_ENT_core_automobiles__advlistET1": {
        "EventType": "core.automobiles:advlistET1",
        "High": 1,
        "Medium": 1,
        "Low": null
    }
}

```

Example 4

```

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')?
$expand=DYN_ENT_core_automobiles__advlistET1

```

Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1
sap-iot-thingtype	core.automobiles:ABCXSeries

```

{
    "d": {
        "__metadata": {
            "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
            "type": "com.sap.apptot.Thing"
        },

```

```

    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
      }
    },
    "DYN_ENT_core_automobiles__CarStyle": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__CarStyle"
      }
    },
    "DYN_ENT_core_automobiles__Engine": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/DYN_ENT_core_automobiles__Engine"
      }
    },
    "DYN_ENT_core_automobiles__advlistET1": {
      "EventType": "core.automobiles:advlistET1",
      "High": 1,
      "Medium": 1,
      "Low": null
    }
  }
}

```

Example 5

```

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')?
$expand=DYN_ENT_core_automobiles__advlistET1,DYN_ENT_core_automobiles__Engine,
DYN_ENT_core_automobiles__CarStyle

```

Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1
sap-iot-thingtype	core.automobiles:ABCXSeries

```

{
  "d": {
    "__metadata": {

```

```

        "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
        "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
        "deferred": {
            "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
        }
    },
    "DYN_ENT_core_automobiles__CarStyle": {
        "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
        "CarModel.Model": null,
        "CarModel.Model.Timestamp": null,
        "CarModel.color": null,
        "CarModel.color.Timestamp": null
    },
    "DYN_ENT_core_automobiles__Engine": {
        "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
        "SpepedPressure.pressure": 28,
        "SpepedPressure.pressure.Timestamp": "/Date(1527465600000)/",
        "SpepedPressure.speed": 108,
        "SpepedPressure.speed.Timestamp": "/Date(1527465600000)/"
    },
    "DYN_ENT_core_automobiles__advlistET1": {
        "EventType": "core.automobiles:advlistET1",
        "High": 1,
        "Medium": 1,
        "Low": null
    }
}
}

```

Example 6

```

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')?
$expand=HierarchyElements

```

Request Header Parameter	Value
none	None

```
{
  "d": {
    "_metadata": {
      "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
      "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCODE": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "HierarchyElements": {
      "results": [
        {
          "HierarchyId": "A23E0110DA6CA5471600B1023FD0F1AC",
          "HierarchyName": "advlist_Hierarchy",
          "RootThingId": "B354E59948B6486ABA70734ED15F793A",
          "RootThingName": "advlistThing2",
          "RootThingType": "core.automobiles:ABCX2Series",
          "RootThingDescription": "advanced list thing 2 description",
          "RootThingExternalId": "advlistThing2",
          "HierarchyDescription": "Desccribes hierarchy of units in
the carXYZ",
          "HierarchyExternalId": "advlist-Hierarchy"
        },
        {
          "HierarchyId": "B13E0110DA6CA5471600B1023FD0F1AC",
          "HierarchyName": "advlist_Hierarchy",
          "RootThingId": "B354E59948B6486ABA70734ED15F793A",
          "RootThingName": "advlistThing2",
          "RootThingType": "core.automobiles:ABCX2Series",
          "RootThingDescription": "advanced list thing 2 description",
          "RootThingExternalId": "advlistThing2",
          "HierarchyDescription": "Desccribes hierarchy of units in
the carXYZ",
          "HierarchyExternalId": "advlist-Hierarchy"
        }
      ]
    }
  }
}
```

Example 7

/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements

Request Header Parameter	Value
none	None

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/HierarchyElements(HierarchyId='A23E0110DA6CA5471600B1023FD0F1AC',RootThingId='B354E59948B6486ABA70734ED15F793A')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/HierarchyElements(HierarchyId='A23E0110DA6CA5471600B1023FD0F1AC',RootThingId='B354E59948B6486ABA70734ED15F793A')",
          "type": "com.sap.apptot.HierarchyElement"
        },
        "HierarchyId": "A23E0110DA6CA5471600B1023FD0F1AC",
        "HierarchyName": "advlist_Hierarchy",
        "RootThingId": "B354E59948B6486ABA70734ED15F793A",
        "RootThingName": "advlistThing2",
        "RootThingType": "core.automobiles:ABCX2Series",
        "RootThingDescription": "advanced list thing 2 description",
        "RootThingExternalId": "advlistThing2",
        "HierarchyDescription": "Descscribes hierarchy of units in the carXYZ",
        "HierarchyExternalId": "advlist-Hierarchy"
      },
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/HierarchyElements(HierarchyId='B13E0110DA6CA5471600B1023FD0F1AC',RootThingId='B354E59948B6486ABA70734ED15F793A')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/HierarchyElements(HierarchyId='B13E0110DA6CA5471600B1023FD0F1AC',RootThingId='B354E59948B6486ABA70734ED15F793A')",
          "type": "com.sap.apptot.HierarchyElement"
        },
        "HierarchyId": "B13E0110DA6CA5471600B1023FD0F1AC",
        "HierarchyName": "advlist_Hierarchy",
        "RootThingId": "B354E59948B6486ABA70734ED15F793A",
        "RootThingName": "advlistThing2",
        "RootThingType": "core.automobiles:ABCX2Series",
        "RootThingDescription": "advanced list thing 2 description",
        "RootThingExternalId": "advlistThing2",
        "HierarchyDescription": "Descscribes hierarchy of units in the carXYZ",
        "HierarchyExternalId": "advlist-Hierarchy"
      }
    ]
  }
}
```

Example 8

```
/CompositeThings/v1/Things('0E121F2106A94BCBB1D2413D4575386A')?
$expand=DYN_ENT_core_automobiles__advlistET1,DYN_ENT_core_automobiles__Engine,DYN_ENT_core_automobiles__CarStyle
```


Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1
sap-iot-thingtype	core.automobiles:ABCXSeries
sap-iot-issync	true

```
{
  "d": {
    "_metadata": {
      "id": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
      "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')",
      "type": "com.sap.apptot.Thing"
    },
    "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
    "ISOCCode": "en",
    "ThingDescription": "advanced list thing 1 description",
    "ThingName": "advlistThing1",
    "ThingExternalId": "advlistThing1",
    "ThingType": "core.automobiles:ABCXSeries",
    "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
    "BusinessPartnerName": null,
    "BPLandlinePhoneNumber": null,
    "BPMobilePhoneNumber": null,
    "ThingCustomerId": null,
    "ThingRegionDescription": null,
    "ThingCountryDescription": null,
    "ThingCountryId": null,
    "ThingCommunicationData": null,
    "ThingLocationId": null,
    "Latitude": null,
    "Longitude": null,
    "AlternateId": "advlistThing1-altId",
    "SyncedTimestamp": "2018-11-13T09:57:33.921Z",
    "HierarchyElements": {
      "_deferred": {
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('0E121F2106A94BCBB1D2413D4575386A')/HierarchyElements"
      }
    },
    "DYN_ENT_core_automobiles__CarStyle": {
      "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
      "CarModel.Model": null,
      "CarModel.Model.Timestamp": null,
      "CarModel.color": null,
      "CarModel.color.Timestamp": null
    },
    "DYN_ENT_core_automobiles__Engine": {
      "ThingId": "0E121F2106A94BCBB1D2413D4575386A",
      "SpepedPressure.pressure": 28,
      "SpepedPressure.pressure.Timestamp": "/Date(1527465600000)/",
      "SpepedPressure.speed": 108,
      "SpepedPressure.speed.Timestamp": "/Date(1527465600000)/"
    },
    "DYN_ENT_core_automobiles__advlistET1": {
      "EventType": "core.automobiles:advlistET1",
      "High": 1,
      "Medium": 1,
      "Low": null
    }
  }
}
```

```
}
}
```

Example 9

You can filter things based on a dynamic property value as explained in this example. /
CompositeThings/v1/Things?\$expand=DYN_ENT_core_automobiles__CarStyle&
\$filter=DYN_ENT_core_automobiles__CarStyle/CarModel.Model eq '2019T'

Request Header Parameter	Value
sap-iot-eventtype	core.automobiles:advlistET1
sap-iot-thingtype	core.automobiles:ABCXSeries

Note

The query parameter `$filter` in the request URL only supports properties of property set type of data category [MasterData](#).

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('F244DA0C48EE416699732D4F1F9C5008')",
          "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('F244DA0C48EE416699732D4F1F9C5008')",
          "type": "com.sap.apptot.Thing"
        },
        "ThingId": "F244DA0C48EE416699732D4F1F9C5008",
        "ISOCODE": "en",
        "ThingDescription": "advanced list thing 2 description",
        "ThingName": "advlistThing2",
        "ThingExternalId": "advlistThing2",
        "ThingType": "core.automobiles:ABCXSeries",
        "ObjectGroup": "47D746ECC8A049CABB98E9D266044FD4",
        "BusinessPartnerName": null,
        "BPLandlinePhoneNumber": null,
        "BPMobilePhoneNumber": null,
        "ThingCustomerId": null,
        "ThingRegionDescription": null,
        "ThingCountryDescription": null,
        "ThingCountryId": null,
        "ThingCommunicationData": null,
        "ThingLocationId": null,
        "Latitude": null,
        "Longitude": null,
        "AlternateId": "advlistThing2-altId",
        "DYN_ENT_core_automobiles__CarStyle": {
          "ThingId": "F244DA0C48EE416699732D4F1F9C5008",
          "CarModel.model": "2019T",
          "CarModel.model.Timestamp": "/Date(1562144400000)/"
        },
        "HierarchyElements": {
          "__deferred": {
            "uri": "https://advancedlist-thing-sap-ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/Things('F244DA0C48EE416699732D4F1F9C5008')/HierarchyElements"
          }
        }
      }
    ]
  }
}
```

```

    },
    "DYN_ENT_core_automobiles__Engine": {
      "__deferred": {
        "uri": "https://advancedlist-thing-sap-
ci.cfapps.sap.hana.ondemand.com:443/CompositeThings/v1/
Things('F244DA0C48EE416699732D4F1F9C5008')/DYN_ENT_core_automobiles__Engine"
      }
    }
  ]
}

```

23.7 Advanced Event List

Overview

The service retrieves list of events for a specific event type across multiple things, based on thing master data properties and event property set type properties specified as header parameters. The service retrieves metadata and data for the event type property set types, thing type, and thing type property set types.

Note

- This method only supports thing property set type of data category *MasterData*.
- Important: The advanced event list services of SAP IoT are deprecated as of March 2022 and will be decommissioned in the future (details to be communicated as soon as possible). In case you've used any of the affected services in your applications based on SAP IoT, we recommend getting in touch with SAP support to find an alternative solution.

You also can use the following API endpoints as an alternative:

- [Read List of Things \[page 1412\]](#)
- [Read Events and Event Data \[page 1256\]](#) [Read List of Things \[page 1412\]](#)

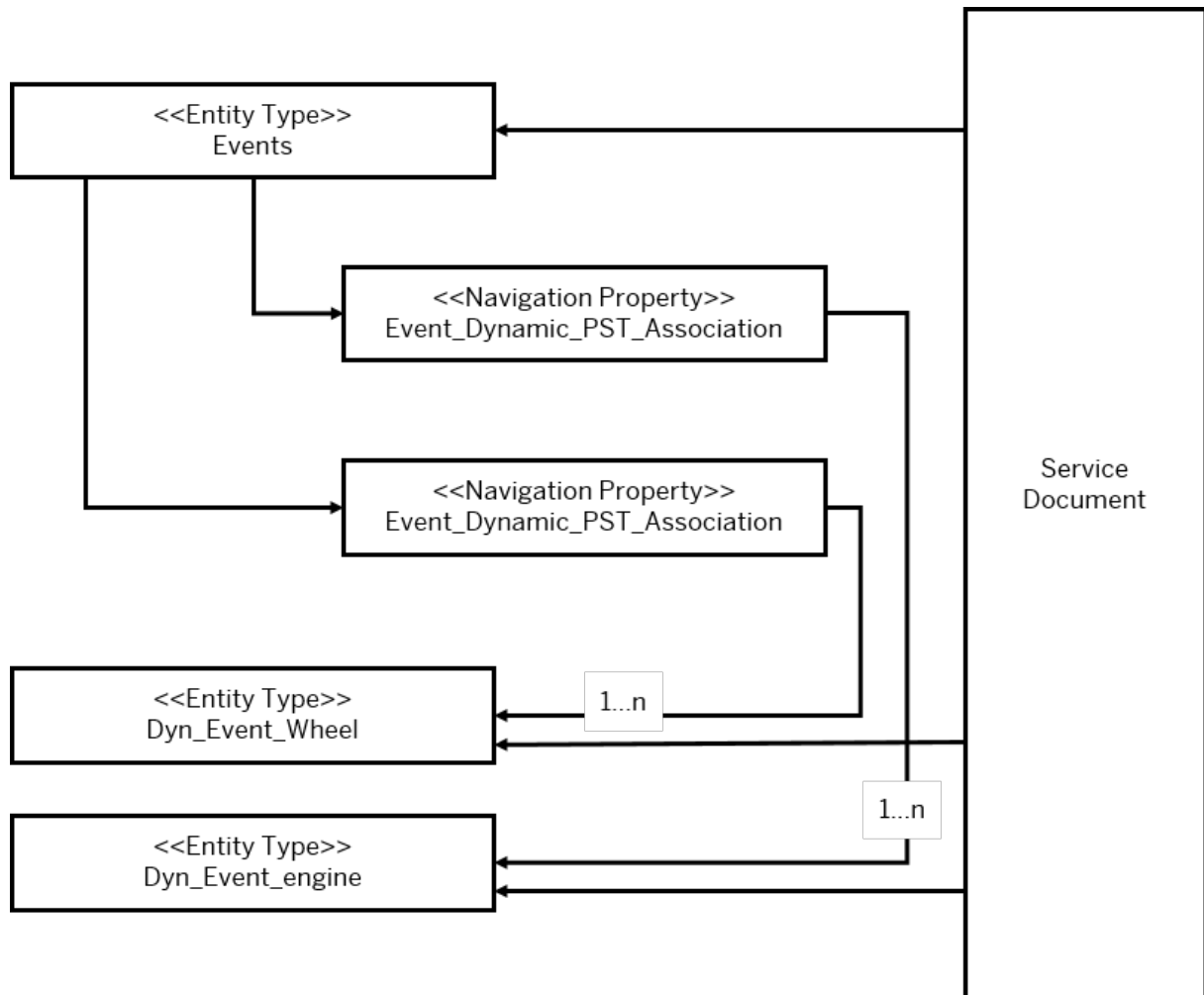
OData Version: 2.0

Root URI: `http://<server address>[:<port number>]ES/EventType/<event type name>/v1`

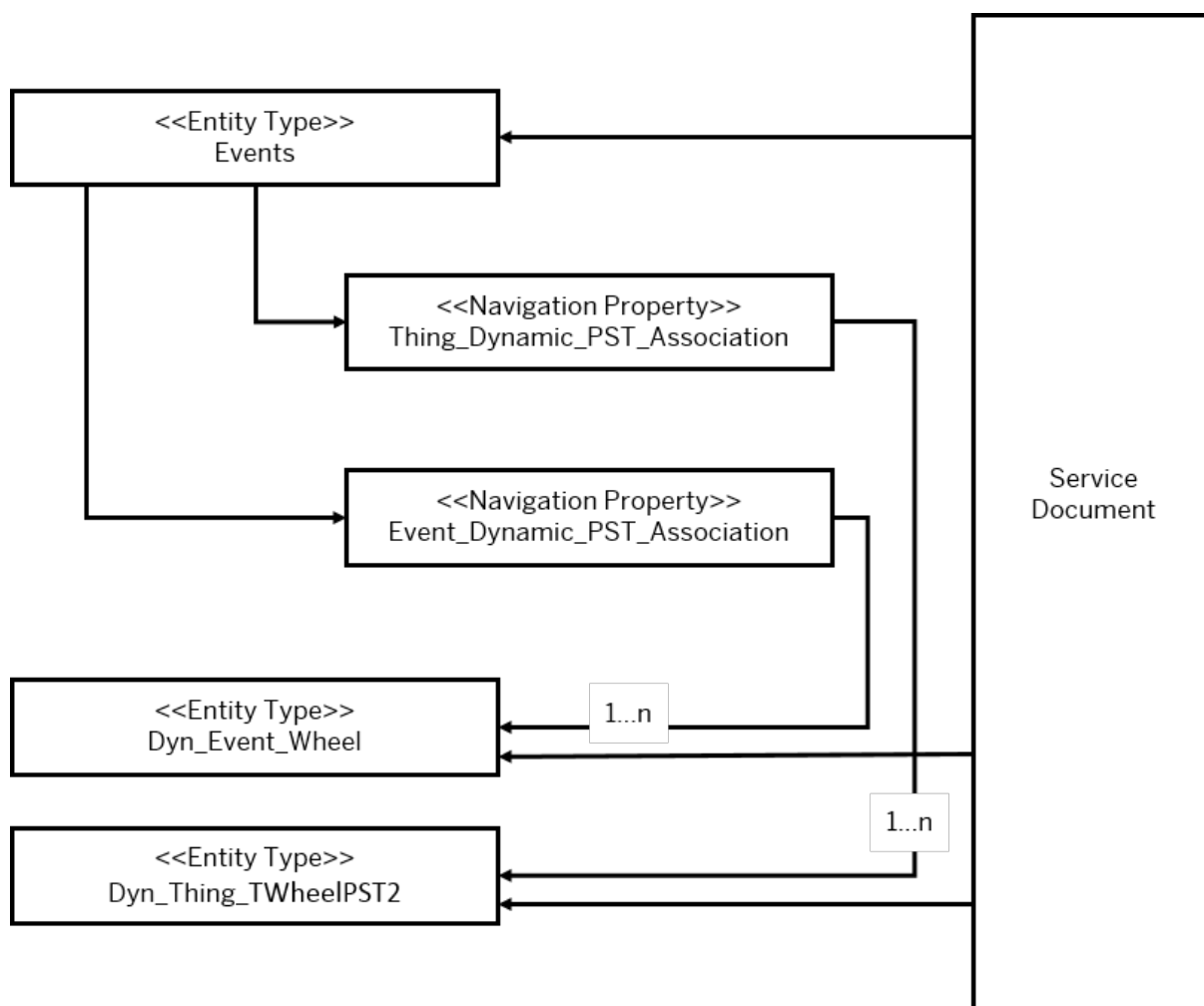
Example for a base URI in a cloud foundry environment: `https://iot-events-advanced.cfapps.eu10.hana.ondemand.com/ES/EventType/<event type name>/v1`

Entity Data Model

The following diagram shows the EDM of Advanced Event List service, when no header parameters are provided:



The following diagram shows the EDM of Advanced Event List service, when event property set type, thing type, and thing type property set type are provided as header parameters:



Service Metadata URI: `https://iot-events-advanced.cfapps.eu10.hana.ondemand.com/ES/EventType/<event type name>/v1/$metadata`

Related Information

[Read Metadata of Event List \[page 1439\]](#)

[Read List of Events \[page 1446\]](#)

23.7.1 Read Metadata of Event List

The service retrieves the metadata for a specific event type provided in the URL. The metadata includes the details of the event property set types associated with the event type. In addition, the service retrieves thing type property set type details based on the header information.

Request

URI: /ES/EventType/<event type name>/v1/\$metadata

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <ES>.r

Request Headers

Header	Required	Values
sap-iot-eventpst	No	Event property set types separated by comma ",". i Note You can only provide up to a maximum of five event property set types.
sap-iot-thingtype	No	Thing types separated by comma ",". i Note - If you provide a thing type in the header, you must also provide the thing property set type of data category MasterData that belongs to the specified thing type. - You can only provide up to a maximum of two thing types.
sap-iot-thingpst	No	Thing property set types of data category MasterData separated by comma ",". i Note - If you provide a thing property set type in the header, you must also provide the thing type to which the provided thing property set type belongs. - You can only provide up to a maximum of two thing property set types.

The request header parameters are optional. You can specify value for one or more, or none of these header parameters.

For example, let us assume, you specify the event type `core.automobiles:ExceededSpeed` in the request URL. The following table illustrates how data is retrieved for a given combination of request header parameters:

Header Parameter			Result set contains
Event Property Set Type	Thing Type	Thing Property Set Type	
None	None	None	Metadata of event property set types core.automobiles:Wheel and core.automobiles:engine
core.automobiles:Wheel	None	None	Metadata of event property set type core.automobiles:Wheel
None	core.automobiles:AB CX2Series	None	Error message displayed
core.automobiles:Wheel	core.automobiles:AB CX2Series	None	Error message displayed
core.automobiles:Wheel	None	core.automobiles:WheelPST	Error message displayed
None	None	core.automobiles:WheelPST	Error message displayed
None	core.automobiles:AB CX2Series	core.automobiles:WheelPST	Metadata of event property set types core.automobiles:Wheel and core.automobiles:engine, including thing property set type core.automobiles:WheelPST
core.automobiles:Wheel	core.automobiles:AB CX2Series	core.automobiles:WheelPST	Metadata of event property set type core.automobiles:Wheel and thing property set type core.automobiles:WheelPST

Request Parameters

None

Request Example

ES/EventType/core.automobiles:Wheel/v1/\$metadata

Response

Response Headers

None

Response Status and Error Codes

Code	Description
200	Metadata retrieved successfully

Response Payload Example

Example 1: No header parameters provided.

The result set contains the event property set types `core.automobiles:Wheel` and `core.automobiles:engine`, and other relevant metadata.

```
<EntityType Name="Events">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String" Nullable="false">
    <Documentation>
      <LongDescription>Event unique ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="CorrelationId" Type="Edm.String">
    <Documentation>
      <LongDescription>Event Correlation ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="BusinessTimestamp" Type="Edm.String"
MaxLength="24"></Property>
  <Property Name="Type" Type="Edm.String" MaxLength="81"></
Property>
  <Property Name="EventType" Type="Edm.String" Nullable="false"
MaxLength="81"></Property>
  <Property Name="EventStatus" Type="Edm.String" MaxLength="50"></
Property>
  <Property Name="EventStatusDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventSeverity" Type="Edm.Int64"></Property>
  <Property Name="EventSeverityDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventCode" Type="Edm.String" MaxLength="50"></
Property>
  <Property Name="EventCodeDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventSource" Type="Edm.String" MaxLength="100"></
Property>
  <Property Name="ThingId" Type="Edm.String" Nullable="false"
MaxLength="32"></Property>
  <Property Name="ThingProperty" Type="Edm.String"
MaxLength="255"></Property>
  <Property Name="ExternalId" Type="Edm.String" MaxLength="255"></
Property>
  <Property Name="EventInfo" Type="Edm.String" MaxLength="200"></
Property>
  <Property Name="ThingAlternateId" Type="Edm.String"
MaxLength="32"></Property>
  <Property Name="ThingExternalId" Type="Edm.String"
MaxLength="255"></Property>
```



```

        <Property Name="ThingName" Type="Edm.String" MaxLength="255"></
Property>
        <Property Name="ThingLocation" Type="Edm.String"
MaxLength="32"></Property>
        <Property Name="ThingCustomer" Type="Edm.String"
MaxLength="32"></Property>
        <Property Name="ThingObjectGroup" Type="Edm.String"
MaxLength="32"></Property>
        <NavigationProperty Name="Dyn_Event_core_automobiles__engine"
Relationship="com.sap.apptot.es.EventToDyn_Event_core_automobiles__engine"
FromRole="Event" ToRole="Dyn_Event_core_automobiles__engine"></
NavigationProperty>
        <NavigationProperty Name="Dyn_Event_core_automobiles__Wheel"
Relationship="com.sap.apptot.es.EventToDyn_Event_core_automobiles__Wheel"
FromRole="Event" ToRole="Dyn_Event_core_automobiles__Wheel"></NavigationProperty>
    </EntityType>
    <EntityType Name="Dyn_Event_core_automobiles__engine">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="enginetemp.entemp" Type="Edm.Int64"></Property>
    </EntityType>
    <EntityType Name="Dyn_Event_core_automobiles__Wheel">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="WheelSpeed.whspeed" Type="Edm.Int64"></Property>
    </EntityType>
    <Association Name="EventToDyn_Event_core_automobiles__engine">
        <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="Event"></End>
        <End Type="com.sap.apptot.es.Dyn_Event_core_automobiles__engine"
Multiplicity="1" Role="Dyn_Event_core_automobiles__engine"></End>
    </Association>
    <Association Name="EventToDyn_Event_core_automobiles__Wheel">
        <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="Event"></End>
        <End Type="com.sap.apptot.es.Dyn_Event_core_automobiles__Wheel"
Multiplicity="1" Role="Dyn_Event_core_automobiles__Wheel"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Events" EntityType="com.sap.apptot.es.Event"></
EntitySet>
        <EntitySet Name="Dyn_Event_core_automobiles__engine"
EntityType="com.sap.apptot.es.Dyn_Event_core_automobiles__engine"></EntitySet>
        <EntitySet Name="Dyn_Event_core_automobiles__Wheel"
EntityType="com.sap.apptot.es.Dyn_Event_core_automobiles__Wheel"></EntitySet>
        <AssociationSet Name="EventToDyn_Event_core_automobiles__engine"
Association="com.sap.apptot.es.EventToDyn_Event_core_automobiles__engine">
            <End EntitySet="Events" Role="Event"></End>
            <End EntitySet="Dyn_Event_core_automobiles__engine"
Role="Dyn_Event_core_automobiles__engine"></End>
        </AssociationSet>
        <AssociationSet Name="EventToDyn_Event_core_automobiles__Wheel"
Association="com.sap.apptot.es.EventToDyn_Event_core_automobiles__Wheel">
            <End EntitySet="Events" Role="Event"></End>
            <End EntitySet="Dyn_Event_core_automobiles__Wheel"
Role="Dyn_Event_core_automobiles__Wheel"></End>
        </AssociationSet>
    </EntityContainer>

```

Example 2: The header contains the thing type name (`core.automobiles:ABCX2Series`) and property set type name (`core.automobiles:WheelPST`) associated with the thing type. Note that the method displays an error message if you provide only the thing type name or only the property set type name associated with the thing type.

The result set contains the event property set type and the thing type details specified in the header parameter.

```
<EntityType Name="Events">
  <Key>
    <PropertyRef Name="EventId"></PropertyRef>
  </Key>
  <Property Name="EventId" Type="Edm.String" Nullable="false">
    <Documentation>
      <LongDescription>Event unique ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="CorrelationId" Type="Edm.String">
    <Documentation>
      <LongDescription>Event Correlation ID</LongDescription>
    </Documentation>
  </Property>
  <Property Name="BusinessTimestamp" Type="Edm.String"
MaxLength="24"></Property>
  <Property Name="Type" Type="Edm.String" MaxLength="81"></
Property>
  <Property Name="EventType" Type="Edm.String" Nullable="false"
MaxLength="81"></Property>
  <Property Name="EventStatus" Type="Edm.String" MaxLength="50"></
Property>
  <Property Name="EventStatusDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventSeverity" Type="Edm.Int64"></Property>
  <Property Name="EventSeverityDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventCode" Type="Edm.String" MaxLength="50"></
Property>
  <Property Name="EventCodeDescription" Type="Edm.String"
MaxLength="60"></Property>
  <Property Name="EventSource" Type="Edm.String" MaxLength="100"></
Property>
  <Property Name="ThingId" Type="Edm.String" Nullable="false"
MaxLength="32"></Property>
  <Property Name="ThingProperty" Type="Edm.String"
MaxLength="255"></Property>
  <Property Name="ExternalId" Type="Edm.String" MaxLength="255"></
Property>
  <Property Name="EventInfo" Type="Edm.String" MaxLength="200"></
Property>
  <Property Name="ThingAlternateId" Type="Edm.String"
MaxLength="32"></Property>
  <Property Name="ThingExternalId" Type="Edm.String"
MaxLength="255"></Property>
  <Property Name="ThingName" Type="Edm.String" MaxLength="255"></
Property>
  <Property Name="ThingLocation" Type="Edm.String"
MaxLength="32"></Property>
  <Property Name="ThingCustomer" Type="Edm.String"
MaxLength="32"></Property>
  <Property Name="ThingObjectGroup" Type="Edm.String"
MaxLength="32"></Property>
  <NavigationProperty Name="Dyn_Event_core_automobiles__engine"
Relationship="com.sap.applot.es.EventToDyn_Event_core_automobiles__engine"
FromRole="Event" ToRole="Dyn_Event_core_automobiles__engine"></
NavigationProperty>
```

```

        <NavigationProperty Name="Dyn_Event_core_automobiles__Wheel"
Relationship="com.sap.apptot.es.EventToDyn_Event_core_automobiles__Wheel"
FromRole="Event" ToRole="Dyn_Event_core_automobiles__Wheel"></NavigationProperty>
        <NavigationProperty Name="Dyn_Thing_core_automobiles__WheelPST"
Relationship="com.sap.apptot.es.EventToDyn_Thing_core_automobiles__WheelPST"
FromRole="Event" ToRole="Dyn_Thing_core_automobiles__WheelPST"></
NavigationProperty>
    </EntityType>
    <EntityType Name="Dyn_Event_core_automobiles__engine">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="enginetemp.entemp" Type="Edm.Int64"></Property>
    </EntityType>
    <EntityType Name="Dyn_Event_core_automobiles__Wheel">
        <Key>
            <PropertyRef Name="EventId"></PropertyRef>
        </Key>
        <Property Name="EventId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="WheelSpeed.whspeed" Type="Edm.Int64"></Property>
    </EntityType>
    <EntityType Name="Dyn_Thing_core_automobiles__WheelPST">
        <Key>
            <PropertyRef Name="ThingId"></PropertyRef>
        </Key>
        <Property Name="ThingId" Type="Edm.String"></Property>
        <Property Name="PropertySetType" Type="Edm.String"></Property>
        <Property Name="ThingType" Type="Edm.String"></Property>
        <Property Name="propsetmd.color" Type="Edm.String"
MaxLength="127"></Property>
    </EntityType>
    <Association Name="EventToDyn_Event_core_automobiles__engine">
        <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="Event"></End>
        <End Type="com.sap.apptot.es.Dyn_Event_core_automobiles__engine"
Multiplicity="1" Role="Dyn_Event_core_automobiles__engine"></End>
    </Association>
    <Association Name="EventToDyn_Event_core_automobiles__Wheel">
        <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="Event"></End>
        <End Type="com.sap.apptot.es.Dyn_Event_core_automobiles__Wheel"
Multiplicity="1" Role="Dyn_Event_core_automobiles__Wheel"></End>
    </Association>
    <Association Name="EventToDyn_Thing_core_automobiles__WheelPST">
        <End Type="com.sap.apptot.es.Event" Multiplicity="1"
Role="Event"></End>
    </End>
    Type="com.sap.apptot.es.Dyn_Thing_core_automobiles__WheelPST" Multiplicity="1"
Role="Dyn_Thing_core_automobiles__TWheelPST2"></End>
    </Association>
    <EntityContainer Name="UnifiedEvents"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Events" EntityType="com.sap.apptot.es.Event"></
EntitySet>
        <EntitySet Name="Dyn_Event_core_automobiles__engine"
EntityType="com.sap.apptot.es.Dyn_Event_core_automobiles__engine"></EntitySet>
        <EntitySet Name="Dyn_Event_core_automobiles__Wheel"
EntityType="com.sap.apptot.es.Dyn_Event_core_automobiles__Wheel"></EntitySet>
        <EntitySet Name="Dyn_Thing_core_automobiles__WheelPST"
EntityType="com.sap.apptot.es.Dyn_Thing_core_automobiles__WheelPST"></EntitySet>
        <AssociationSet Name="EventToDyn_Event_core_automobiles__engine"
Association="com.sap.apptot.es.Dyn_Event_core_automobiles__engine">
            <End EntitySet="Events" Role="Event"></End>
            <End EntitySet="Dyn_Event_core_automobiles__engine"
Role="Dyn_Event_core_automobiles__engine"></End>

```

```

        </AssociationSet>
        <AssociationSet Name="EventToDyn_Event_core_automobiles__Wheel"
Association="com.sap.apptot.es.Dyn_Event_core_automobiles__Wheel">
        <End EntitySet="Events" Role="Event"></End>
        <End EntitySet="Dyn_Event_core_automobiles__Wheel"
Role="Dyn_Event_core_automobiles__Wheel"></End>
        </AssociationSet>
        <AssociationSet
Name="EventToDyn_Thing_core_automobiles__TWheelPST2"
Association="com.sap.apptot.es.Dyn_Thing_core_automobiles__TWheelPST2">
        <End EntitySet="Events" Role="Event"></End>
        <End EntitySet="Dyn_Thing_core_automobiles__WheelPST"
Role="Dyn_Thing_core_automobiles__WheelPST"></End>
        </AssociationSet>
    </EntityContainer>

```

Related Information

[Advanced Event List \[page 1437\]](#)

23.7.2 Read List of Events

This service retrieves list of events based on the combined values of thing type, thing property set type, and event property set type provided as header parameters.

Request

URI: /ES/EventType/<event type name>/v1/Events

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <ES>.r

Request Headers

Header	Required	Values
sap-iot-eventpst	No	Event property set types separated by comma ",".

Note

You can only provide up to a maximum of five event property set types.

Header	Required	Values
sap-iot-thingtype	No	Thing types separated by comma ",".
i Note - If you provide a thing type in the header, you must also provide the thing property set type of data category <i>MasterData</i> that belongs to the specified thing type. - You can only provide up to a maximum of two thing types.		
sap-iot-thingpst	No	Thing property set types separated by comma ",".
i Note - If you provide a thing property set type in the header, you must also provide the thing type to which the provided thing property set type belongs. - You can only provide up to a maximum of two thing property set types.		

The header parameters are optional. You can specify values for one or more, or none of the parameters. However, if you provide thing type, you must also provide thing property set type and vice-versa. You cannot provide only thing type or only thing property set type. In addition, you can use the `$expand` query parameter to view the properties of dynamic entities of thing property set type and event property set type.

The following table illustrates the available thing types, thing property set types, things, event property set types, and events created for specific things :

Thing Type	Thing Property Set Type	Thing	Event Property Set Type	Event
TT1	TPST1	T1	EPST1	E1
	TPST2		EPST2	
TT2	TPST1	T2	EPST1	E2, E3, E4, E5
	TPST2		EPST2	

The following table illustrates how data is retrieved for a given combination of request header parameters:

Request	Request Header Parameters	Result set contains...
/ES/EventType/core.automobiles:ExceededSpeed/v1/Events	None	E1, E2, E3, E4, E5
/ES/EventType/core.automobiles:ExceededSpeed/v1/Events	EPST1	E1, E2, E3, E4, E5

Request	Request Header Parameters	Result set contains...
/ES/EventType/ core.automobiles:ExceededSpeed/v1/Events	EPST1	Service displays an error message indicating the thing property set type is missing in the head parameter
	TT1	
/ES/EventType/ core.automobiles:ExceededSpeed/v1/Events	EPST1	E1
	TT1	
	TPST1	
/ES/EventType/ core.automobiles:ExceededSpeed/v1/Events	EPST1	E2, E3, E4, E5
	TT2	
	TPST1	

Request Parameters

Parameter	Required	Data Type	Description
Name	Yes	String	Name of the event type

Query Request Parameters

Parameter	Required	Type	Description
\$top	No	Integer	Number of records to include in the result set.
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$inlinecount	No	String	Total number of events available; permissible values are <i>allpages</i> and <i>none</i>. The following results apply if this parameter is used in conjunction with the other query parameters: - If you use this with the \$top and \$skip parameters, the result contains the total count of events available. - If you use this with \$filter parameter, the result contains the total count of events based on the defined filter condition.

Parameter	Required	Type	Description
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; supported fields are <code>CorrelationId</code>, <code>BusinessTimestamp</code>, <code>EventType</code>, <code>EventStatus</code>, <code>EventSeverity</code>, <code>EventCode</code>, <code>ThingId</code>, <code>ThingProperty</code>, and <code>ExternalId</code>. To sort the result set, use asc for the ascending order and desc for the descending order.
\$select		String	Select condition for the entity fields to be included in the result set; all static event fields, event and thing properties are valid.
\$filter		String	Filter condition to be applied; all static event fields, event and thing properties are valid. Multiple filters are supported using the and separator. You can use the string functions such as substringof, startswith, and endswith to search data using <code>\$filter</code>.

Request Example

```
/ES/EventType/core.automobiles:Wheel/v1/Events
```

Response

Response Headers

None

Response Status and Error Codes

Code	Description
200	List of events retrived successfully

Response Payload Example

Example 1:

sap-iot-eventpst	sap-iot-thingtype	sap-iot-thingpst
core.automobiles:Wheel	-	-

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('96581C415A46492FB8570E66F74B85F7')",
          "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('96581C415A46492FB8570E66F74B85F7')",
          "type": "com.sap.apptot.es.Events"
        },
        "EventId": "96581C415A46492FB8570E66F74B85F7",
        "CorrelationId": "15741d1db4044081a97eeb1940cd08e1",
        "BusinessTimestamp": "2021-01-06T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "Open",
        "EventStatusDescription": null,
        "EventSeverity": "1",
        "EventSeverityDescription": null,
        "EventCode": "EQ12",
        "EventCodeDescription": null,
        "EventSource": null,
        "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
        "ThingProperty": "Wheel Speed engine temperature",
        "ExternalId": "SampleEvent2",
        "EventInfo": "Alert on speed",
        "ThingAlternateId": "thingaelist2-altId",
        "ThingExternalId": "thingaelist2",
        "ThingName": "thingaelist2",
        "ThingLocation": null,
        "ThingCustomer": null,
        "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
        "Dyn_Event_core_automobiles__Wheel": {
          "__deferred": {
            "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('96581C415A46492FB8570E66F74B85F7') /
Dyn_Event_core_automobiles__Wheel"
          }
        }
      },
      {
        "__metadata": {
          "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
          "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
```



```

        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "3BA4744392344A5EA5F4F8818A852DF7",
    "CorrelationId": "351a0a9a6ccd420eb3c7840a672bce06",
    "BusinessTimestamp": "2020-10-05T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "open",
    "EventStatusDescription": null,
    "EventSeverity": "1",
    "EventSeverityDescription": null,
    "EventCode": "EQ12",
    "EventCodeDescription": null,
    "EventSource": null,
    "ThingId": "E8076A0335864A09A2D56A0BBC1365AB",
    "ThingProperty": "Wheel Speed",
    "ExternalId": "SampleEvent",
    "EventInfo": "Alert on speed",
    "ThingAlternateId": "thingaelist-altId",
    "ThingExternalId": "thingaelist",
    "ThingName": "thingaelist",
    "ThingLocation": null,
    "ThingCustomer": null,
    "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
    "Dyn_Event_core_automobiles__Wheel": {
        "__deferred": {
            "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')/
Dyn_Event_core_automobiles__Wheel"
        }
    }
},
{
    "__metadata": {
        "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('9F39479B6B1D4339BB80E4809D2547A1')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "9F39479B6B1D4339BB80E4809D2547A1",
    "CorrelationId": "a31c0a76903945f28cea262cbd05eecc",
    "BusinessTimestamp": "2021-01-05T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "open",
    "EventStatusDescription": null,
    "EventSeverity": "1",
    "EventSeverityDescription": null,
    "EventCode": "EQ12",
    "EventCodeDescription": null,
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "ThingAlternateId": "thingaelist2-altId",
    "ThingExternalId": "thingaelist2",
    "ThingName": "thingaelist2",
    "ThingLocation": null,
    "ThingCustomer": null,
    "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
    "Dyn_Event_core_automobiles__Wheel": {
        "__deferred": {

```

```

        "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('9F39479B6B1D4339BB80E4809D2547A1')/
Dyn_Event_core_automobiles__Wheel"
    }
},
{
    "__metadata": {
        "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('FF09C38C275D4570BF3801782EE21BC3')",
        "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('FF09C38C275D4570BF3801782EE21BC3')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "FF09C38C275D4570BF3801782EE21BC3",
    "CorrelationId": "218803aae7f84dcf8fdec4660c3cf657",
    "BusinessTimestamp": "2021-01-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "InProgress",
    "EventStatusDescription": null,
    "EventSeverity": "1",
    "EventSeverityDescription": null,
    "EventCode": "EQ12",
    "EventCodeDescription": null,
    "EventSource": null,
    "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
    "ThingProperty": "Wheel Speed engine temperature",
    "ExternalId": "SampleEvent2",
    "EventInfo": "Alert on speed",
    "ThingAlternateId": "thingaelist2-altId",
    "ThingExternalId": "thingaelist2",
    "ThingName": "thingaelist2",
    "ThingLocation": null,
    "ThingCustomer": null,
    "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
    "Dyn_Event_core_automobiles__Wheel": {
        "__deferred": {
            "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('FF09C38C275D4570BF3801782EE21BC3')/
Dyn_Event_core_automobiles__Wheel"
        }
    }
},
{
    "__metadata": {
        "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('F0272785E0C64A6D9EE53DFD26D22A14')",
        "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('F0272785E0C64A6D9EE53DFD26D22A14')",
        "type": "com.sap.apptot.es.Events"
    },
    "EventId": "F0272785E0C64A6D9EE53DFD26D22A14",
    "CorrelationId": "b041884987844c2f985bbec07198c459",
    "BusinessTimestamp": "2021-03-06T09:00:00Z",
    "Type": "Alert",
    "EventType": "core.automobiles:ExceededSpeed",
    "EventStatus": "Open",
    "EventStatusDescription": null,
    "EventSeverity": "1",
    "EventSeverityDescription": null,
    "EventCode": "EQ12",

```

```

        "EventCodeDescription": null,
        "EventSource": null,
        "ThingId": "1324CA5C952E4096B54F6D5A351C8B86",
        "ThingProperty": "Wheel Speed engine temperature",
        "ExternalId": "SampleEvent2",
        "EventInfo": "Alert on speed",
        "ThingAlternateId": "thingaelist2-altId",
        "ThingExternalId": "thingaelist2",
        "ThingName": "thingaelist2",
        "ThingLocation": null,
        "ThingCustomer": null,
        "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
        "Dyn_Event_core_automobiles__Wheel": {
            "__deferred": {
                "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('F0272785E0C64A6D9EE53DFD26D22A14')/
Dyn_Event_core_automobiles__Wheel"
            }
        }
    }
}
]
}
}

```

Example 2:

sap-iot-eventpst	sap-iot-thingtype	sap-iot-thingpst
core.automobiles:Wheel	core.automobiles:ABCX2Series	core.automobiles:WheelPST

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
          "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
          "type": "com.sap.apptiot.es.Events"
        },
        "EventId": "3BA4744392344A5EA5F4F8818A852DF7",
        "CorrelationId": "351a0a9a6ccd420eb3c7840a672bce06",
        "BusinessTimestamp": "2020-10-05T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "open",
        "EventStatusDescription": null,
        "EventSeverity": "1",
        "EventSeverityDescription": null,
        "EventCode": "EQ12",
        "EventCodeDescription": null,
        "EventSource": null,
        "ThingId": "E8076A0335864A09A2D56A0BBC1365AB",
        "ThingProperty": "Wheel Speed",
        "ExternalId": "SampleEvent",
        "EventInfo": "Alert on speed",
        "ThingAlternateId": "thingaelist-altId",
        "ThingExternalId": "thingaelist",
        "ThingName": "thingaelist",
        "ThingLocation": null,
        "ThingCustomer": null,
        "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",

```

```

        "Dyn_Event_core_automobiles__Wheel": {
            "__deferred": {
                "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')/
Dyn_Event_core_automobiles__Wheel"
            }
        },
        "Dyn_Thing_core_automobiles__WheelPST": {
            "__deferred": {
                "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')/
Dyn_Thing_core_automobiles__WheelPST"
            }
        }
    }
}
]
}
}

```

Example 2: Request URL with the \$expand query parameter /ES/EventType/

core.automobiles:ExceededSpeed/v1/Events?\$expand=Dyn_Event_core_automobiles__Wheel,
Dyn_Thing_core_automobiles__WheelPST

sap-iot-eventpst	sap-iot-thingtype	sap-iot-thingpst
core.automobiles:Wheel	core.automobiles:ABCX2Series	core.automobiles:WheelPST

```

{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
          "uri": "https://iot-events-advanced-
ci.cfapps.sap.hana.ondemand.com:443/ES/EventType/
core.automobiles:ExceededSpeed/v1/Events('3BA4744392344A5EA5F4F8818A852DF7')",
          "type": "com.sap.apptot.es.Events"
        },
        "EventId": "3BA4744392344A5EA5F4F8818A852DF7",
        "CorrelationId": "351a0a9a6ccd420eb3c7840a672bce06",
        "BusinessTimestamp": "2020-10-05T09:00:00Z",
        "Type": "Alert",
        "EventType": "core.automobiles:ExceededSpeed",
        "EventStatus": "open",
        "EventStatusDescription": null,
        "EventSeverity": "1",
        "EventSeverityDescription": null,
        "EventCode": "EQ12",
        "EventCodeDescription": null,
        "EventSource": null,
        "ThingId": "E8076A0335864A09A2D56A0BBC1365AB",
        "ThingProperty": "Wheel Speed",
        "ExternalId": "SampleEvent",
        "EventInfo": "Alert on speed",
        "ThingAlternateId": "thingaelist-altId",
        "ThingExternalId": "thingaelist",
        "ThingName": "thingaelist",
        "ThingLocation": null,
        "ThingCustomer": null,
        "ThingObjectGroup": "7F0F8060EF634361AFE46C054BF93891",
        "Dyn_Event_core_automobiles__Wheel": {

```

```

        "EventId": "3BA4744392344A5EA5F4F8818A852DF7",
        "PropertySetType": "core.automobiles:Wheel",
        "WheelSpeed.whspeed": "104"
    },
    "Dyn_Thing_core_automobiles_WheelPST": {
        "ThingId": "E8076A0335864A09A2D56A0BBC1365AB",
        "PropertySetType": "core.automobiles:WheelPST",
        "ThingType": "core.automobiles:ABCX2Series",
        "propsetmd.color": null
    }
}
]
}
}

```

Related Information

[Advanced Event List \[page 1437\]](#)

23.8 Event List: OData Service

Overview

The event list OData service is used to retrieve the complete information of events for a specific event type.

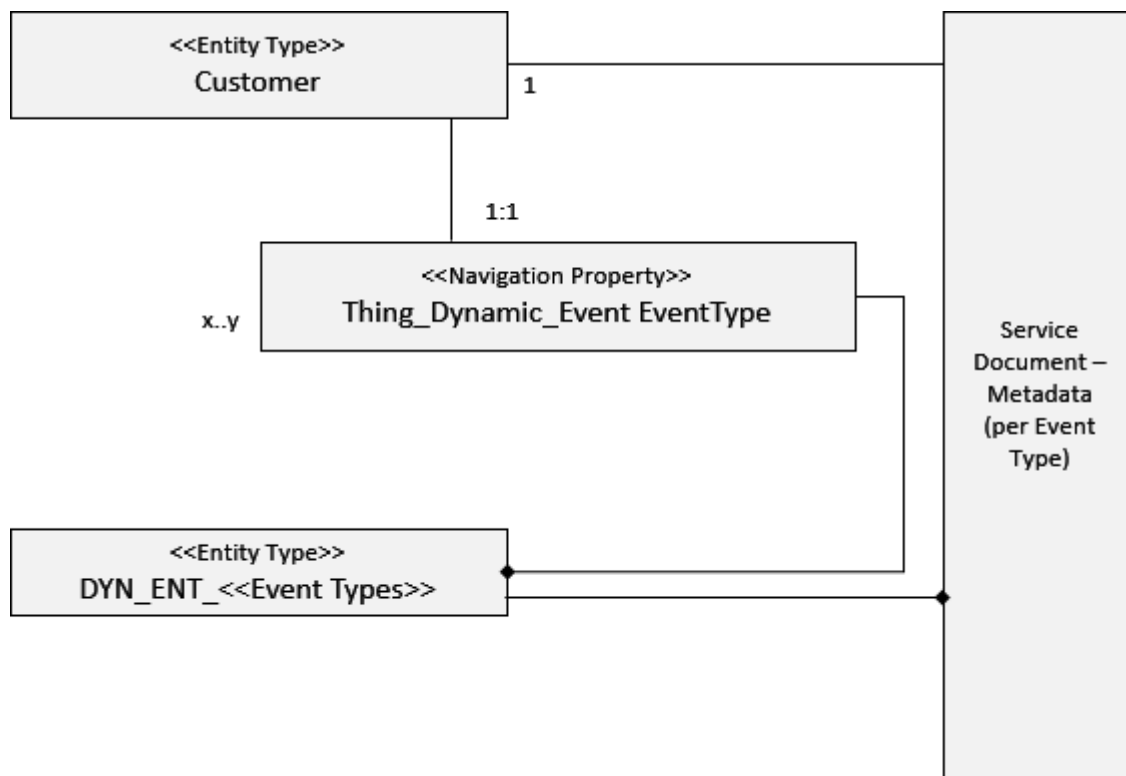
OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/BPAnalytics/EventType/v1/<event type name>`

Example for a Root URI in a cloud foundry environment: `https://bpanalytics-event-sap.cfapps.eu10.hana.ondemand.com/BPAnalytics/EventType/v1/<event type name>`

Entity Data Model

The following diagram shows the EDM of Event List OData service:



Service Metadata URI: `http://<server address>[:<port number>]/BPAnalytics/EventType/v1/<event type name>/$metadata`

Related Information

[Read Metadata of Event Type \[page 1456\]](#)

[Read Events of Event Type for Customer \[page 1458\]](#)

23.8.1 Read Metadata of Event Type

Retrieves metadata of a specific event type

i Note

You cannot specify multiple event types in the request URL.

Request

URI: /BPAnalytics/EventType/v1/<event type name>/\$metadata

Operation Type: CRUD

HTTP Method: *GET*

Permissions: <bpanlyt>.r

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type

Request Example

/BPAnalytics/EventType/v1/core.automobiles:AlertEventType/\$metadata

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

```
<EntityType Name="Customer">
  <Key>
    <PropertyRef Name="BusinessPartnerId"/>
  </Key>
  <Property Name="BusinessPartnerId" Type="Edm.String"/>
  <Property Name="Name" Type="Edm.String"/>
  <Property Name="Country" Type="Edm.String" Nullable="false"/>
  <Property Name="AddressRepresentation" Type="Edm.String"/>
  <Property Name="LandlinePhoneNumber" Type="Edm.String"/>
  <Property Name="MobilePhoneNumber" Type="Edm.String"/>
  <NavigationProperty Name="DYN_ENT_core_automobiles__AlertEventType"
Relationship="com.sap.apptot.odata2.bpevents.DYN_ENT_core_automobiles__AlertEvent
Type" FromRole="CustomerEntities"
ToRole="DYN_ENT_core_automobiles_AlertEventTypeEntities">
</EntityType>
<EntityType Name="DYN_ENT_core_automobiles__AlertEventType">
  <Key>
    <PropertyRef Name="EventTypeId"/>
  </Key>
  <Property Name="EventTypeId" Type="Edm.String" Nullable="false"/>
  <Property Name="High" Type="Edm.Numeric"/>
  <Property Name="Medium" Type="Edm.Numeric"/>
  <Property Name="Low" Type="Edm.Numeric"/>
</EntityType>
```

```
<EntityContainer Name="CompositeThingStatisticDataContainer"
m:IsDefaultEntityContainer="true">
  <EntitySet Name="Customer"
EntityType="com.sap.appiot.odata2.bpevents.Customers"/>
  <EntitySet Name="DYN_ENT_core_automobiles__AlertEventType"
EntityType="com.sap.appiot.odata2.bpevents.DYN_ENT_core_automobiles__AlertEventTy
pe"/>
</EntityContainer>
```

Related Information

[Event List: OData Service \[page 1455\]](#)

[Read Events of Event Type for Customer \[page 1458\]](#)

23.8.2 Read Events of Event Type for Customer

Retrieves all events of a specific event type

You can use this service to specify an event type and retrieve aggregates of events for each severity. The service filters the events based on the status and groups the events by customer and their location. The service retrieves all customers for which valid things are created in the system and the respective locations of the customers.

Request

URI: /BPAnalytics/EventType/v1/<event type name>/Customers

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <bpanlyt>.r

Request Headers

Header	Required	Description
Accept-Language	No	Language of the event type description. The default language is en .

Request Parameters

Parameter	Required	Data Type	Description
event type name	Yes	String	Name of the event type.
i Note You cannot specify multiple event types in the request URL.			
customer ID	Yes	String	Unique identifier of the customer

Query Request Parameters

Parameter	Required	Data Type	Description
\$top	No	Integer	Number of records to include in the result set.
i Note Default value is 20			
\$skip	No	Integer	Number of the first n records to be excluded from the result set.
\$orderby	No	String	Field name to be used for sorting the result set in ascending order; valid fields are business partner ID, name, country, and country description. To sort the result set, use asc for the ascending order and desc for the descending order.
\$filter	No	String	Filter condition to be applied; valid fields are business partner ID, name, country, and country description. Multiple filters are supported using the AND separator.
\$select	No	String	Select condition for the data fields to be included in the result set; valid fields are business partner ID, name, country, and country description.

Parameter	Required	Data Type	Description
sap-appiot-es	No	String	Predefined query parameter used to filter events based on the event status. The only supported field is <code>Status</code>. As the status field is not included in the metadata, you can use this parameter to filter events based on <code>Status</code>. For example, <code>sap-appiot-es=Status eq 'coming'</code>.

Request Example

```
/BPAnalytics/EventType/V1/core.automobiles:AlertEventType/Customers
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the structure as depicted in the following examples:

```
/BPAnalytics/EventType/V1/core.automobiles:AlertEventType/Customers
```

Retrieves all events of a specific event type along with customer details and their respective location details

```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom" xmlns:m="http://
schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:d="http://
schemas.microsoft.com/ado/2007/08/dataservices" xml:base="https://bpanalytics-
event-sap-ci.cfapps.sap.hana.ondemand.com:443/BPAnalytics/EventType/v1/
core.automobiles:AlertEventType/">
  <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
BPAnalytics/EventType/v1/core.automobiles:AlertEventType/Customers</id>
  <title type="text">Customers</title>
  <updated>2017-04-04T05:13:49.478Z</updated>
  <author>
    <name></name>
  </author>
  <link href="Customers" rel="self" title="Customers"></link>
```

```

<entry>
  <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
  BPAnalytics/EventType/v1/core.automobiles:AlertEventType/
  Customers('022ACCDE8BD242939AEB70FF42D9133C')</id>
  <title type="text">Customers</title>
  <updated>2017-04-04T05:13:49.486Z</updated>
  <category term="com.sap.apptot.Customers" scheme="http://
  schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
  <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C') " rel="edit"
  title="Customers"></link>
  <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C') /
  DYN_ENT_core_automobiles__AlertEventType" rel="http://schemas.microsoft.com/ado/
  2007/08/dataservices/related/DYN_ENT_core_automobiles__AlertEventType"
  title="DYN_ENT_core_automobiles__AlertEventType" type="application/atom
  +xml;type=entry"></link>
  <content type="application/xml">
    <m:properties>
      <d:BusinessPartnerId>022ACCDE8BD242939AEB70FF42D9133C</
d:BusinessPartnerId>
      <d:Name>Stephan</d:Name>
      <d:Country>FR</d:Country>
      <d:CountryDescription>France</d:CountryDescription>
      <d:BPAddressRepresentationISOCODE>Zyyy</
d:BPAddressRepresentationISOCODE>
      <d:AddressRepresentation>Ring 7, 99999 Walldorf</
d:AddressRepresentation>
      <d:LandlinePhoneNumber>34343434</d:LandlinePhoneNumber>
      <d:MobilePhoneNumber m:null="true"></d:MobilePhoneNumber>
    </m:properties>
  </content>
</entry>
<entry>
  <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
  BPAnalytics/EventType/v1/core.automobiles:AlertEventType/
  Customers('1D8A662167F0427AB02D837D975B12EA')</id>
  <title type="text">Customers</title>
  <updated>2017-04-04T05:13:49.494Z</updated>
  <category term="com.sap.apptot.Customers" scheme="http://
  schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
  <link href="Customers('1D8A662167F0427AB02D837D975B12EA') " rel="edit"
  title="Customers"></link>
  <link href="Customers('1D8A662167F0427AB02D837D975B12EA') /
  DYN_ENT_core_automobiles__AlertEventType" rel="http://schemas.microsoft.com/ado/
  2007/08/dataservices/related/DYN_ENT_core_automobiles__AlertEventType"
  title="DYN_ENT_core_automobiles__AlertEventType" type="application/atom
  +xml;type=entry"></link>
  <content type="application/xml">
    <m:properties>
      <d:BusinessPartnerId>1D8A662167F0427AB02D837D975B12EA</
d:BusinessPartnerId>
      <d:Name>WildCardSearch WildCard</d:Name>
      <d:Country>DE</d:Country>
      <d:CountryDescription>Germany</d:CountryDescription>
      <d:BPAddressRepresentationISOCODE>Zyyy</
d:BPAddressRepresentationISOCODE>
      <d:AddressRepresentation>7, 77777 Walldorf</
d:AddressRepresentation>
      <d:LandlinePhoneNumber>34343434</d:LandlinePhoneNumber>
      <d:MobilePhoneNumber m:null="true"></d:MobilePhoneNumber>
    </m:properties>
  </content>
</entry>
</feed>

```

```

/BPAnalytics/EventType/V1/core.automobiles:AlertEventType/
Customers('022ACCDE8BD242939AEB70FF42D9133C')

```

Retrieves all events of a specific event type along with customer details and their respective location details for the specified customer

```
<?xml version="1.0" encoding="utf-8"?>
<entry xmlns="http://www.w3.org/2005/Atom" xmlns:m="http://
schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:d="http://
schemas.microsoft.com/ado/2007/08/dataservices" xml:base="https://bpanalytics-
event-sap-ci.cfapps.sap.hana.ondemand.com:443/BPAAnalytics/EventType/v1/
core.automobiles:AlertEventType/">
  <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
BPAAnalytics/EventType/v1/core.automobiles:AlertEventType/
Customers('022ACCDE8BD242939AEB70FF42D9133C')</id>
  <title type="text">Customers</title>
  <updated>2017-04-04T05:17:14.584Z</updated>
  <category term="com.sap.apptot.Customers" scheme="http://
schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
  <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C')" rel="edit"
title="Customers"></link>
  <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C') /
DYN_ENT_core_automobiles__AlertEventType" rel="http://schemas.microsoft.com/ado/
2007/08/dataservices/related/DYN_ENT_core_automobiles__AlertEventType"
title="DYN_ENT_core_automobiles__AlertEventType" type="application/atom
+xml;type=entry"></link>
  <content type="application/xml">
    <m:properties>
      <d:BusinessPartnerId>022ACCDE8BD242939AEB70FF42D9133C</
d:BusinessPartnerId>
      <d:Name>Stephan</d:Name>
      <d:Country>FR</d:Country>
      <d:CountryDescription>France</d:CountryDescription>
      <d:BPAAddressRepresentationISOCODE>Zyyy</
d:BPAAddressRepresentationISOCODE>
      <d:AddressRepresentation>Ring 7, 99999 Walldorf</
d:AddressRepresentation>
      <d:LandlinePhoneNumber>34343434</d:LandlinePhoneNumber>
      <d:MobilePhoneNumber m:null="true"></d:MobilePhoneNumber>
    </m:properties>
  </content>
</entry>
```

/BPAAnalytics/EventType/V1/core.automobiles:AlertEventType/Customers?
\$expand=DYN_ENT_core_automobiles__AlertEventType

Retrieves all events of a specific event type along with customer details and their respective location details. In addition, the service lists aggregates of events for each severity.

```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom" xmlns:m="http://
schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns:d="http://
schemas.microsoft.com/ado/2007/08/dataservices" xml:base="https://bpanalytics-
event-sap-ci.cfapps.sap.hana.ondemand.com:443/BPAAnalytics/EventType/v1/
core.automobiles:AlertEventType/">
  <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
BPAAnalytics/EventType/v1/core.automobiles:AlertEventType/Customers</id>
  <title type="text">Customers</title>
  <updated>2017-04-04T05:19:33.919Z</updated>
  <author>
    <name></name>
  </author>
  <link href="Customers" rel="self" title="Customers"></link>
  <entry>
    <id>https://bpanalytics-event-sap-ci.cfapps.sap.hana.ondemand.com:443/
BPAAnalytics/EventType/v1/core.automobiles:AlertEventType/
Customers('022ACCDE8BD242939AEB70FF42D9133C')</id>
    <title type="text">Customers</title>
    <updated>2017-04-04T05:19:33.919Z</updated>
```

```

    <category term="com.sap.apptot.Customers" scheme="http://
schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
    <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C')" rel="edit"
title="Customers"></link>
    <link href="Customers('022ACCDE8BD242939AEB70FF42D9133C')/
DYN_ENT_core_automobiles__AlertEventType" rel="http://schemas.microsoft.com/ado/
2007/08/dataservices/related/DYN_ENT_core_automobiles__AlertEventType"
title="DYN_ENT_core_automobiles__AlertEventType" type="application/atom
+xml;type=entry">
        <m:inline>
            <entry xml:base="https://bpanalytics-event-sap-
ci.cfapps.sap.hana.ondemand.com:443/BPAAnalytics/EventType/v1/
core.automobiles:AlertEventType/">
                <id>https://bpanalytics-event-sap-
ci.cfapps.sap.hana.ondemand.com:443/BPAAnalytics/EventType/v1/
core.automobiles:AlertEventType/
DYN_ENT_core_automobiles__AlertEventType('test.sandbox.devxperf.eventpackage
%3AAlertEventType')</id>
                <title type="text">DYN_ENT_core_automobiles__AlertEventType</
title>
                <updated>2017-04-04T05:19:33.921Z</updated>
                <category
term="com.sap.apptot.DYN_ENT_test_core_automobiles__AlertEventType"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>
                <link
href="DYN_ENT_core_automobiles__AlertEventType('core.automobiles
%3AAlertEventType')" rel="edit"
title="DYN_ENT_core_automobiles__AlertEventType"></link>
                <content type="application/xml">
                    <m:properties>
                        <d:TypeId>core.automobiles:AlertEventType</
d:TypeId>
                        <d:High>10</d:High>
                        <d:Medium>2</d:Medium>
                        <d:Low>4</d:Low>
                    </m:properties>
                </content>
            </entry>
        </m:inline>
    </link>
    <content type="application/xml">
        <m:properties>
            <d:BusinessPartnerId>022ACCDE8BD242939AEB70FF42D9133C</
d:BusinessPartnerId>
            <d:Name>Stephan</d:Name>
            <d:Country>FR</d:Country>
            <d:CountryDescription>France</d:CountryDescription>
            <d:BPAAddressRepresentationISOCODE>Zyyy</
d:BPAAddressRepresentationISOCODE>
            <d:AddressRepresentation>Ring 7, 99999 Walldorf</
d:AddressRepresentation>
            <d:LandlinePhoneNumber>34343434</d:LandlinePhoneNumber>
            <d:MobilePhoneNumber m:null="true"></d:MobilePhoneNumber>
        </m:properties>
    </content>
</entry>
</feed>

```

Related Information

[Event List: OData Service \[page 1455\]](#)

[Read Metadata of Event Type \[page 1456\]](#)

23.9 Events Aggregate: OData Service

Overview

The events aggregate OData service is used to retrieve aggregate of events grouped by the event type for the specified time interval.

Time Bucket

The time bucket is the time interval that is calculated as follows:

Time Bucket = (toTime - fromTime) / number of divisions

OData Version: 2.0

Root URI: `http://<server address>[:<port number>]/EventsAggregate/v1/Events?timeRange=<from time>-<to time>&divisions=<divisions>`

Example for a Root URI in a cloud foundry environment: `https://events-aggregate-sap.cfapps.eu10.hana.ondemand.com/EventsAggregate/v1/Events?timeRange=<from time>-<to time>&divisions=<divisions>`

Support of OData Features

The current implementation supports only `$filter` query option, which can be passed as query or path parameter.

Service Metadata URI: `http://<server address>[:<port number>]/EventsAggregate/v1/$metadata`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scope
GET	Read Metadata of Events Aggregate [page 1465]	<code>/EventsAggregate/v1/\$metadata</code>	<tde>.r
GET	Read Aggregate of Events [page 1466]	<code>/EventsAggregate/v1/Events?timeRange=<fromTime>-<toTime>&divisions=<division></code>	<tde>.r

i Note

<tde> refers to the event application name.

23.9.1 Read Metadata of Events Aggregate

With this method, you can retrieve the metadata of time division based aggregate of events.

Request

URI: `/EventsAggregate/v1/$metadata`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `<td>.r`

Request Parameters

None

Request Example

`/EventsAggregate/v1/$metadata`

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<EntityType Name="Events">
  <Key>
    <PropertyRef Name="EventType"></PropertyRef>
  </Key>
  <Property Name="EventType" Type="Edm.String" Nullable="false"></
Property>
  <Property Name="FirstOccuringEventId" Type="Edm.String"></
Property>
  <Property Name="Timestamp" Type="Edm.DateTimeOffset"></Property>
  <Property Name="Count" Type="Edm.Int32"></Property>
  <Property Name="ThingProperty" Type="Edm.String"></Property>
  <Property Name="ThingId" Type="Edm.String"></Property>
  <Property Name="SecondsDuration" Type="Edm.Double"></Property>
  <Property Name="Type" Type="Edm.String"></Property>
```

```

        <Property Name="CreatedBusinessTimestamp"
Type="Edm.DateTimeOffset"></Property>
    </EntityType>
    <EntityContainer Name="EventsAggregate"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="Events" EntityType="com.sap.appiot.esa.Event"></
EntitySet>
    </EntityContainer>

```

Related Information

[Events Aggregate: OData Service \[page 1464\]](#)

23.9.2 Read Aggregate of Events

Retrieves aggregate of events grouped by the event type for the specified time interval

You can use this method to retrieve aggregates of events for each event type. The method performs the following:

- Retrieves latest events grouped by the correlation ID.
- Retrieves the first occurrence of the event per event type for the calculated time bucket. The method also retrieves the count events retrieved.

For example, consider the following set of events:

Event ID	Correlation ID	Timestamp	Event Type
E1	C1	10:00 am	ET1
E2	C1	10:10 am	ET1
E3	C1	11:10 am	ET1
E4	C2	09:00 am	ET1
E5	C2	09:30 am	ET1
E6	C3	10:10 am	ET2

The method `/EventsAggregate/v1/Events?`

`timerange=2016-02-10T09:00:00.514Z-2017-08-16T12:00:00.533Z&divisions=40` when executed, performs the following:

- Retrieves latest events grouped by the correlation ID as depicted in the following table:

Event ID	Correlation ID	Timestamp	Event Type
E3	C1	11:10 am	ET1
E5	C2	09:30 am	ET1

Event ID	Correlation ID	Timestamp	Event Type
E6	C3	10:10 am	ET2

- From the list of latest events grouped by the correlation ID, the method retrieves the first occurrence of the event per event type. In this example, event E5 of event type ET1 with correlation ID C2 and event E6 of event type ET2 with correlation ID C3.
- From the complete list of events, for a combination of event type (ET1) and correlation ID (C2), the method retrieves the first occurrence of the event (E4). The timestamp of this first occurred event (E4) created for the correlation ID (C2) is displayed as the created business timestamp in the response payload as indicated in the following table:

Event ID	Correlation ID	Timestamp	Event Type	Creation Time
E5	C2	09:30 am	ET1	09:00 am
E6	C3	10:10 am	ET2	10:10 am

Request

URI: /EventsAggregate/v1/Events?timerange=<fromTime>-<toTime>&divisions=<division>

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: <td>.r

Request Parameters

Parameter	Required	Data Type	Description
fromTime	Yes	Timestamp	Time from which the aggregates are calculated for events
toTime	Yes	Timestamp	Time up to which the aggregates are calculated for events
divisions	Yes	Integer	Number of divisions
thing ID	No	String	Unique identifier of a thing
thing property	No	String	Free text that describes the thing property
type	No	String	Free text that describes the event

Query Request Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; valid fields are ThingId , ThingProperty , and Type .

Request Example

```
/EventsAggregate/v1/Events?  
timerange=2016-02-10T13:10:16.514Z-2017-08-16T13:10:16.533Z&divisions=40&  
$filter=ThingId eq '0089A1D3E6C444E8894FEE517320EC92'
```

Response

Response Status and Error Codes

Code	Description
200	Data retrieved successfully

Payload

Format: [XML](#)

Media types supported are [JSON](#) and [XML](#). The [XML](#) for this method has the following structure:

```
<entry>  
  <id>https://events-aggregate-sap-ci.cfapps.sap.hana.ondemand.com:443/  
EventsAggregate/v1/Events('core.automobiles%3AAlertEventType')</id>  
  <title type="text">Events</title>  
  <updated>2019-05-31T09:45:29.613Z</updated>  
  <category term="com.sap.apptot.esa.Events" scheme="http://  
schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>  
  <link href="Events('core.automobiles%3AAlertEventType')" rel="edit"  
title="Events"></link>  
  <content type="application/xml">  
    <m:properties>  
      <d:EventType>core.automobiles:AlertEventType</d:EventType>  
      <d:FirstOccuringEventId>42FFF4BFB4844A77B19B0F3ED13A459D</  
d:FirstOccuringEventId>  
      <d:Timestamp>2018-07-08T05:30:00Z</d:Timestamp>  
      <d:Count>2</d:Count>  
      <d:ThingProperty>core.automobiles:TTCar/carWheel</  
d:ThingProperty>  
      <d:ThingId>DFA5E70345E24205A065939A59A47FF2</d:ThingId>  
      <d:SecondsDuration>7583400.0</d:SecondsDuration>  
      <d:Type m:null="true"></d:Type>  
      <d:CreatedBusinessTimestamp>2018-07-08T05:00:00Z</  
d:CreatedBusinessTimestamp>  
    </m:properties>  
  </content>  
</entry>  
<entry>  
  <id>https://events-aggregate-sap-ci.cfapps.sap.hana.ondemand.com:443/  
EventsAggregate/v1/Events('core.automobiles%3AAlertEventType1')</id>  
  <title type="text">Events</title>  
  <updated>2019-05-31T09:45:29.613Z</updated>  
  <category term="com.sap.apptot.esa.Events" scheme="http://  
schemas.microsoft.com/ado/2007/08/dataservices/scheme"></category>  
  <link href="Events('core.automobiles%3AAlertEventType1')" rel="edit"  
title="Events"></link>  
  <content type="application/xml">  
    <m:properties>
```

```

        <d:EventType>core.automobiles:AlertEventType1</d:EventType>
        <d:FirstOccuringEventId>96003CD12C5242A9848967DCA3D15670</
d:FirstOccuringEventId>
        <d:Timestamp>2018-07-08T06:40:00Z</d:Timestamp>
        <d:Count>2</d:Count>
        <d:ThingProperty>core.automobiles:TTCar/carWheel</
d:ThingProperty>
        <d:ThingId>DFA5E70345E24205A065939A59A47FF2</d:ThingId>
        <d:SecondsDuration>7579200.0</d:SecondsDuration>
        <d:Type m:null="true"></d:Type>
        <d:CreatedBusinessTimestamp>2018-07-08T06:30:00Z</
d:CreatedBusinessTimestamp>
        </m:properties>
    </content>
</entry>

```

Related Information

[Events Aggregate: OData Service \[page 1464\]](#)

24 SAP Analytics Cloud Integration

Analyze and visualize time series data with SAP Analytics Cloud.

In SAP IoT, you can gain insights about the time series data recorded by sensors with the help of graphics and visualizations provided by SAP Analytics Cloud. To accomplish this, you set up a mapping of data models between the thing model of SAP IoT and the corresponding data structures expected by SAP Analytics Cloud.

Related Information

[Data Model Consumption in SAP Analytics Cloud \[page 1470\]](#)

[Content Manager \[page 1471\]](#)

24.1 Data Model Consumption in SAP Analytics Cloud

Introduction

SAP Analytics Cloud is one of the consumers of the IoT-based data model created in Content Manager. Learn how you can integrate SAP IoT and SAP Analytics Cloud to build analytical dashboards using IoT data.

Most companies rely on analytical and operational dashboards to monitor key metrics and KPIs that impact their business. The Internet of Things (IoT) allows companies to collect large amounts of data. Adding the IoT data while calculating the metrics makes these metrics more effective.

Currently, companies use SAP IoT to store and process IoT data and add business context to IoT data via integration with business systems. On the other hand, companies use SAP Analytics Cloud to monitor their metrics and KPIs. Therefore, integrating the two products provides the right platform for companies to build IoT-enriched metrics and visualize it in SAP Analytics Cloud.

i Note

For SAP Analytics Cloud access, you would require following role:

- `ContentManager_User`

Overall Process

Here is an overview of the process to be followed to create SAP Analytics Cloud Stories using data from SAP IoT using the Content Manager:

1. With the Content Manager, you define a data model. When the data model is activated, a calculation view with the same name as model name is generated. This calculation view can then be consumed by SAP Analytics Cloud using live connectivity to SAP HANA.
2. In SAP Analytics Cloud, proceed as follows:
 1. Establish a connection to SAP IoT.

Note

SAP IoT launchpad URL needs to be used as the connection URL while creating a connection in the SAP Analytics Cloud.

2. Create an SAP Analytics Cloud model using a data model created with the Content Manager.
3. Create Story based on the SAP Analytics Cloud model.

Related Information

[Content Manager \[page 1471\]](#)

[Data Model \[page 1498\]](#)

24.2 Content Manager

An application for defining a data model to be consumed by applications such as SAP Analytics Cloud.

Overview

You use the Content Manager to define a data model. The data model contains the definition of aggregates and dimensions:

- Aggregates are aggregation of sensor data.
- Dimensions are properties based on which data is aggregated.

❖ Example

You want to calculate the sum of fill level for a given material in all containers in Berlin. Here the property **Fill level of Material** is aggregated over the dimension **City**. Creating and activating of the data model results in a calculation view being generated.

End-to-End Process Flow

The following steps describe the necessary activities for setting up time series data chunks that can then be further analyzed:

1. Physical devices are modeled and onboarded as Things into SAP IoT. The Things have the master data information of the devices.
2. Sensor data is measured and sent by the devices.
3. Using the Content Manager, explore the metadata through catalog API's.
4. Define a data model choosing the dimensions and measures from the catalog as well as the required time parameters
5. Activate the data model. Activation of data model creates and persists aggregate data based on the input parameters.
6. Incremental aggregation generation happens at regular intervals for newly ingested sensor data and for changes in the thing master data.

Supported Artifacts:

- Thing Master Data
- Thing Time Series Data

Content Manager Metadata

In order to define a data model, you must understand the metadata that can be used to define it. Content Manager provides Catalog APIs to explore the metadata. These metadata comprise the following categories:

- Catalog Type
- Catalog
- Dataset
- Property

Catalog Type

A catalog type defines a static type of an artifact within SAP IoT. The following catalog types are supported:

- Catalog Type
- Thing Type

Catalog

A catalog defines a business artifact definition of a type. A catalog is based on a catalog type. There can be any number of catalogs inside a single catalog type.

❖ Example

A catalog type named "ThingType" contains user-defined thing types as catalogs. Two thing types ("ThingType1" and "ThingType2") have been created. This constellation is shown in the following table:

Example

Catalog Type	Catalog
ThingType	ThingType1

Catalog Type	Catalog
ThingType	ThingType2

Dataset

Datasets are the actual entities that contain the time series data that can be used to generate aggregates. A dataset is based on a catalog. A catalog can contain one or more datasets.

❖ Example

The previously introduced "ThingType1" has two named property set types assigned, "NPST1", and "NPST2". This results in the following element table:

Example

Catalog Type	Catalog	Dataset
ThingType	ThingType1	NPST1
ThingType	ThingType1	NPST2

i Note

Named property set types should be unique across all thing types to define more than one data model.

Properties

Properties are the attributes of a dataset that can be used in data model definitions. Properties belong to a catalog.

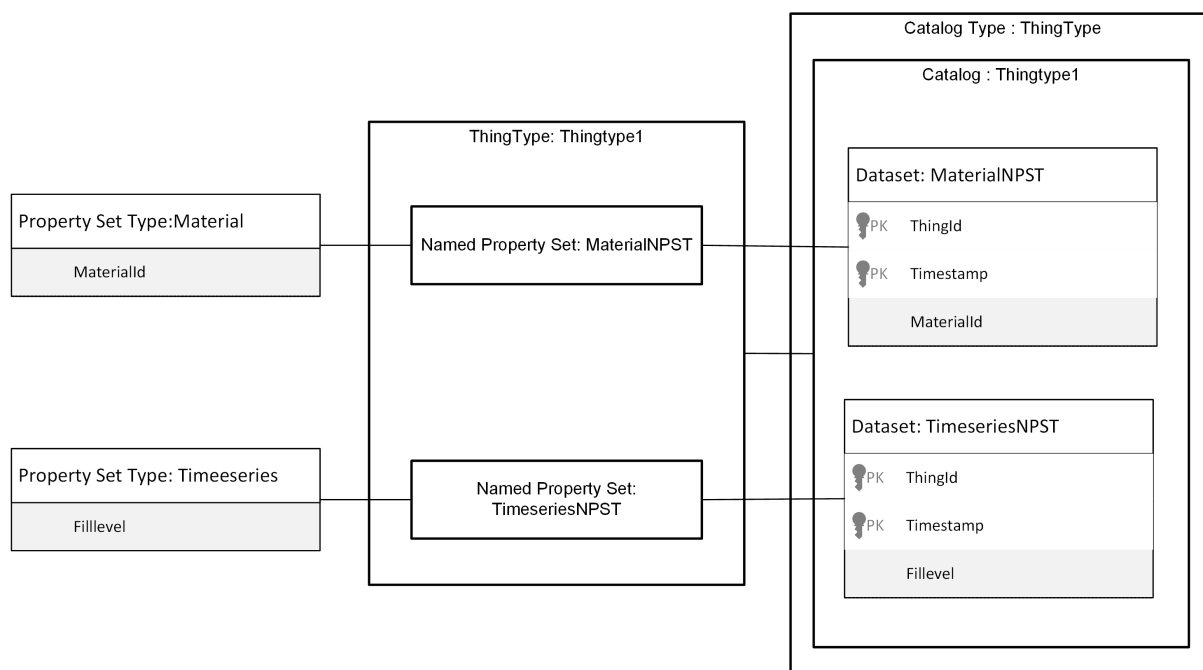
❖ Example

The named property set type "NPST1" contains two properties, "Property1" and "Property2". The element table reflects that as follows:

Example

Catalog Type	Catalog	Dataset	Property
ThingType	ThingType1	NPST1	Property1
ThingType	ThingType1	NPST1	Property2

The following diagram illustrates the mapping of genuine IoT-related entities (such as thing properties and time series data) to the metadata required for integration with SAP Analytics Cloud:



Endpoint

The Content Manager offers an OData endpoint to expose the catalog metadata and to manage the lifecycle of data models:

Resource Endpoint Name Used in Service Keys of a SAP IoT Service Instance: `content-manager`

Example for a base URL in a cloud foundry environment:

`https://sap-iot-noah-live-cm-metadata-management.hana.ondemand.com`

Methods

HTTP Method	Action	URI	Scopes
GET	Read Metadata [page 1485]	/metadata/v1/model.svc/ \$metadata	<cm>.r
GET	Read Catalog Types [page 1489]	/metadata/v1/model.svc/ CatalogTypes	<cm>.r
GET	Read Catalogs [page 1491]	/metadata/v1/model.svc/ CatalogTypes('{{CatalogType}}') /Catalogs?\$format=json	<cm>.r

HTTP Method	Action	URI	Scopes
GET	Read Datasets [page 1493]	/metadata/v1/model.svc/ Catalogs (Name='{{Catalog}}',CatalogType='{{CatalogType}}')/ Datasets	<cm>.r
GET	Read Properties [page 1495]	/metadata/v1/model.svc/ Datasets (Name='{{Dataset}}',CatalogType='{{CatalogType}}',CatalogName='{{Catalog}}')/ Properties	<cm>.r

Related Information

[SAP Analytics Cloud](#)

24.2.1 Functional Overview

An overview of data model activation and aggregate generation.

This section answers following questions:

1. How data model is activated?
2. How are aggregates generated?
3. How are changes to master data or metadata handled by Content Manager?
4. How and when are Aggregates purged?

24.2.1.1 Data Model Activation

Ways to activate Data Model.

There are multiple ways to activate a Model as explained below:

Procedure 1

1. Create a data model with Status “NEW” or without status field in the payload using data model creation API.
2. Data model gets created with status “NEW”.
3. Copy the generated data model ID of the data model from the response payload.

4. Copy the Response Header value for "ETag" from the Response.
5. Trigger activation of data model for the selected Data Model ID using data model activation API with If-Match Request Header value as "ETag" copied from the previous Response.
Activation request gets registered and the data model status changes to "ACTIVATION_REQUESTED".
The activation process starts in the background.

Procedure 2

1. Create a data model with Status as "ACTIVE" in the payload using the data model creation API.
Data model gets created with "ACTIVATION_REQUESTED".
The activation process starts in the background.

Related Information

[Create a Data Model \[page 1499\]](#)

[Activate a Data Model \[page 1506\]](#)

24.2.1.2 Aggregate Generation

Aggregation of time series data.

Overview

Once a Data Model is marked as 'ACTIVATION_REQUESTED' state, it is kept in queue to execute the activation with next available resources. Typically, this happens within few minutes.

Once a model is picked up for activation, the status of the model is marked as "ACTIVATION_IN_PROGRESS" to indicate that the activation process has been started.

During activation, data from various datasets is read for the selected time window and merged together.

After the data from various datasets have been merged, Aggregates are generated at a lowest granularity of the combination of a thing ID and a timestamp.

The entire aggregation process involves data processing as well as data manipulation steps to generate aggregates. This process can take from minutes up to several hours, depending on the following factors:

- Number of onboarded things
- Number of master data records
- Number of messages within an aggregate bucket
- Granularity of the aggregate window

Once the aggregates are generated, the data model status changes to `ACTIVE`. Reaching this status is a prerequisite for further data analysis with the help of SAP Analytics Cloud.

Details

Handling of Data Records Arriving Late

In IoT mass data processing scenarios, it is not unusual that sensor data arrive at a particular processing stage at a point in time that doesn't properly reflect the sequence of data measurements. Such irregularities can be caused by numerous factors, for example:

- Internal data clustering strategies of the involved devices that cannot be influenced from outside ("black box" principle).
- Weak data transfer capacity of wireless transmission paths.
- Processing delays and temporary outages in the data ingestion pipeline.

Example

Let's consider that the activation of a data model has been completed successfully for the period of 12 February 2020 00:00:00 to 16 February 2020 23:59:59.

Some data with a timestamp at 15 February 2020 23:59:59 (that is, within the time period in question) have been posted on 17 February 2020 03:00:00 (that is, three hours after the observation window has closed). In this case, these late arriving datapoints are **not** considered in the aggregate generation because the aggregate window of this time point has already been processed by the Content Manager.

Sample Data

#	Time Win- dow identi- fier	Time Win- dow Value	Lag Period Identifier	Lag Period Value	Aggregate Time Win- dow	Warm Store Re- tention	Activation Trigger Time (UTC)	Extraction Time
1	DAY	10	null	null	HOURLY	90	2020-02-12 T03:20:00	Start: 2020-02-12 T03:00:00 End: 2020-02-12 T02:59:59
2	DAY	10	DAY	1	HOURLY	90	2020-02-12 T03:20:00	Start: 2020-02-01 T03:00:00 End: 2020-02-11 T02:59:59

#	Time Window Identifier	Time Window Value	Lag Period Identifier	Lag Period Value	Aggregate Time Window	Warm Store Retention	Activation Trigger Time (UTC)	Extraction Time
3	DAY	10	null	null	DAILY	90	2020-02-12 T03:20:00	Start: 2020-02-01 T00:00:00 End: 2020-02-11 T23:59:59
4	DAY	10	DAY	1	DAILY	90	2020-02-12 T03:20:00	Start: 2020-31-01 T00:00:00 End: 2020-02-10 T23:59:59
5	DAY	10	null	null	WEEKLY	90	2020-02-12 T03:20:00	Start: 2020-27-01 T00:00:00 End: 2020-02-09 T23:59:59
6	DAY	10	DAY	1	WEEKLY	90	2020-02-12 T03:20:00	Start: 2020-27-01 T00:00:00 End: 2020-02-09 T23:59:59
7	DAY	10	DAY	4	WEEKLY	90	2020-02-12 T03:20:00	Start: 2020-20-01 T00:00:00 End: 2020-02-02 T23:59:59
8	DAY	30	null	null	MONTHLY	90	2020-02-12 T03:20:00	Start: 2020-01-01 T00:00:00 End: 2020-01-31 T23:59:59

#	Time Window Identifier	Time Window Value	Lag Period Identifier	Lag Period Value	Aggregate Time Window	Warm Store Retention	Activation Trigger Time (UTC)	Extraction Time
9	DAY	30	DAY	1	MONTHLY	90	2020-02-12 T03:20:00	Start: 2020-01-01 T00:00:00 End: 2020-01-31 T23:59:59
10	DAY	60	null	null	DAILY	30	2020-02-12 T03:20:00	Start: 2020-01-14 T00:00:00 End: 2020-02-11 T23:59:59
11	DAY	60	DAY	1	DAILY	30	2020-02-12 T03:20:00	Start: 2020-01-14 T00:00:00 End: 2020-02-10 T23:59:59
12	DAY	60	null	null	WEEKLY	30	2020-02-12 T03:20:00	Start: 2020-01-20 T00:00:00 End: 2020-02-09 T23:59:59
13	DAY	60	DAY	1	WEEKLY	30	2020-02-12 T03:20:00	Start: 2020-01-20 T00:00:00 End: 2020-02-09 T23:59:59
14	DAY	60	DAY	4	WEEKLY	30	2020-02-12 T03:20:00	Start: 2020-01-20 T00:00:00 End: 2020-02-02 T23:59:59

#	Time Window Identifier	Time Window Value	Lag Period Identifier	Lag Period Value	Aggregate Time Window	Warm Store Retention	Activation Trigger Time (UTC)	Extraction Time
15	DAY	90	null	null	MONTHLY	60	2020-03-01 T00:00:00	Start: 2020-01-01 T00:00:00 End: 2020-02-29T23:59:59
16	DAY	90	DAY	1	MONTHLY	60	2020-03-01 T00:00:00	Start: 2020-01-01 T00:00:00 End: 2020-01-31 T23:59:59

Note

- Only data stored in warm store are aggregated and available for consumption.
- Time Window Identifier and Time Window values together form the Total Time Window. The extraction start time can't go beyond Warm Store Retention period.
- By default, records arriving late are **not** considered. In such cases, you can define a Lag Period Identifier and Lag Period Value, provided the delay in data arrival is predictable. However, if the delay in data arrival is **not** predictable, the usage of data model aggregates is **not** recommended.

Incremental Aggregate Workflow

1. Once the activation is completed, aggregates for data that are posted later are processed in intervals according to the specified Aggregate Time Window. Aggregates for the selected window are then generated for all things.
2. The incremental aggregates for a model are always computed sequentially. The first chunk of data is processed between 3:00 a.m. to 4:00 a.m., and the next chunk between 4:00 a.m. and 5:00 a.m.
3. In case the incremental aggregate flow is delayed, the system recognizes the timeout after 6 hours for data models based on an HOURLY aggregation window and after 1 day for all data models with an aggregate window other than HOURLY.
4. This means that any pending incremental aggregates are executed after a timeout of 6 hours for HOURLY-based data models. Similarly, for data models with an aggregate window other than HOURLY execution takes place with a delay of one day.
5. The frequency of the incremental aggregate flow is equal to the Aggregation Window setting of the data model. It will be executed as per the schedule explained below:
 - Every UTC Hour for Hourly Aggregate Window.
 - Every day 12 a.m. UTC time for Daily Aggregate Window.
 - Every Monday 12 a.m. UTC time for Weekly Aggregate Window.
 - 1st day of every Month at 12 a.m. UTC time for Monthly Aggregate Window.

24.2.1.3 Changes to Master Data and Metadata

Impact of changed master data and metadata on existing aggregates.

Whenever master data or metadata are changed for entities that have been used for setting up a data model, the question arises: How are such changes reflected by the affected data models? The following list explains the different aspects:

- Whenever there are changes to master data for one or more things, the Content Manager identifies the data models that are modeled based on the changed thing type. Existing data is invalidated by refreshing the data for all impacted things.
- The changes are captured once in a day except if the data model uses an `HOURLY` aggregate time window. In that case, changes are detected within one hour.
- The following changes or operations are considered:
 - Master data changes to a thing or a thing type.
 - Onboarding of a new thing.
 - Deletion of a new thing.
- Whenever changes are detected, Content Manager identifies the impacted data models and marks the usage status of the model as `VALID` or `INVALID`. In some cases, the system may decide to deactivate an active model to prevent further data access due to data privacy guidelines.
 - Usage status `VALID` means that the data model definition is consistent. No further actions are taken on such `VALID` models.
 - Usage status `INVALID` means that the data model definition is inconsistent. This results in the following consequences, depending on the data model status:
 - If the data model status is `ACTIVE`, the Incremental Aggregates & Dimension Delta Workflow is discontinued. Existing aggregates remain untouched and can be consumed by SAP Analytics Cloud. Such data model can be left as is. Alternatively, it can be deleted after manual deactivation.
 - If the data model status is **not** `ACTIVE`, it means that this model is unusable. In this case, the only allowed operation is deletion.

The following table lists the changes that are recognized from Thing Modeling and the Impact of them on the Data models.

Impact of Metadata Changes on Data Models

Object Type	Change	Impact
Property Set Type	Deletion	All Data models that used the named property set of the property set type as a dataset become invalid.
Property Set Type	Property deleted	All data models using the selected property through the named property set of this property set type as a dataset become invalid.
Property Set Type	Data type of property changed	All data models using the selected property through the named property set of this property set type as a dataset become invalid.

Object Type	Change	Impact
Property Set Type	Property flagged as personal or sensitive data	All data models using the named property set of this property set type as a dataset gets updated with Data Privacy Relevance details (spi or pii).
Thing Type	Deletion	All data models using the selected thing type as a catalog become invalid.
Named Property Set	Changed reference of named PST to PST in thing type for which a thing exists.	All Data models using the named property set of this property set type as a dataset become invalid.
Named Property Set	Deletion	All Data models using the named property set of this property set type as a dataset become invalid.

i Note

- **All** changes listed in the table lead to data model usage status `INVALID`.
- If there are dimension data changes that need to be invalidated for a data model, then the next incremental aggregate workflow for this data model is paused until the dimension delta workflow has been executed.
- In case of massive dimension delta changes that need to be considered immediately, you can call the Trigger Dimension Delta API to start the Dimension Delta job for all models instantly.

24.2.1.4 Purging Aggregated Data

A clean-up mechanism for aggregated data.

Introduction

In an IoT-related Big Data scenario, the sheer amount of data to be processed can be so high that even the aggregates that are constantly derived from the raw data can turn into a burden. It is therefore desirable to clean up the aggregates on a regular schedule. The data models that you maintain in SAP IoT provide a built-in mechanism to support such clean-ups: Each data model contains a time window that defines the retention period for the generated aggregates of the selected model. The aggregated data is purged once a week. In any case, aggregates are stored only within the retention period defined for a data model. Aggregate data older than that is deleted and can no longer be accessed.

Details

The following table presents some detail information that helps you better understand the aggregation process:

Workflow Time Details

Workflow	Aggregation Window	Time (UTC)
Incremental Aggregate	HOURLY	At second 0 of minute 0 of every hour.
	DAILY	At 00:00:00 a.m. every day.
	WEEKLY	At 00:00:00 a.m., on every Monday, every month.
	MONTHLY	At 00:00:00 a.m., on the first day, every month.

→ Recommendation

- In your production environment, try to create only minimal data models. For example, 5 data models can be configured, and each model can contain a maximum of 5 dimensions and 5 measures.
- Validate the data first for shorter retention periods before trying out longer retention periods.
- For better performance, use the following maximum retention periods

Recommended Maximum Retention Periods

Workflow	Aggregation Window	Maximum Retention Period
Incremental Aggregate	HOURLY	1 month
	DAILY	3 months
	WEEKLY	3 months
	MONTHLY	6 months

24.2.2 API Reference

This section explains the API details.

Naming Conventions

The names of the service method chapters in this documentation follow the "CRUD" scheme that is common in the realm of REST services, that is, "create/read/update/delete". The service chapter names match the technical HTTP requests according to the following table:

Service Methods and HTTP Requests

Service Method	HTTP Request	Description
Create	<i>POST</i>	Creating a new instance of a database entity managed by a service
Read	<i>GET</i>	Retrieve a single instance of a database entity managed by a particular service
Read all	<i>GET</i>	Retrieve multiple database entities managed by a particular service
Update	<i>PUT</i>	Modify a database entity managed by a service
Delete	<i>DELETE</i>	Delete a database entity managed by a service (logically or physically, depending on the service)

Case Sensitivity

Note that capital and non-capital letters in the technical names used by the services must be used exactly as given in this documentation. This affects payload parameters, request parameters, filter values and so on. In other words, the services that make up the SAP IoT solution are case-sensitive. Programming against the API without taking care of the proper letter case leads either to HTTP errors or, which is even worse, to unpredictable results.

❖ Example

Here is an example of a collective GET request for retrieving a subset of persons stored in the system:

```
/Persons?$top=25&$orderby='personName.familyName' desc
```

In the following example, the system will complain about an unknown parameter because of a misspelled "T" instead of "t" for the \$top parameter:

```
/Persons?$Top=25&$orderby='personName.familyName' desc
```

In the following example, the system returns an HTTP error because the correct capitalization of the referenced payload attribute has not been observed:

```
/Persons?$top=25&$orderby='PersonName.FamilyName' desc
```

24.2.2.1 Content Manager Metadata

24.2.2.1.1 Read Metadata

Read the metadata of the data model used for analytics.

Request

URI: /metadata/v1/model.svc/\$metadata

HTTP Method: *GET*

Permissions: <cm>.r

Request Headers

Header	Required	Values
Authorization	Yes	Bearer token

Request Parameters

None.

Request Example

/metadata/v1/model.svc/\$metadata

Response

Response Status and Error Codes

Code	Description
200	OK
401	Unauthorized

Response Example

```
<?xml version='1.0' encoding='UTF-8'?>
<edmx:Edmx xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx"
Version="1.0" xmlns:sap="http://www.sap.com/Protocols/SAPData">
  <edmx:DataServices m:DataServiceVersion="1.0" xmlns:m="http://
schemas.microsoft.com/ado/2007/08/dataservices/metadata">
    <Schema Namespace="com.sap.iot.cm.mm" xmlns="http://
schemas.microsoft.com/ado/2008/09/edm">
```

```

        <EntityType Name="DataModelType">
            <Key>
                <PropertyRef Name="Id"/>
            </Key>
            <Property Name="Id" Type="Edm.String" Nullable="false"
MaxLength="36"/>
            <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="100"/>
            <Property Name="AggregationWindow" Type="Edm.String"
Nullable="false" MaxLength="15"/>
            <Property Name="TimeWindowIdentifier" Type="Edm.String"
Nullable="false" MaxLength="15"/>
            <Property Name="TimeWindowValue" Type="Edm.Int16"
Nullable="false"/>
            <Property Name="Status" Type="Edm.String" Nullable="false"
MaxLength="30"/>
            <Property Name="UsageStatus" Type="Edm.String" MaxLength="15"/>
            <Property Name="LagPeriodIdentifier" Type="Edm.String"
Nullable="true" MaxLength="15"/>
            <Property Name="LagPeriodValue" Type="Edm.Int16"/>
            <Property Name="CreationTime" Type="Edm.DateTime"/>
            <NavigationProperty Name="Descriptions"
Relationship="com.sap.iot.cm.mm.DataModelType_Description_Description_DataModels"
FromRole="DataModelType_Description" ToRole="Description_DataModels"/>
            <NavigationProperty Name="Fields"
Relationship="com.sap.iot.cm.mm.DataModelType_Field_Field_DataModels"
FromRole="DataModelType_Field" ToRole="Field_DataModels"/>
        </EntityType>
        <EntityType Name="DataModelDescriptionType">
            <Key>
                <PropertyRef Name="ModelId"/>
                <PropertyRef Name="LanguageCode"/>
            </Key>
            <Property Name="LanguageCode" Type="Edm.String" Nullable="false"
MaxLength="2"/>
            <Property Name="Description" Type="Edm.String" Nullable="false"
MaxLength="60"/>
        </EntityType>
        <EntityType Name="DataModelFieldType">
            <Key>
                <PropertyRef Name="Id"/>
            </Key>
            <Property Name="Id" Type="Edm.String" Nullable="false"
MaxLength="36"/>
            <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="50"/>
            <Property Name="CatalogName" Type="Edm.String" Nullable="false"
MaxLength="100"/>
            <Property Name="CatalogType" Type="Edm.String" Nullable="false"
MaxLength="100"/>
            <Property Name="DatasetName" Type="Edm.String" Nullable="false"
MaxLength="100"/>
            <Property Name="DatasetType" Type="Edm.String" Nullable="false"
MaxLength="20"/>
            <Property Name="FriendlyName" Type="Edm.String" Nullable="false"
MaxLength="50"/>
            <Property Name="AnalyticType" Type="Edm.String" Nullable="false"
MaxLength="20"/>
            <Property Name="AggregationType" Type="Edm.String"
Nullable="true" MaxLength="20"/>
        </EntityType>
        <EntityType Name="CatalogType">
            <Key>
                <PropertyRef Name="Name"/>
            </Key>
            <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="70"/>

```

```

        <NavigationProperty Name="Catalogs"
Relationship="com.sap.iot.cm.mm.CatalogType_Catalog_Catalog_CatalogTypes"
FromRole="CatalogType_Catalog" ToRole="Catalog_CatalogTypes"/>
    </EntityType>
    <EntityType Name="Catalog">
        <Key>
            <PropertyRef Name="Name"/>
            <PropertyRef Name="CatalogType"/>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="CatalogType" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <NavigationProperty Name="Datasets"
Relationship="com.sap.iot.cm.mm.Catalog_Dataset_Dataset_Catalogs"
FromRole="Catalog_Dataset" ToRole="Dataset_Catalogs"/>
    </EntityType>
    <EntityType Name="Dataset">
        <Key>
            <PropertyRef Name="Name"/>
            <PropertyRef Name="CatalogType"/>
            <PropertyRef Name="CatalogName"/>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="CatalogType" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="CatalogName" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <NavigationProperty Name="Properties"
Relationship="com.sap.iot.cm.mm.Dataset_Property_Property_Datasets"
FromRole="Dataset_Property" ToRole="Property_Datasets"/>
    </EntityType>
    <EntityType Name="Property">
        <Key>
            <PropertyRef Name="CatalogType"/>
            <PropertyRef Name="CatalogName"/>
            <PropertyRef Name="DatasetName"/>
            <PropertyRef Name="Name"/>
        </Key>
        <Property Name="Name" Type="Edm.String" Nullable="false"
MaxLength="70"/>
        <Property Name="CatalogType" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="CatalogName" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="DatasetName" Type="Edm.String" Nullable="false"
MaxLength="100"/>
        <Property Name="AggregationRole" Type="Edm.String"
Nullable="true" MaxLength="50"/>
        <Property Name="DataType" Type="Edm.String" Nullable="true"
MaxLength="30"/>
    </EntityType>
    <EntityType Name="DataModelStatusLogType">
        <Key>
            <PropertyRef Name="ModelId"/>
            <PropertyRef Name="StatusTime"/>
        </Key>
        <Property Name="ModelId" Type="Edm.String" Nullable="false"
MaxLength="70"/>
        <Property Name="Status" Type="Edm.String" Nullable="false"
MaxLength="70"/>
        <Property Name="StatusTime" Type="Edm.DateTime"
Nullable="false"/>
        <Property Name="Remarks" Type="Edm.String" Nullable="true"
MaxLength="2048"/>
    </EntityType>
    <Association Name="DataModelType_Description_Description_DataModels">

```

```

        <End Type="com.sap.iot.cm.mm.DataModelType" Multiplicity="1"
Role="DataModelType_Description"/>
        <End Type="com.sap.iot.cm.mm.DataModelDescriptionType"
Multiplicity="*" Role="Description_DataModels"/>
    </Association>
    <Association Name="DataModelType_Field_Field_DataModels">
        <End Type="com.sap.iot.cm.mm.DataModelType" Multiplicity="1"
Role="DataModelType_Field"/>
        <End Type="com.sap.iot.cm.mm.DataModelFieldType"
Multiplicity="*" Role="Field_DataModels"/>
    </Association>
    <Association Name="CatalogType_Catalog_Catalog_CatalogTypes">
        <End Type="com.sap.iot.cm.mm.CatalogType" Multiplicity="1"
Role="CatalogType_Catalog"/>
        <End Type="com.sap.iot.cm.mm.Catalog" Multiplicity="*"
Role="Catalog_CatalogTypes"/>
    </Association>
    <Association Name="Catalog_Dataset_Dataset_Catalogs">
        <End Type="com.sap.iot.cm.mm.Catalog" Multiplicity="1"
Role="Catalog_Dataset"/>
        <End Type="com.sap.iot.cm.mm.Dataset" Multiplicity="*"
Role="Dataset_Catalogs"/>
    </Association>
    <Association Name="Dataset_Property_Property_Datasets">
        <End Type="com.sap.iot.cm.mm.Dataset" Multiplicity="1"
Role="Dataset_Property"/>
        <End Type="com.sap.iot.cm.mm.Property" Multiplicity="*"
Role="Property_Datasets"/>
    </Association>
    <EntityContainer Name="DataModelContainer"
m:IsDefaultEntityContainer="true">
        <EntitySet Name="DataModels"
EntityType="com.sap.iot.cm.mm.DataModelType"/>
        <EntitySet Name="DataModelFields"
EntityType="com.sap.iot.cm.mm.DataModelFieldType"/>
        <EntitySet Name="DataModelDescriptions"
EntityType="com.sap.iot.cm.mm.DataModelDescriptionType"/>
        <EntitySet Name="CatalogTypes"
EntityType="com.sap.iot.cm.mm.CatalogType"/>
        <EntitySet Name="Catalogs"
EntityType="com.sap.iot.cm.mm.Catalog"/>
        <EntitySet Name="Datasets"
EntityType="com.sap.iot.cm.mm.Dataset"/>
        <EntitySet Name="Properties"
EntityType="com.sap.iot.cm.mm.Property"/>
        <EntitySet Name="DataModelStatusLogs"
EntityType="com.sap.iot.cm.mm.DataModelStatusLogType"/>
        <AssociationSet Name="DataModels_Descriptions"
Association="com.sap.iot.cm.mm.DataModelType_Description_Description_DataModels">
            <End EntitySet="DataModels"
Role="DataModelType_Description"/>
            <End EntitySet="DataModelDescriptions"
Role="Description_DataModels"/>
        </AssociationSet>
        <AssociationSet Name="DataModels_Fields"
Association="com.sap.iot.cm.mm.DataModelType_Field_Field_DataModels">
            <End EntitySet="DataModels" Role="DataModelType_Field"/>
            <End EntitySet="DataModelFields" Role="Field_DataModels"/>
        </AssociationSet>
        <AssociationSet Name="CatalogTypes_Catalogs"
Association="com.sap.iot.cm.mm.CatalogType_Catalog_Catalog_CatalogTypes">
            <End EntitySet="CatalogTypes" Role="CatalogType_Catalog"/>
            <End EntitySet="Catalogs" Role="Catalog_CatalogTypes"/>
        </AssociationSet>
        <AssociationSet Name="Catalogs_Datasets"
Association="com.sap.iot.cm.mm.Catalog_Dataset_Dataset_Catalogs">
            <End EntitySet="Catalogs" Role="Catalog_Dataset"/>
            <End EntitySet="Datasets" Role="Dataset_Catalogs"/>
        </AssociationSet>
    </EntityContainer>

```

```

        </AssociationSet>
        <AssociationSet Name="Datasets_Properties"
Association="com.sap.iot.cm.mm.Dataset_Property_Property_Datasets">
            <End EntitySet="Datasets" Role="Dataset_Property"/>
            <End EntitySet="Properties" Role="Property_Datasets"/>
        </AssociationSet>
    </EntityContainer>
</Schema>
</edmx:DataServices>
</edmx:Edmx>

```

Related Information

[Content Manager \[page 1471\]](#)

24.2.2.2 Catalog Metadata

Content Manager currently supports several IoT artifacts in aggregate scenarios. These artifacts are referred as Catalogs. Catalog Metadata section explains how the metadata of these artifacts can be accessed in Content Manager APIs in Catalog terminology.

24.2.2.2.1 Read Catalog Types

Read the catalog types defined for the data model.

Request

URI: /metadata/v1/model.svc/CatalogTypes

HTTP Method: *GET*

Permissions: <cm>.r

Request Headers

Header	Required	Values
Accept	No	application/json
Authorization	Yes	Bearer token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
\$format	No	string	Data format of the response. Possible values: • xml • json • atom	Path

Request Example

/metadata/v1/model.svc/CatalogTypes?\$format=json

With this request, the service method returns the catalog types defined in the data model in JSON format.

Response

Response Status and Error Codes

Code	Description
200	Catalog types returned successfully.
400	Bad request
401	Unauthorized

Response Example

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://<host>/metadata/v1/model.svc/CatalogTypes('ThingType')",
          "uri": "https://<host>/metadata/v1/model.svc/CatalogTypes('ThingType')",
          "type": "com.sap.iot.cm.mm.CatalogType"
        },
        "Name": "ThingType",
        "Catalogs": {
          "__deferred": {
            "uri": "https://<host>/metadata/v1/model.svc/CatalogTypes('ThingType')/Catalogs"
          }
        }
      }
    ]
  }
}
```


Related Information

[Content Manager \[page 1471\]](#)

24.2.2.2.2 Read Catalogs

Read the catalogs of a specified catalog type.

Request

URI: `/metadata/v1/model.svc/CatalogTypes('<CatalogType>')/Catalogs`

HTTP Method: *GET*

Permissions: `<cm>.r`

Request Headers

Header	Required	Values
Accept	No	application/json
Authorization	Yes	Bearer token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
CatalogType	Yes	string	Name of the catalog type from which catalogs shall be returned.	Path
\$format	No	string	Data format of the response. Possible values: - xml - json - atom	Query

Request Example

`/metadata/v1/model.svc/CatalogTypes('ThingType')/Catalogs?$format=json`

With this request, the service method returns the catalogs that belong to catalog type `ThingType` in JSON format.

Response

Response Status and Error Codes

Code	Description
200	Catalogs returned successfully.
400	Bad request
401	Unauthorized

Response Example

```
{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='com.sap.iotaestandardcontent
%3ASAPIOT_Monitoring',CatalogType='ThingType') ",
          "uri": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='com.sap.iotaestandardcontent
%3ASAPIOT_Monitoring',CatalogType='ThingType') ",
          "type": "com.sap.iot.cm.mm.Catalog"
        },
        "Name": "com.sap.iotaestandardcontent:SAPIOT_Monitoring",
        "CatalogType": "ThingType",
        "Datasets": {
          "deferred": {
            "uri": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='com.sap.iotaestandardcontent
%3ASAPIOT_Monitoring',CatalogType='ThingType') /Datasets"
          }
        }
      },
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1
',CatalogType='ThingType') ",
          "uri": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1
',CatalogType='ThingType') ",
          "type": "com.sap.iot.cm.mm.Catalog"
        },
        "Name": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
        "CatalogType": "ThingType",
        "Datasets": {
          "deferred": {
            "uri": "https://<host>/metadata/v1/model.svc/
Catalogs (Name='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1
',CatalogType='ThingType') /Datasets"
          }
        }
      }
    ]
  }
}
```

Related Information

[Content Manager \[page 1471\]](#)

24.2.2.2.3 Read Datasets

Read the datasets of a specified catalog.

With this method, you can retrieve the datasets that have been defined within a particular catalog.

i Note

Although datasets are directly assigned only to a catalog, you also must specify the superordinate catalog type when calling this method (that is, not only the catalog alone).

Request

URI: `/metadata/v1/model.svc/Catalogs(Name='<Catalog>',CatalogType='<CatalogType>')/Datasets`

HTTP Method: [GET](#)

Permissions: `<cm>.r`

Request Headers

Header	Required	Values
Accept	No	application/json
Authorization	Yes	Bearer token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
CatalogType	Yes	string	Name of the catalog type from which catalogs shall be returned.	Path
Catalog	Yes	string	Name of the catalog from which datasets shall be returned.	Path
\$format	No	string	Data format of the response. Possible values: • xml • json • atom	Query

Request Example

```
/metadata/v1/model.svc/  
Catalogs (Name='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1',CatalogType='ThingType') /  
Datasets?$format=json
```

With this request, the service method returns the datasets that belong to catalog type ThingType and catalog ThingType1 in JSON format.

Response

Response Status and Error Codes

Code	Description
200	Datasets returned successfully.
400	Bad request
401	Unauthorized

Response Example

```
{  
  "d": {  
    "results": [  
      {  
        "__metadata": {  
          "id": "https://<host>/metadata/v1/model.svc/  
Datasets (Name='%24thing',CatalogType='ThingType',CatalogName='<TENANT_NAMESPACE>.  
<PACKAGE>:ThingType1')",  
          "uri": "https://<host>/metadata/v1/model.svc/  
Datasets (Name='%24thing',CatalogType='ThingType',CatalogName='<TENANT_NAMESPACE>.  
<PACKAGE>:ThingType1')",  
          "type": "com.sap.iot.cm.mm.Dataset"  
        },  
        "Name": "$thing",  
        "CatalogType": "ThingType",  
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",  
        "Properties": {  
          "deferred": {  
            "uri": "https://<host>/metadata/v1/model.svc/  
Datasets (Name='%24thing',CatalogType='ThingType',CatalogName='<TENANT_NAMESPACE>.  
<PACKAGE>:ThingType1')/Properties"  
          }  
        }  
      },  
      {  
        "__metadata": {  
          "id": "https://<host>/metadata/v1/model.svc/  
Datasets (Name='SAPIOTSERVICE',CatalogType='ThingType',CatalogName='<TENANT_NAMESP  
ACE>.<PACKAGE>:ThingType1')",  
          "uri": "https://<host>/metadata/v1/model.svc/  
Datasets (Name='SAPIOTSERVICE',CatalogType='ThingType',CatalogName='<TENANT_NAMESP  
ACE>.<PACKAGE>:ThingType1')",  
          "type": "com.sap.iot.cm.mm.Dataset"  
        },  
        "Name": "NPST1",  
        "CatalogType": "ThingType",  
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",  
        "Properties": {
```

```

        "_deferred": {
            "uri": "https://<host>/metadata/v1/model.svc/
Datasets (Name='SAPIOTSERVICE',CatalogType='ThingType',CatalogName='<TENANT_NAMESP
ACE>.<PACKAGE>:ThingType1')/Properties"
        }
    },
    {
        "_metadata": {
            "id": "https://<host>/metadata/v1/model.svc/
Datasets (Name='SAPIOT_DataIngest',CatalogType='ThingType',CatalogName='<TENANT_NA
MESPSPACE>.<PACKAGE>:ThingType1')",
            "uri": "https://<host>/metadata/v1/model.svc/
Datasets (Name='SAPIOT_DataIngest',CatalogType='ThingType',CatalogName='
<TENANT_NAMESPACE>.<PACKAGE>:ThingType1')",
            "type": "com.sap.iot.cm.mm.Dataset"
        },
        "Name": "NPST2",
        "CatalogType": "ThingType",
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
        "Properties": {
            "_deferred": {
                "uri": "https://<host>/metadata/v1/model.svc/
Datasets (Name='SAPIOT_DataIngest',CatalogType='ThingType',CatalogName='<TENANT_NA
MESPSPACE>.<PACKAGE>:ThingType1')/Properties"
            }
        }
    }
]
}
}
[response example]

```

Related Information

[Content Manager \[page 1471\]](#)

24.2.2.2.4 Read Properties

Read the properties of a specified dataset.

With this method, you can retrieve the properties that have been defined within a particular dataset.

i Note

Although properties are directly assigned only to a dataset, you also must specify the superordinate catalog type and catalog as well when calling this method (that is, not only the catalog alone).

Request

URI: URL: `/metadata/v1/model.svc/`

`Datasets (Name='<Dataset>', CatalogType='<CatalogType>', CatalogName='<Catalog>') / Properties`

HTTP Method: [GET](#)

Permissions: `<cm>.r`

Request Headers

Header	Required	Values
Accept	No	application/json
Authorization	Yes	Bearer token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
CatalogType	Yes	string	Name of the catalog type from which catalogs shall be returned.	Path
Catalog	Yes	string	Name of the catalog from which datasets shall be returned.	Path
Dataset	Yes	string	Name of the dataset from which the properties shall be returned.	Path
\$format	No	string	Data format of the response. Possible values: • xml • json • atom	Path

Request Example

`/metadata/v1/model.svc/`

`Datasets (Name='NPST1', CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1') / Properties?$format=json`

Response

Response Status and Error Codes

Code	Description
200	Properties returned successfully.
400	Bad request

Code	Description
401	Unauthorized

Response Example

```
{
  "d": {
    "results": [
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='Property1')",
          "uri": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='Property1')",
          "type": "com.sap.iot.cm.mm.Property"
        },
        "Name": "Property1",
        "CatalogType": "ThingType",
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
        "DatasetName": "NPST1",
        "AggregationRole": null,
        "DataType": "String"
      },
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='Property2')",
          "uri": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='Property2')",
          "type": "com.sap.iot.cm.mm.Property"
        },
        "Name": "Property2",
        "CatalogType": "ThingType",
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
        "DatasetName": "NPST1",
        "AggregationRole": null,
        "DataType": "Numeric"
      },
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='ThingId')",
          "uri": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='ThingId')",
          "type": "com.sap.iot.cm.mm.Property"
        },
        "Name": "ThingId",
        "CatalogType": "ThingType",
        "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
        "DatasetName": "NPST1",
        "AggregationRole": null,
        "DataType": "String"
      },
      {
        "_metadata": {
          "id": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType', CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1', DatasetName='NPST1', Name='Timestamp')",

```

```

        "uri": "https://<host>/metadata/v1/model.svc/
Properties (CatalogType='ThingType',CatalogName='<TENANT_NAMESPACE>.<PACKAGE>:ThingType1',DatasetName='NPST1',Name='Timestamp')",
        "type": "com.sap.iot.cm.mm.Property"
    },
    "Name": "Timestamp",
    "CatalogType": "ThingType",
    "CatalogName": "<TENANT_NAMESPACE>.<PACKAGE>:ThingType1",
    "DatasetName": "NPST1",
    "AggregationRole": null,
    "DataType": null
}
]
}
}
}

```

Related Information

[Content Manager \[page 1471\]](#)

24.2.2.3 Data Model

A service for the definition of a data model to be consumed by SAP Analytics Cloud

With the methods provided by this service, you can set up and maintain data models that are suitable for consumption by SAP Analytics Cloud. The data model is built on the basis of the data sets, catalogs, and catalog types that you have modeled with the Content Manager as a preparatory step for analyzing time series data.

Base URI: /metadata/v1/model.svc/DataModels

Permissions:

<cm>.c

<cm>.r

<cm>.u

<cm>.d

Methods

HTTP Method	Action	URI	Scopes
<i>POST</i>	Create a Data Model [page 1499]	/metadata/v1/model.svc/DataModels	<cm>.c

HTTP Method	Action	URI	Scopes
GET	Read a Data Model [page 1503]	/metadata/v1/model.svc/ DataModels(<Data Model ID>)	<cm>.r/ metadata/v 1/ model.svc/ DataModel s(<Data Model ID>)
PATCH	Activate a Data Model [page 1506]		/ metadata/v 1/ model.svc/ DataModel s(<cm>.u
DELETE	Delete a Data Model [page 1507]	/metadata/v1/model.svc/ DataModels(<Data Model ID>)	<cm>.d
POST	Update Master Data and Meta-data [page 1508]	/data/triggerDeltaUpdate	
READ	Read Data Model Status Log [page 1509]	/metadata/v1/model.svc/ DataModelStatusLogs? \$filter=ModelId eq '<Data Model ID>'	

i Note

As you can see in the list of supported methods, there is currently **no** service method supported for updating an existing data model. If you need to change any of the settings, you need to copy the existing model and set up a new one.

Related Information

[Content Manager \[page 1471\]](#)

24.2.2.3.1 Create a Data Model

Create a new data model

With this service method, you set up a data model based on time series data that can be analyzed by SAP Analytics Cloud. The data model comprises a larger set of fields, where several fields stand out that you use to define a time period serving as a boundary for the data stream to be analyzed.

i Note

After having created a data model, you must activate it before you can use it with SAP Analytics Cloud. To accomplish this, use the dedicated activation method. See [Activate a Data Model \[page 1506\]](#).

Request

URI: /metadata/v1/model.svc/DataModels

HTTP Method: *POST*

Permissions: <cm>.c

Request Parameters

Request Header Fields

Parameter	Required	Data Type
Accept	No	application/json
Content-Type	Yes	application/json
Authorization	Yes	Bearer Token

Data Model Header Fields

Parameter	Required	Data Type	Description	Parameter Type
Name	Yes	string	User-defined name of the data model. The name must be unique.	Request body
AggregationWindow	Yes	string	Aggregates are generated based on the specified time base. Possible Values: HOURLY, DAILY, WEEKLY, MONTHLY	Request body
TimeWindowIdentifier	Yes	string	Specifies the time base for data retention period. Possible values: DAY, MONTH	Request body
TimeWindowValue	Yes	integer	Specifies the duration of the data retention period.	Request body
LagPeriodIdentifier	Yes	string	Specifies the time base for the lag period that may occur for data arriving in SAP IoT with a delay. Possible values: DAY, HOUR	Request body
LagPeriodValue	Yes	integer	Specifies the duration of the lag period.	Request body
Status	Yes	string	Current data model status determined by the system. Possible values: NEW, ACTIVE, ACTIVATION_REQUESTED, ACTIVATION_IN_PROGRESS, ACTIVATION_FAILED, DEACTIVE, DEACTIVATION_REQUESTED, DEACTIVATION_IN_PROGRESS, DEACTIVATION_FAILED	Request body
Fields	Yes	array of string values	Measures and dimensions to be analyzed.	Request body

For each member of the `Fields` array mentioned in the previous table, the following structure applies:

Properties of the Fields Array

Parameter	Required	Data Type	Description	Parameter Type
<code>FriendlyName</code>	Yes	string	Friendly Name of the selected field used for the property of the generated dimension or measure. A friendly name must be unique within the Data model.	Request body
<code>AnalyticType</code>	Yes	string	Specifies whether this property is a dimension or a measure. Possible values: <code>Dimension</code> , <code>Measure</code>	Request body
<code>Name</code>	Yes	string	Technical name of the property from the selected dataset.	Request body
<code>DatasetType</code>	Yes	string	Specifies the type of data. Possible Values: <code>MasterData</code> , <code>TimeseriesData</code>	Request body
<code>DatasetName</code>	Yes	string	Name of the dataset from the selected catalog.	Request body
<code>CatalogName</code>	Yes	integer	Name of the catalog from the selected catalog type.	Request body
<code>CatalogType</code>	Yes	string	Name of the catalog type.	Request body
<code>AggregationType</code>	Yes	string	Aggregation type (if <code>AnalyticType</code> is <code>Measure</code>). Possible Values: <code>COUNT</code> , <code>SUM</code> , <code>MIN</code> , <code>MAX</code> . For details, see the next table.	Request body

Supported Aggregation Types

Aggregation Type	Description
<code>COUNT</code>	Computes number of times a property has occurred in the defined time period.
<code>SUM</code>	Computes sum of all values of a property in the defined time period.
<code>MIN</code>	Computes minimum value of a property in the defined time period.
<code>MAX</code>	Computes maximum value of a property in the defined time period.

Note

- Aggregation type `AVG` for computing average values is not directly supported in the Content Manager while creating a data model. However, as a workaround, you can derive the average with the help of the supported aggregation types (`SUM` / `COUNT` of property).
- Filters are not supported in the data model definition. In other words: The only way of limiting the amount of data to be analyzed is by properly selecting values for the `AggregationWindow` and `TimeWindow*` header fields.
- Be sure to always use a unique name for the data model.

Validity Checks

Before actually creating a new data model, the system performs numerous validations. If any of the following conditions is determined during creation, the validation fails and the data model cannot be created:

- A property is marked as multilingual.
- A data model has been defined without any measure from time series data dataset.
- Measures contained in master data datasets have been defined.
- Measures have been defined based on non-numeric properties.
- Unallowed values have been used for data model properties with a restricted set of allowed values.
- Any of the `AggregateWindow`, `TimeWindow`, or `TimeWindowIdentifier` fields is evaluated as null.

Request Example

```
{
  "Name": "ConnectedCoolerKPIs",
  "AggregationWindow": "DAILY",
  "TimeWindowIdentifier": "MONTH",
  "TimeWindowValue": 3,
  "Descriptions": [
    {
      "Description": "Analysis of Performance and Monitoring KPIs for Coolers",
      "LanguageCode": "en"
    }
  ],
  "Fields": [
    {
      "FriendlyName": "City",
      "AnalyticType": "Dimension",
      "CatalogName": "{{TenantPackageNamespace}}.{{PackageName}}:SMART_COOLER",
      "CatalogType": "ThingType",
      "DatasetName": "Address",
      "DatasetType": "MasterData",
      "Name": "city"
    },
    {
      "FriendlyName": "doorOpenCountSUM",
      "AnalyticType": "Measure",
      "CatalogName": "{{TenantPackageNamespace}}.{{PackageName}}:SMART_COOLER",
      "CatalogType": "ThingType",
      "DatasetName": "SmartCooler_MessagePayload",
      "DatasetType": "TimeSeriesData",
      "Name": "doorOpenCount",
      "AggregationType": "SUM"
    }
  ]
}
```

Response

Response Headers

Header	Description
Etag	Entity tag of the newly created DataModel instance.

Response Status and Error Codes

Code	Description
201	Data model created successfully.
400	Bad request.
401	Unauthorized.

Response Example

```
{
  "d": {
    "_metadata": {
      "id": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')",
      "uri": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')",
      "type": "com.sap.iot.cm.mm.DataModelType"
    },
    "Id": "25D88B2B5D55457B9321A083117325C0",
    "Name": "ConnectedCoolerKPIs",
    "AggregationWindow": "DAILY",
    "TimeWindowIdentifier": "MONTH",
    "TimeWindowValue": 3,
    "Status": "NEW",
    "UsageStatus": "VALID",
    "LagPeriodIdentifier": null,
    "LagPeriodValue": null,
    "CreationTime": "/Date(1585053065922)/",
    "Descriptions": {
      "deferred": {
        "uri": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')/Descriptions"
      }
    },
    "Fields": {
      "deferred": {
        "uri": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')/Fields"
      }
    }
  }
}
```

Related Information

[Data Model \[page 1498\]](#)

[Activate a Data Model \[page 1506\]](#)

24.2.2.3.2 Read a Data Model

Read a data model.

With this service method, you can retrieve the details of a specified data model. In order to retrieve the model fields along with Model definition, use `$expandFields` query parameter as shown in the example.

Request

URI: /metadata/v1/model.svc/DataModels (<'Model_ID'>)

HTTP Method: [GET](#)

Permissions: <cm>.r

Request Headers

Header	Required	Values
Accept	Yes	application/json
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Model_ID	Yes	string	Technical ID of the data model to be retrieved.	Path
\$expand	No	string	Used for including the Fields array in the response payload. If omitted, only the data model metadata are returned.	Query

Request Example

```
/metadata/v1/model.svc/DataModels('25D88B2B5D55457B9321A083117325C0')?
$expand=Fields
```

Response

Response Headers

Header	Description
If-match	Check if cached version matches server version of the DataModel instance.

Response Status and Error Codes

Code	Description
200	Data model successfully retrieved.
401	Unauthorized.
404	Specified data model not found.

Response Example

```
{
  "d": {
```

```

    "_metadata": {
      "id": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')",
      "uri": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')",
      "type": "com.sap.iot.cm.mm.DataModelType"
    },
    "Id": "25D88B2B5D55457B9321A083117325C0",
    "Name": "ConnectedCoolerKPIs",
    "AggregationWindow": "DAILY",
    "TimeWindowIdentifier": "MONTH",
    "TimeWindowValue": 3,
    "Status": "NEW",
    "UsageStatus": "VALID",
    "LagPeriodIdentifier": null,
    "LagPeriodValue": null,
    "CreationTime": "/Date(1585053065922)/",
    "Descriptions": {
      "_deferred": {
        "uri": "https://<host>/metadata/v1/model.svc/
DataModels('25D88B2B5D55457B9321A083117325C0')/Descriptions"
      }
    },
    "Fields": {
      "results": [
        {
          "Id": "D14AF1C2AB034F1BBBF4CBDA372EF904",
          "FriendlyName": "City",
          "AnalyticType": "Dimension",
          "CatalogName": "{{TenantPackageName}}.
{{PackageName}}:SMART_COOLER",
          "CatalogType": "ThingType",
          "DatasetName": "Address",
          "DatasetType": "MasterData",
          "Name": "city"
        },
        {
          "Id": "31B31357ABBA4B6F9CC7B24D6140A9DF",
          "FriendlyName": "doorOpenCountSUM",
          "AnalyticType": "Measure",
          "CatalogName": "{{TenantPackageName}}.
{{PackageName}}:SMART_COOLER",
          "CatalogType": "ThingType",
          "DatasetName": "SmartCooler_MessagePayload",
          "DatasetType": "TimeSeriesData",
          "Name": "doorOpenCount",
          "AggregationType": "SUM"
        }
      ]
    }
  }
}

```

Related Information

[Data Model \[page 1498\]](#)

24.2.2.3.3 Activate a Data Model

Activate a data model.

With this method, you can activate a data model so that it can be used with SAP Analytics Cloud. If the model activation is successful, the status of the model changes to `Active`. If the model activation is not successful, the status of the model changes to `Activation Failed`.

Request

URI: `/metadata/v1/model.svc/DataModels('<Model_ID>')`

HTTP Method: `PATCH`

Permissions: `<cm>.u`

Request Headers

Header	Required	Values
Accept	Yes	application/json
If-Match	Yes	etag value
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Model_ID	Yes	string	Technical ID of the data model to be activated.	Path

Request Example

`/metadata/v1/model.svc/DataModels('25D88B2B5D55457B9321A083117325C0')`

Response

Response Status and Error Codes

Code	Description
202	Success. Activation request has been accepted.
400	HTTP code 400 is used for two scenarios: • Data model not found. • Data model is already active.
401	Unauthorized.

Response Example

```
{
  "Status" : "<STATUS>"
}
```

The response payload contains nothing but the `Status` field alone with its current value.

Related Information

[Data Model \[page 1498\]](#)

24.2.2.3.4 Delete a Data Model

Delete a data model.

With this method, you can delete the data model specified by its ID. This is useful for system cleanup and whenever you find a particular data analysis based on a data model is no longer needed.

Note

When you delete a data model, existing aggregated data and model definition is deleted as well.

Request

URI: `/metadata/v1/model.svc/DataModels('<Model_ID>')`

HTTP Method: `DELETE`

Permissions: `<cm>.d`

Request Headers

Header	Required	Values
If-Match	Yes	etag value
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
Model_ID	Yes	string	Technical ID of the data model to be deleted.	Path

Request Example

```
/metadata/v1/model.svc/DataModels('25D88B2B5D55457B9321A083117325C0')
```

Response

Response Status and Error Codes

Code	Description
204	Data model deleted successfully.
400	Data model not found.
401	Unauthorized.
428	If-match header parameter missing.

Related Information

[Data Model \[page 1498\]](#)

24.2.2.3.5 Update Master Data and Metadata

Manually apply changed masterdata to existing data models.

Whenever new things are onboarded, offboarded, or updated, data changes in the master data are **not** adopted by existing data models immediately because such changes happen only occasionally. Therefore, it is considered sufficient to make the required adjustments via scheduled background jobs.

In fact, the SAP IoT environment provides such update jobs that are executed based on a predefined schedule. However, if you urgently need to adopt any such changes to your data models, you can execute this service method to trigger the dimension delta workflow for all affected data models.

Request

URI: /data/triggerDeltaUpdate

HTTP Method: *POST*

Permissions: <cm>.u

Request Headers

Header	Required	Values
Authorization	Yes	Bearer Token

Request Parameters

None.

Request Example

```
/data/triggerDeltaUpdate
```

Response

Response Status and Error Codes

Code	Description
202	Update job has successfully been started for all affected data models.
401	Unauthorized.

Related Information

[Data Model \[page 1498\]](#)

24.2.2.3.6 Read Data Model Status Log

Retrieve the log of status changes for a specified data model.

With this service method, you can retrieve the status log for a specified data model.

Every time a data model transitions from one status to another, the result of such transitions is recorded in the data model status log. Each entry in the status log contains the following data fields of type string:

Data Model Status Log Entry

Field Name	Description
<ModelId>	Technical ID of the data model.
<Status>	Target status reached after the status transition.
<StatusTime>	Timestamp of the status transition.
<Remarks>	System-generated text with additional information on the status transition.

A status change can occur in the following ways:

- Automatic status assignment: For example, when creating a new data model, the system creates the data model with initial status `NEW`.
- Data model activation: If you call the dedicated activation method of the data model service, this leads to a status change from `NEW` to `ACTIVE`.
- Explicit status assignment upon data model creation: If you decide to create a data model that you want to see in active state as soon as possible, you can provide the string `ACTIVE` to the optional `Status` payload field.

Request

URI: `/metadata/v1/model.svc/DataModelStatusLogs?$filter=ModelId eq '<Model_ID>'`

HTTP Method: `GET`

Permissions: `<cm>.r`

Request Headers

Header	Required	Values
Accept	Yes	application/json
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
ModelId	Yes	string	Technical ID of the data model.	Path
\$filter	No	string	Filter condition for retrieving a data model.	Query
\$orderBy	No	string	Sorts log entries by <code><StatusTime></code>	Query

Request Example

```
/metadata/v1/model.svc/DataModelStatusLogs?$filter=ModelId eq  
'25D88B2B5D55457B9321A083117325C0'
```

Response

Response Headers

Header	Description
If-Match	etag value

Response Status and Error Codes

Code	Description
200	Status log retrieved successfully.
401	Unauthorized.

Response Example

```
{
  "d": {
    "results": [
      {
        "ModelId": "25D88B2B5D55457B9321A083117325C0",
        "Status": "MODEL_CREATED",
        "StatusTime": "/Date(1584713758158)/",
        "Remarks": "Model Id: 567AE72E43E9406A8287DA32CB3F2454, Name: myGeneratedModel23, Status: NEW"
      },
      {
        "ModelId": "25D88B2B5D55457B9321A083117325C0",
        "Status": "ACTIVATION_REQUESTED",
        "StatusTime": "/Date(1584713759108)/",
        "Remarks": "Status: ACTIVATION_REQUESTED"
      },
      {
        "ModelId": "25D88B2B5D55457B9321A083117325C0",
        "Status": "ACTIVATION_STARTED",
        "StatusTime": "/Date(1584713784875)/",
        "Remarks": "Extraction Period from 2020-03-16T14:00Z[UTC] till 2020-03-20T14:00Z[UTC], Status: ACTIVATION_IN_PROGRESS"
      },
      {
        "ModelId": "25D88B2B5D55457B9321A083117325C0",
        "Status": "ACTIVATED",
        "StatusTime": "/Date(1584713804077)/",
        "Remarks": "Status: ACTIVE"
      }
    ]
  }
}
```

Related Information

[Data Model \[page 1498\]](#)

24.2.2.4 Authorization Group

Overview

Content Manager is used to define an *Authorization Group* for a *Data Model*. The Authorization Group contains role collections name and data model ID. Authorization Group restricts the access of the

Calculation View data only to the users that have role collections assigned to them which is defined in Authorization Group definition.

End-to-End Process Flow

1. Model and onboard physical *Devices* as *Things* into SAP IoT.

i Note

The Things have the master data information of the devices.

2. Sensor data is measured and sent by the devices.
3. Obtain the metadata through catalog APIs using the Content Manager.
4. Define a Data model by choosing the dimensions, measures from the catalog and required time parameters.
5. Activate the Data model.

i Note

Activation of Data model creates and persists aggregate data based on the input parameters.

6. Create a Role Collection in the Cloud Platform cockpit.
7. Define an Authorization Group with the Data Model ID and Role Collection name.

API Operations

HTTP Method	Operation	URL
POST	Create an Authorization Group	/metadata/v1/model.svc/AuthorizationGroups
GET	Get an Authorization Group	/metadata/v1/model.svc/AuthorizationGroups(<AUTH_GROUP_ID>)
GET	Get Authorization Groups	/metadata/v1/model.svc/AuthorizationGroups
PATCH	Update an Authorization Group	/metadata/v1/model.svc/AuthorizationGroups(<AUTH_GROUP_ID >)
DELETE	Delete Authorization Group	/metadata/v1/model.svc/AuthorizationGroups(<AUTH_GROUP_ID >)

24.2.2.4.1 Create a New Authorization Group

This operation helps to create a new Authorization Group. A unique ID represented as "Authorization Group ID" is generated when an authorization group is created.

An Authorization Group can be defined with following properties:

1. Name

2. Descriptions
 1. Description
 2. LanguageCode
3. RoleCollections
 1. Name
4. Models
 1. ID

Authorization Group header properties

Property Name	Description	Allowed Values
Name	Name of the Authorization Group. Name should be unique across all authorization groups.	User defined
Model	Data Model ID to be defined in an array.	
Description	Description of the Authorization Group for each language with the corresponding ISO language code	User defined
RoleCollection	Role Collection names to be defined in an array	User defined

Authorization Group RoleCollections Properties

Property Name	Description	Allowed Values
Name	Role Collection Name	User defined

Authorization Group Models Properties

Property Name	Description	Allowed Values
ID	Data Model ID	N/A

i Note

Following validation checks are performed while creation of a Authorization Group:

- Authorization Group Model ID is valid
- Authorization Group Name is unique

If the above validation is not successful, it leads to failure of Authorization Group creation.

Request

URL: /metadata/v1/model.svc/AuthorizationGroups

HTTP Method: *POST*

Permissions: <iotas>.cm.c

Request Parameters

Header	Required	Values
Accept	No	application/json
Content-Type	Yes	Application/json
Authorization	Yes	Bearer Token

Request Example

/metadata/v1/model.svc/AuthorizationGroups

HTTP Method: POST

Request Payload Format: JSON

Media types supported are JSON and XML. The JSON for this method has the following structure:

```
{
  "Name": "ConnectedCoolerKPIsGroup",
  "Descriptions": [{
    "Description": " ConnectedCoolerKPIsGroup",
    "LanguageCode": "en"
  }],
  "RoleCollections": [{
    "Name": "cooler_user"
  }],
  "Models": [{
    "Id": "EFE7399A269546"
  }]
}
```

Response

Response Header Fields

Header	Description
Etag	Etag

Response Payload

Response Payload Format: JSON

```
{
  "d": {
    "_metadata": {
      "id": "https://iot-applications-noah-sandbox-cm-metadata-management.cfapps.sap.hana.ondemand.com:443/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
      "uri": "https://iot-applications-noah-sandbox-cm-metadata-management.cfapps.sap.hana.ondemand.com:443/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
      "type": "com.sap.iot.cm.mm.AuthorizationGroupType"
    },
    "Id": "0B33514D9CBC47DA96943C28695F3D0E",
    "Name": "ConnectedCoolerKPIsGroup",
    "CreationTime": "/Date(1601872085721) /",
  }
}
```



```

    "UpdationTime": "/Date(1601872085721)/",
    "Descriptions": {
      "__deferred": {
        "uri": "https://iot-applications-noah-sandbox-cm-metadata-
management.cfapps.sap.hana.ondemand.com:443/metadata/v1/model.svc/
AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/Descriptions"
      }
    },
    "Models": {
      "__deferred": {
        "uri": "https://iot-applications-noah-sandbox-cm-metadata-
management.cfapps.sap.hana.ondemand.com:443/metadata/v1/model.svc/
AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/Models"
      }
    },
    "RoleCollections": {
      "__deferred": {
        "uri": "https://iot-applications-noah-sandbox-cm-metadata-
management.cfapps.sap.hana.ondemand.com:443/metadata/v1/model.svc/
AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/RoleCollections"
      }
    }
  }
}

```

Response Status and Error Codes

Code	Description
201	Authorization Group created successfully
400	Bad Request
401	Unauthorized

24.2.2.4.2 Read an Authorization Group

With this method, you can retrieve the details of a specific Authorization Group.

In order to read an Authorization Group, you must provide the Authorization Group ID.

Request

URL: /metadata/v1/model.svc/AuthorizationGroups ('{{AUTH_GROUP_ID}}')

HTTP Method: [GET](#)

Permissions: <iotas>.cm.r

Request Headers

Header	Required	Values
Accept	Yes	application/json

Header	Required	Values
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description
\$expand	No	String	RoleCollections,Models,Descriptions
AUTH_GROUP_ID	Yes	String	

Request Example

/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')?
\$expand=RoleCollections,Models

Response

Response Header Fields

Header	Description
If-Match	Etag value

Response Payload

Format: JSON

Media types supported are JSON and XML. The JSON for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
      "uri": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
      "type": "com.sap.iot.cm.mm.AuthorizationGroupType"
    },
    "Id": "0B33514D9CBC47DA96943C28695F3D0E",
    "Name": "ConnectedCoolerKPIsGroup",
    "CreationTime": "/Date(1601872085721)/",
    "UpdationTime": "/Date(1601872085721)/",
    "Descriptions": {
      "__deferred": {
        "uri": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/Descriptions"
      }
    },
    "Models": {
      "results": [
        {
          "Id": "EFE7399A26954600A99FCC85633A9ACA"
        }
      ]
    },
    "RoleCollections": {
```

```
    "results": [
      {
        "Name": "cooler_user"
      }
    ]
  }
}
```

Response Status and Error Codes

Code	Description
200	OK
404	Authorization Group not Found
401	Unauthorized

24.2.2.4.3 Read all Authorization Groups

With this method, you can retrieve the details of all Authorization Group.

Request

URL: /metadata/v1/model.svc/AuthorizationGroups

HTTP Method: [GET](#)

Permissions: <iotas>.cm.r

Request Headers

Header	Required	Values
Accept	Yes	application/json
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description
\$expand	No	String	RoleCollections,Models,Descriptions
\$filter	No	String	Name,CreationTime
\$orderby	No	String	Name,CreationTime

Response

Format: JSON

Media types supported are JSON and XML. The JSON for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
          "uri": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')",
          "type": "com.sap.iot.cm.mm.AuthorizationGroupType"
        },
        "Id": "0B33514D9CBC47DA96943C28695F3D0E",
        "Name": "ConnectedCoolerKPIsGroup",
        "CreationTime": "/Date(1601872085721)/",
        "UpdateTime": "/Date(1601872085721)/",
        "Descriptions": {
          "__deferred": {
            "uri": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/Descriptions"
          }
        },
        "Models": {
          "__deferred": {
            "uri": "https://<<cm-metadata-management host>>/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')/Models"
          }
        },
        "RoleCollections": {
          "results": [
            {
              "Name": "cooler_user"
            }
          ]
        }
      }
    ]
  }
}
```

Response Status and Error Codes

Code	Description
200	OK
401	Unauthorized

24.2.2.4.4 Update an Authorization Group

With this method, you can:

- add or delete Models from the Authorization Group
- add or delete Role Collections from the Authorization Group
- update existing descriptions

Note

- The valid operations are ADD and DELETE.
- You cannot change the name of Authorization Group using PUT request

Request

URL: /metadata/v1/model.svc/AuthorizationGroups ('{{AUTH_GROUP_ID}}')

HTTP Method: *PUT*

Permissions: <iotas>.cm.u

Request Headers

Header	Required	Values
Accept	Yes	application/json
If-Match	Yes	ETag value
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description
AUTH_GROUP_ID	Yes	String	Authorization Group ID

Request Payload

Format: JSON

```
{
  "Name": "ConnectedCoolerKPIsGroup",
  "Id" : "0B33514D9CBC47DA96943C28695F3D0E",
  "RoleCollections": [{
    "Name": "cooler_user2",
    "Operation" : "ADD"
  }],
  "Models": [{
    "Id": "25678",
    "Operation" : "ADD"
  }]
}
```

Request Example

/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')

Response

Response Status and Error Codes

Code	Description
204	Authorization Group updated successfully
400	Bad Request
401	Unauthorized

24.2.2.4.5 Delete an Authorization Group

With this method, you can delete an Authorization Group.

In order to delete an Authorization Group, you must provide the Authorization Group ID.

Request

URL: `/metadata/v1/model.svc/AuthorizationGroups('{{AUTH_GROUP_ID}}')`

HTTP Method: `DELETE`

Permissions: `<iotas>.cm.d`

Request Headers

Header	Required	Value
If-Match	Yes	
Authorization	Yes	Bearer Token

Request Parameters

Parameter	Required	Data Type	Description
AUTH_GROUP_ID	Yes	String	Authorization Group ID

Request Example

`/metadata/v1/model.svc/AuthorizationGroups('0B33514D9CBC47DA96943C28695F3D0E')`

Response

Response Status and Error Codes

Code	Description
204	Authorization Group deleted
400	Authorization Group not found
401	Unauthorized
428	If Match is not present in the Header

24.2.2.5 Content Manager Runtime Service

Content Manager Runtime service will provide OData V4 based API (with streaming capability) to read aggregates from Content Manager. The service has read-only APIs to read the data from Content Manager.

Resource Path: `http://<server address>[:<port number>]/data/v1/odata.svc`

Example for a base URI in a cloud foundry environment: `https://iot-applications--cm-runtime.cfapps.sap.hana.ondemand.com/data/v1/odata.svc`

API Operations

HTTP Method	Operation	URI	Permission
GET	Read Metadata of Content Manager Runtime Service	/data/v1/odata.svc/\$metadata	cm.user
GET	Read data of Content Manager Runtime Service	/data/v1/odata.svc/(<<ENTITYSET>>)(where <<ENTITYSET>> is name of the data model in capital letters)	cm.user

24.2.2.5.1 Read Metadata of Content Manager Runtime Service

Using this API, you can read the metadata of all data models in Content Manager. The metadata contains entity types for all data models. Each entity type will have properties that include *dimensions*, *measures* and *timestamp* related fields.

Request

URL : /data/v1/odata.svc/\$metadata

HTTP Method : [GET](#)

Permissions : cm.user

Request Headers

Header	Required	Value
If-None-Match	No	Etag
Accept	No	application/json or application/atom+xml

Annotation Terms in Metadata Service Document

Annotation Term	Data Type	Description
Analytics.Dimension	Boolean	If an entity property has annotation term Analytics.Dimension set to true, then the property is a dimension.
Analytics.Measure	Boolean	If an entity property has annotation term Analytics.Measure set to true, then the property is a measure.
Common.Label	String	The annotation term Common.Label defines the label of the property.

Below are default entity type properties apart from properties that are part of data model:

Property	Data Type	Description
BASEID	String	Base Attribute
		i Note For the Data Models created before 2108a, BASEID was THINGID.
TIMESTAMP	DateTime	Timestamp of aggregated time series data.
TIMESTAMP_STR	String	String representation of timestamp of aggregated time series data
DATE	Date	Date of aggregated time series data, and this property is a member of time hierarchy
DATE_NH	Date	Date of aggregated time series data, and this property is not a member of time hierarchy

Property	Data Type	Description
WEEK_NH	Integer (Format: YYYYWW)	Week of aggregated time series data
MONTH	Integer (Format: YYYYMM)	Month of aggregated time series data, and this property is a member of time hierarchy
MONTH_NH	Integer (Format: YYYYMM)	Month of aggregated time series data, and this property is not a member of time hierarchy
QUARTER	Integer (Format: YYYYMM)	Quarter of aggregated time series data, and this property is a member of time hierarchy
QUARTER_NH	Integer (Format: YYYYQ)	Quarter of aggregated time series data, and this property is not a member of time hierarchy
HALF_YEAR	String (Format: H1/H2)	Half year of aggregated time series data, and this property is a member of time hierarchy
HALF_YEAR_NH	String (Format: H1/H2)	Half year of aggregated time series data, and this property is not a member of time hierarchy
YEAR	Integer (Format: YYYY)	Year of aggregated time series data, and this property is a member of time hierarchy
YEAR_NH	Integer (Format: YYYY)	Year of aggregated time series data, and this property is not a member of time hierarchy
DIMENSIONS_START_TIME	DateTime	Start time of master data dimensions.
DIMENSIONS_START_TIME_STR	String	String representation of start time of master data dimensions.
DIMENSIONS_END_TIME	DateTime	End time of master data dimensions.
DIMENSIONS_END_TIME_STR	String	String representation of end time of master data dimensions.

Request Example

```
/data/v1/odata.svc/$metadata
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<edmx:Edmx Version="4.0" xmlns:edmx="http://docs.oasis-open.org/odata/ns/edmx">
  <edmx:Reference Uri="/annotations/com.sap.vocabularies.Common.v1.xml">
```

```

    <edmx:Include Namespace="com.sap.vocabularies.Common.v1"
Alias="Common"></edmx:Include>
    </edmx:Reference>
    <edmx:Reference Uri="/annotations/com.sap.vocabularies.Analytics.v1.xml">
    <edmx:Include Namespace="com.sap.vocabularies.Analytics.v1"
Alias="Analytics"></edmx:Include>
    </edmx:Reference>
    <edmx:DataService>
    <Schema xmlns="http://docs.oasis-open.org/odata/ns/edm"
Namespace="com.sap.iot.cm.rt">
    <EntityType Name="COOLERMODELANALYSISTYPE">
    <Key>
    <PropertyRef Name="GENERATED_ID"/>
    </Key>
    <Property Name="MONTH" Type="Edm.Int32" MaxLength="10">
    <Annotation Term="Common.Label">
    <String>MONTH</String>
    </Annotation>
    <Annotation Term="Analytics.Dimension">
    <Bool>true</Bool>
    </Annotation>
    </Property>
    <Property Name="MONTH_NH" Type="Edm.Int32" MaxLength="10">
    <Annotation Term="Common.Label">
    <String>MONTH_NH</String>
    </Annotation>
    <Annotation Term="Analytics.Dimension">
    <Bool>true</Bool>
    </Annotation>
    </Property>
    <Property Name="QUARTER" Type="Edm.Int16" MaxLength="5">
    <Annotation Term="Common.Label">
    <String>QUARTER</String>
    </Annotation>
    <Annotation Term="Analytics.Dimension">
    <Bool>true</Bool>
    </Annotation>
    </Property>
    <Property Name="QUARTER_NH" Type="Edm.Int16" MaxLength="5">
    <Annotation Term="Common.Label">
    <String>QUARTER_NH</String>
    </Annotation>
    <Annotation Term="Analytics.Dimension">
    <Bool>true</Bool>
    </Annotation>
    </Property>
    <Property Name="TEMPERATUREMAX" Type="Edm.Decimal" MaxLength="4"
Precision="4" Scale="2">
    <Annotation Term="Common.Label">
    <String>TEMPERATUREMAX</String>
    </Annotation>
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    </Annotation>
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    </Annotation>

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        </Annotation>
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        </Annotation>
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        </Annotation>
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        </Annotation>
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        </Annotation>
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    </Property>
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      </Annotation>
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        </Annotation>
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        </Annotation>
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    <Property Name="COOLERSTATEDESC" Type="Edm.String"
MaxLength="5000">
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```

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        </Annotation>
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        </Annotation>
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    <EntitySet Name="COOLERMODELKPI"
EntityType="com.sap.iot.cm.rt.COOLERMODELKPIITYPE"></EntitySet>
</EntityContainer>
</Schema>
</edmx:DataServices>
</edmx:Edmx>

```

Response Status and Error Codes

Code	Description
200	Content Manager Run Time Service Metadata retrieved successfully
304	If-None-Match header with etag value is provided in the request , and this etag (in metadata document) is not changed since the metadata is last accessed, then response code "304: Not Modified" is returned. If metadata document is changed, then the latest metadata service document is returned in response.

24.2.2.5.2 Read Data of Content Manager Runtime Service

Using this API, you can read the aggregates of the underlying data model of the selected entity type. This API returns a streaming response which can be used to read data in smaller chunks on client side for incremental reads. So, the data is served as chunked HTTP responses, and consumer client of API request can process entities/entries as and when they are derived from the streaming response.

Request & Response

URL: /data/v1/odata.svc/<<ENTITYSET>>

(where <<ENTITYSET>> is name of the data model in capital letters)

HTTP Method: [GET](#)

Permissions: cm.user

Request Headers

Header	Required	Value
Accept	No	application/json or application/atom+xml

Request Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied. Below methods can be used in <code>\$filter</code>: concat, indexof, length, substring, toupper, tolower, trim, endswith, startswith, substringof, day, hour, minute, month, second, year, ceiling, floor, round.
\$select	No	String	<code>\$select</code> is used for projection based aggregations. If <code>\$select</code> query parameter has dimensions and measures, then measures will be aggregated by dimensions based on the aggregation types of measures defined in the calculation view.
\$orderby	No	String	Field name to be used for sorting the entries in response. To sort the entries in response, use <i>asc</i> for the ascending order and <i>desc</i> for the descending order.
\$count	No	Boolean	Total number of entries in response. The count number will be included in the response. <code>\$count</code> ignores any <code>\$top</code> and <code>\$skip</code> query options, returns the count of total number of entries matching any <code>\$filter</code> condition specified.
\$top	No	Integer	Number of entries to include in the response
\$skip	No	Integer	Number of the first <i>n</i> entries to be excluded from the response

Request Example 1

/data/v1/odata.svc/COOLERMODELKPI

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "HALF_YEAR_NH": "H2",
      "MONTH": 202009,
      "MONTH_NH": 202009,
      "QUARTER": 20203,
      "QUARTER_NH": 20203,
      "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
      "TIMESTAMP": "2020-09-21T19:59:59Z",
      "TIMESTAMP_STR": "2020-09-21 19:59:59",
      "WEEK_NH": 202039,
      "YEAR": 2020,
      "YEAR_NH": 2020,
      "COOLERNAME": "Cooler1",
      "COOLERSTATEDESC": "State1",
      "COOLERTYPE": "OneDoor",
      "DATE": "2020-09-21",
      "DATE_NH": "2020-09-21",
      "DIMENSIONS_END_TIME": "9999-12-12T00:00:00Z",
      "DIMENSIONS_END_TIME_STR": "9999-12-12 00:00:00",
      "DIMENSIONS_START_TIME": "2020-09-21T01:10:00Z",
      "DIMENSIONS_START_TIME_STR": "2020-09-21 01:10:00",
      "DOOROPENCOUNTSUM": 12,
      "HALF_YEAR": "H2",
      "GENERATED_ID": "2bd8308a-06d2-4bf0-8160-dcd0e0c18e93"
    },
    {
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      "MONTH": 202009,
      "MONTH_NH": 202009,
      "QUARTER": 20203,
      "QUARTER_NH": 20203,
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "TIMESTAMP": "2020-09-19T17:59:59Z",
      "TIMESTAMP_STR": "2020-09-19 17:59:59",
      "WEEK_NH": 202038,
      "YEAR": 2020,
      "YEAR_NH": 2020,
      "COOLERNAME": "Cooler16",
      "COOLERSTATEDESC": "State6",
      "COOLERTYPE": "ThreeDoor",
      "DATE": "2020-09-19",
      "DATE_NH": "2020-09-19",
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      "DIMENSIONS_START_TIME_STR": "2020-09-19 06:21:00",
      "DOOROPENCOUNTSUM": null,
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      "GENERATED_ID": "5d97ec44-8a01-48ca-a8dd-e5144a0426b6"
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    {
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      "MONTH": 202009,
      "MONTH_NH": 202009,
      "QUARTER": 20203,
      "QUARTER_NH": 20203,
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```

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  {
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    "QUARTER_NH": 20203,
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    "QUARTER": 20203,
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    "YEAR": 2020,
    "YEAR_NH": 2020,
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  },

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  "YEAR": 2020,
  "YEAR_NH": 2020,
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  "COOLERSTATEDESC": "State1",
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        "YEAR_NH": 2020,
        "COOLERNAME": null,
        "COOLERSTATEDESC": "State8",
        "COOLERTYPE": null,
        "DATE": "2020-09-19",
        "DATE_NH": "2020-09-19",
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": null,
        "HALF_YEAR": "H2",
        "GENERATED_ID": "77b2c0fe-3b29-4c36-a776-fc916cd996d8"
    },
    {
        "HALF_YEAR_NH": "H2",
        "MONTH": 202009,
        "MONTH_NH": 202009,
        "QUARTER": 20203,
        "QUARTER_NH": 20203,
        "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
        "TIMESTAMP": "2020-09-20T19:59:59Z",
        "TIMESTAMP_STR": "2020-09-20 19:59:59",
        "WEEK_NH": 202038,
        "YEAR": 2020,
        "YEAR_NH": 2020,
        "COOLERNAME": null,
        "COOLERSTATEDESC": "State4",
        "COOLERTYPE": null,
        "DATE": "2020-09-20",
        "DATE_NH": "2020-09-20",
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": null,
        "HALF_YEAR": "H2",
        "GENERATED_ID": "8b6dd7f1-4b14-4165-ad2e-c48ec1c9dcaf"
    },
    {
        "HALF_YEAR_NH": "H2",
        "MONTH": 202009,
        "MONTH_NH": 202009,
        "QUARTER": 20203,
        "QUARTER_NH": 20203,
        "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
        "TIMESTAMP": "2020-09-20T20:59:59Z",
        "TIMESTAMP_STR": "2020-09-20 20:59:59",
        "WEEK_NH": 202038,
        "YEAR": 2020,

```

```

        "YEAR_NH": 2020,
        "COOLERNAME": null,
        "COOLERSTATEDESC": "State1",
        "COOLERTYPE": null,
        "DATE": "2020-09-20",
        "DATE_NH": "2020-09-20",
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": 28,
        "HALF_YEAR": "H2",
        "GENERATED_ID": "26c816dd-af15-4cc3-ba60-ac5a6949fb67"
    },
    {
        "HALF_YEAR_NH": "H2",
        "MONTH": 202009,
        "MONTH_NH": 202009,
        "QUARTER": 20203,
        "QUARTER_NH": 20203,
        "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
        "TIMESTAMP": "2020-09-20T22:59:59Z",
        "TIMESTAMP_STR": "2020-09-20 22:59:59",
        "WEEK_NH": 202038,
        "YEAR": 2020,
        "YEAR_NH": 2020,
        "COOLERNAME": null,
        "COOLERSTATEDESC": "State1",
        "COOLERTYPE": null,
        "DATE": "2020-09-20",
        "DATE_NH": "2020-09-20",
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": 10,
        "HALF_YEAR": "H2",
        "GENERATED_ID": "82a4948b-106f-4880-a3eb-37c46cb7243d"
    },
    {
        "HALF_YEAR_NH": "H2",
        "MONTH": 202009,
        "MONTH_NH": 202009,
        "QUARTER": 20203,
        "QUARTER_NH": 20203,
        "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
        "TIMESTAMP": "2020-09-20T23:59:59Z",
        "TIMESTAMP_STR": "2020-09-20 23:59:59",
        "WEEK_NH": 202038,
        "YEAR": 2020,
        "YEAR_NH": 2020,
        "COOLERNAME": null,
        "COOLERSTATEDESC": "State4",
        "COOLERTYPE": null,
        "DATE": "2020-09-20",
        "DATE_NH": "2020-09-20",
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": null,
        "HALF_YEAR": "H2",
        "GENERATED_ID": "b0a16b08-ca32-4273-995a-da2890ecee6"
    },
    {
        "HALF_YEAR_NH": null,
        "MONTH": null,
        "MONTH_NH": null,

```

```

        "QUARTER": null,
        "QUARTER_NH": null,
        "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
        "TIMESTAMP": null,
        "TIMESTAMP_STR": null,
        "WEEK_NH": null,
        "YEAR": null,
        "YEAR_NH": null,
        "COOLERNAME": null,
        "COOLERSTATEDESC": null,
        "COOLERTYPE": null,
        "DATE": null,
        "DATE_NH": null,
        "DIMENSIONS_END_TIME": null,
        "DIMENSIONS_END_TIME_STR": null,
        "DIMENSIONS_START_TIME": null,
        "DIMENSIONS_START_TIME_STR": null,
        "DOOROPENCOUNTSUM": null,
        "HALF_YEAR": null,
        "GENERATED_ID": "17ed319f-743d-4a77-9e68-b738f0068dcb"
    }
}

```

Request Example 2

Below example has `$select` which is used for projection based aggregations. If `$select` query parameter has dimensions and measures, then measures will be aggregated by dimensions based on the aggregation types of measures defined in the calculation view.

`/data/v1/odata.svc/COOLERMDELKPI?$select=BASEID,DOOROPENCOUNTSUM`

Response

In below response `DOOROPENCOUNTSUM` is aggregated with an aggregation type "SUM" by dimension `BASEID`:

```

{
  "@odata.context":
  "$metadata#COOLERMDELKPI(BASEID,DOOROPENCOUNTSUM,GENERATED_ID)",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "@odata.id":
      "COOLERMDELKPI('1423b525-0057-4a74-906a-84b3ccdde38c')",
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "DOOROPENCOUNTSUM": 103,
      "GENERATED_ID": "1423b525-0057-4a74-906a-84b3ccdde38c"
    },
    {
      "@odata.id":
      "COOLERMDELKPI('d7bf83aa-075a-4df4-8f7f-060355d9e2eb')",
      "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
      "DOOROPENCOUNTSUM": 50,
      "GENERATED_ID": "d7bf83aa-075a-4df4-8f7f-060355d9e2eb"
    }
  ]
}

```

Request Example 3

Below example request filters the data by `BASEID`, orders the data by `TIMESTAMP`, skips 2 entries, and returns next 2 entries. Also, overall count is included in the response.

/data/v1/odata.svc/COOLERMODELKPI?\$filter=BASEID eq '096A2F8A4DB947A4A2FAC017A9CFB708'&
 \$orderby=TIMESTAMP&\$skip=2&\$top=2&\$count=true

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "@odata.count": 8,
  "value": [
    {
      "HALF_YEAR_NH": "H2",
      "MONTH": 202009,
      "MONTH_NH": 202009,
      "QUARTER": 20203,
      "QUARTER_NH": 20203,
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "TIMESTAMP": "2020-09-19T20:59:59Z",
      "TIMESTAMP_STR": "2020-09-19 20:59:59",
      "WEEK_NH": 202038,
      "YEAR": 2020,
      "YEAR_NH": 2020,
      "COOLERNAME": "Cooler16",
      "COOLERSTATEDESC": "State6",
      "COOLERTYPE": "ThreeDoor",
      "DATE": "2020-09-19",
      "DATE_NH": "2020-09-19",
      "DIMENSIONS_END_TIME": "9999-12-12T00:00:00Z",
      "DIMENSIONS_END_TIME_STR": "9999-12-12 00:00:00",
      "DIMENSIONS_START_TIME": "2020-09-19T06:21:00Z",
      "DIMENSIONS_START_TIME_STR": "2020-09-19 06:21:00",
      "DOOROPENCOUNTSUM": 28,
      "HALF_YEAR": "H2",
      "GENERATED_ID": "0fdbdb6e-064c-4dd2-a6b9-1394b1fcf774"
    },
    {
      "HALF_YEAR_NH": "H2",
      "MONTH": 202009,
      "MONTH_NH": 202009,
      "QUARTER": 20203,
      "QUARTER_NH": 20203,
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "TIMESTAMP": "2020-09-20T17:59:59Z",
      "TIMESTAMP_STR": "2020-09-20 17:59:59",
      "WEEK_NH": 202038,
      "YEAR": 2020,
      "YEAR_NH": 2020,
      "COOLERNAME": "Cooler16",
      "COOLERSTATEDESC": "State2",
      "COOLERTYPE": "ThreeDoor",
      "DATE": "2020-09-20",
      "DATE_NH": "2020-09-20",
      "DIMENSIONS_END_TIME": "9999-12-12T00:00:00Z",
      "DIMENSIONS_END_TIME_STR": "9999-12-12 00:00:00",
      "DIMENSIONS_START_TIME": "2020-09-19T06:21:00Z",
      "DIMENSIONS_START_TIME_STR": "2020-09-19 06:21:00",
      "DOOROPENCOUNTSUM": null,
      "HALF_YEAR": "H2",
      "GENERATED_ID": "2ed6c77e-3c05-42d4-988b-8f88f64206b6"
    }
  ]
}
```


\$apply request parameter for Count Distinct Aggregation:

\$apply request parameter can be used for only count distinct feature. \$apply supports filter, groupby, and countdistinct aggregation within it. The filter that can be specified within \$apply, and it follows same the expression language/format as that of \$filter.

Note

1. \$apply query parameter works in a mutually exclusive manner in current implementation. It means \$apply is supported alone, when \$apply is sent in the request, the other query parameters like \$select, \$count, \$filter, \$orderby, \$top and \$skip if any sent in the same request are not considered.
2. Streaming support is not available if \$apply specification is used in the request.

Request Example 1

/data/v1/odata.svc/COOLERMODELKPI?\$apply=groupby((BASEID),aggregate(COOLERSTATEDESC with countdistinct as COOLERSTATEDESCPERTHINGID))

In response, with grouping the data by BASEID, count distinct of COOLERSTATEDESC as COOLERSTATEDESCPERTHINGID is shown along with its BASEID.

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "COOLERSTATEDESCPERTHINGID": 4
    },
    {
      "BASEID": "CAB583A8369A436790D72F67CFE4D0E3",
      "COOLERSTATEDESCPERTHINGID": 3
    }
  ]
}
```

Request Example 2

/data/v1/odata.svc/COOLERMODELKPI?\$apply=aggregate(COOLERSTATEDESC with countdistinct as TOTALCOOLERSTATES)

Response shows count distinct of COOLERSTATEDESC as TOTALCOOLERSTATES.

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "TOTALCOOLERSTATES": 5
    }
  ]
}
```

Request Example 3

data/v1/odata.svc/COOLERMODELKPI?\$apply=filter(BASEID eq '096A2F8A4DB947A4A2FAC017A9CFB708')/groupby((THINGID),aggregate(COOLERSTATEDESC with countdistinct as COOLERSTATEDESCPERTHINGID))

In response, filter is applied on BASEID, and with grouping the data by BASEID, count distinct of COOLERSTATEDESC as COOLERSTATEDESCPERTHINGID is shown along with its BASEID.

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "BASEID": "096A2F8A4DB947A4A2FAC017A9CFB708",
      "COOLERSTATEDESCPERTHINGID": 4
    }
  ]
}
```

Request Example 4

data/v1/odata.svc/COOLERMODELKPI?\$apply=filter(BASEID eq '096A2F8A4DB947A4A2FAC017A9CFB708')/aggregate(COOLERSTATEDESC with countdistinct as TOTALCOOLERSTATES)

In response, filter is applied on BASEID , and count distinct of COOLERSTATEDESC is shown as TOTALCOOLERSTATES.

Response

```
{
  "@odata.context": "$metadata#COOLERMODELKPI",
  "@odata.metadataEtag":
  "\"eefec9793a4e841c50bbae73f37fb5ed10c7c554026e0791b21474d677cfef65\"",
  "value": [
    {
      "TOTALCOOLERSTATES": 4
    }
  ]
}
```

25 Monitoring and Logging

Overview

Using the monitoring and the logging service, you can retrieve the status of a service executed. For example, the service to create multiple things generates a correlation ID.

- You can use the monitoring service to retrieve status of correlation IDs. The response of the monitoring service includes statuses such as **Success**, **In Process**, **Error**, or **Partial Success** and a detailed log for the service executed.
- You can use the logging service to retrieve the log details of a specific correlation ID and in turn the details of individual logs.

Resource Path: `http://<server address>[:<port number>][<path>]/ServiceMonitoring`

Example for a base URI in a cloud foundry environment: `https://service-metrics-sap.cfapps.eu10.hana.ondemand.com/ServiceMonitoring`

Operations

CRUD Operations

HTTP Method	Operation	URI	Scopes
GET	Read all Correlations [page 1541]	/Logging/Correlations	monitor.r
GET	Read Status of a Correlation ID [page 1544]	/State/Status('<<Correlation ID>>')	monitor.r
GET	Read Log Details of a Correlation [page 1546]	/Logging/Correlations('<<Correlation ID>>')/Logs	monitor.r
GET	Read Details of a Log [page 1548]	/Logging/Logs('<<log ID>>')	monitor.r

25.1 Read all Correlations

With this method, you can retrieve all correlation IDs. The response includes the following details:

- Correlation ID
- Timestamp
- Number of requests processed, for example, the number of thing instances to be created provided in the request payload

- Number of requests succeeded, for example, the number of thing instances created successfully
- Number of requests failed, for example, the number of thing instances failed to be created

Request

URI: `/Logging/Correlations`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `monitor.r`

Request Parameters

None

Query String Parameters

Parameter	Required	Data Type	Description
<code>\$filter</code>	No	String	Filter condition to be applied; the only valid field is correlation ID. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or.

Request Example

`/Logging/Correlations`

Response

Response Status and Error Codes

Code	Description
200	Correlation details are retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "results": [{
      "_metadata": {
        "id": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('BF517F7DB459490CB03D71C9A28B5822')",
        "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('BF517F7DB459490CB03D71C9A28B5822')",
        "type": "com.sap.apptot.service.Correlation"
      },
      "CorrelationID": "BF517F7DB459490CB03D71C9A28B5822",
      "ProcessedRequestsCount": 3,
      "RequestFailureCount": 0,
      "RequestSuccessCount": 3,
      "Logs": {
        "_deferred": {
          "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('BF517F7DB459490CB03D71C9A28B5822')/Logs"
        }
      }
    },
    {
      "_metadata": {
        "id": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('E7F632BF57D04F0CA9C531863364A92D')",
        "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('E7F632BF57D04F0CA9C531863364A92D')",
        "type": "com.sap.apptot.service.Correlation"
      },
      "CorrelationID": "E7F632BF57D04F0CA9C531863364A92D",
      "ProcessedRequestsCount": 1,
      "RequestFailureCount": 1,
      "RequestSuccessCount": 0,
      "Logs": {
        "_deferred": {
          "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('E7F632BF57D04F0CA9C531863364A92D')/Logs"
        }
      }
    },
    {
      "_metadata": {
        "id": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('04FBF4A2DD34456E87027CBEB24AC407')",
        "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('04FBF4A2DD34456E87027CBEB24AC407')",
        "type": "com.sap.apptot.service.Correlation"
      },
      "CorrelationID": "04FBF4A2DD34456E87027CBEB24AC407",
      "ProcessedRequestsCount": 1,
      "RequestFailureCount": 1,
      "RequestSuccessCount": 0,
      "Logs": {
        "_deferred": {
          "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Correlations('04FBF4A2DD34456E87027CBEB24AC407')/Logs"
        }
      }
    }
  ]
}
```

```
}
  }
]
}
```

Related Information

[Monitoring and Logging \[page 1541\]](#)

25.2 Read Status of a Correlation ID

With this method, you can read the status of a specific correlation ID.

The response includes a correlation ID along with its corresponding timestamp, service name, and status. The following values indicate different statuses of the service:

- **Success** – The service successfully completed. For example, if the service is executed to create three thing instances, this status indicates that all three thing instances are created successfully.
- **In Process** – The service is in process. For example, if the service is executed to create 30 thing instances, this status indicated that creation of some of the thing instances is in progress.
- **Error** – The service failed. For example, if the service is executed to create three thing instances, this status indicates that none of the thing instances are created.
- **Partial Success** – The service partially succeeded. For example, if the service is executed to create three thing instances, the status indicates that one or more thing instances are not created successfully.

Request

URI: `/State/Status('<<Correlation ID>>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `monitor.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlation ID	Yes	GUID	Indicates the unique correlation ID	Path

Query String Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; the valid fields are correlation ID, timestamp, service name, and status. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or.

Request Example

```
/State/Status('F8E69835B61F4130B12DB342043DA116')
```

Response

Response Status and Error Codes

Code	Description
200	Status of a specific correlation ID retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://service-metrics-sap-ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/State/Status('F8E69835B61F4130B12DB342043DA116')",
      "uri": "https://service-metrics-sap-ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/State/Status('F8E69835B61F4130B12DB342043DA116')",
      "type": "com.sap.apptot.service.Status"
    },
    "CorrelationID": "F8E69835B61F4130B12DB342043DA116",
    "Timestamp": "/Date(1557113529515)/",
    "ServiceName": "/v2/Things",
    "Status": "Success"
  }
}
```

Related Information

[Monitoring and Logging \[page 1541\]](#)

25.3 Read Log Details of a Correlation

With this method, you can retrieve the status of the individual requests corresponding to a correlation ID. For example, the individual status of the thing instances to be created specified in the request payload. For every single thing instance creation request, a log ID is generated. The response includes the following details:

- Log ID, for example, unique log IDs for every thing instance to be created.
- Timestamp
- Log Status, for example, whether the creation of thing instance corresponding to this log ID succeeded or failed.

Request

URI: `/Logging/Correlations('<<Correlation ID>>')/Logs`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `monitor.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
correlation ID	Yes	GUID	Unique correlation ID	Path

Query String Parameters

Parameter	Required	Data Type	Description
\$filter	No	String	Filter condition to be applied; the valid fields are log ID and log status. The filter operators supported are eq, lt, gt, le, ge, and ne. Multiple filters are supported using the separators – and, or.

Request Example

```
/Logging/Correlations('<<Correlation ID>>')/Logs
```

Response

Response Status and Error Codes

Code	Description
200	Log details retrieved successfully

Payload

Format: *JSON*

Media types supported are *JSON* and *XML*. The *JSON* for this method has the following structure:

```
{
  "d": {
    "results": [
      {
        "__metadata": {
          "id": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Logs('C4244252A7EA43F892B2FE82CC7C64B6')",
          "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Logs('C4244252A7EA43F892B2FE82CC7C64B6')",
          "type": "com.sap.apptot.service.Log"
        },
        "LogID": "C4244252A7EA43F892B2FE82CC7C64B6",
        "Timestamp": "/Date(1557734655033)/",
        "LogStatus": "Success",
        "LogDetails": null
      },
      {
        "__metadata": {
          "id": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Logs('66FA474E6BE54D568571C70A4C6EED8B')",
          "uri": "https://service-metrics-sap-
ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/
Logs('66FA474E6BE54D568571C70A4C6EED8B')",
          "type": "com.sap.apptot.service.Log"
        },
        "LogID": "66FA474E6BE54D568571C70A4C6EED8B",
        "Timestamp": "/Date(1557734655033)/",
        "LogStatus": "Success",
        "LogDetails": null
      }
    ]
  }
}
```

Related Information

[Monitoring and Logging \[page 1541\]](#)

25.4 Read Details of a Log

With this method, you can read the details of a specific log ID. For example, whether the creation of thing instance corresponding to the log ID succeeded or failed. The response includes the following details:

- Log ID
- Timestamp
- Log Status, for example, Success or Error status with creation of a specific thing instance.
- Log Details, for example, the message text on the status of the thing creation. This includes the thing ID and thing name.

Request

URI: `/Logging/Logs('<<log ID>>')`

Operation Type: CRUD

HTTP Method: [GET](#)

Permissions: `monitor.r`

Request Parameters

Parameter	Required	Data Type	Description	Parameter Type
log ID	Yes	GUID	Unique log ID	Path

Request Example

`/Logging/Logs('C4244252A7EA43F892B2FE82CC7C64B6')`

Response

Response Status and Error Codes

Code	Description
200	Logs details retrieved successfully

Payload

Format: [JSON](#)

Media types supported are [JSON](#) and [XML](#). The [JSON](#) for this method has the following structure:

```
{
  "d": {
    "__metadata": {
      "id": "https://service-metrics-sap-ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/Logs('C4244252A7EA43F892B2FE82CC7C64B6')",
      "uri": "https://service-metrics-sap-ci.cfapps.sap.hana.ondemand.com:443/ServiceMonitoring/Logging/Logs('C4244252A7EA43F892B2FE82CC7C64B6')",
      "type": "com.sap.apptot.service.Log"
    },
    "LogID": "C4244252A7EA43F892B2FE82CC7C64B6",
    "Timestamp": "/Date(1557734655033)/",
    "LogStatus": "Success",
    "LogDetails": "{ \"thingId\": \"B739F3004387424A9CAFB832C9B52642\", \"name\": \"BMWCarX2\", \"url\": \"https://apptot-mds-ci.cfapps.sap.hana.ondemand.com/Things('B739F3004387424A9CAFB832C9B52642')\", \"alternateId\": \"BMWCarX2-altid\" }"
  }
}
```

Related Information

[Monitoring and Logging \[page 1541\]](#)

26 Filter Conditions (\$filter)

You can restrict the data to be retrieved by using filter conditions. The filter conditions are validated before being applied.

Overview

All services that are available in the SAP IoT platform offer a method to retrieve a collection of either all objects or a subset of objects of a certain type from the database. This kind of method is often referred to as a "collective GET request". In this documentation, you can find these methods by their topic title always starting with *Read all <objects>*, for example, *Read all Persons*. By default, all these methods come with a filter parameter that allows for defining simple as well as more advanced object selection criteria. Although the standard filter may be simple, it is still important and often even required to avoid excessive server load caused by reading too much data from the server.

i Note

Filter conditions can be defined for many properties, but **not for all** the properties in the payload of a particular service. You can find a list of the fields supported for creating filter conditions in the documentation of each individual *Read All* service method.

Availability

i Note

The filter conditions described in this section are currently available for the following services:

Services With Filter Support

Area	Services
Configuration	thingType
	propertySetType
Thing	All services
Thing Hierarchy	All services
Event, Event Type	All services

Area	Services
Authorization	ObjectGroup
	ObjectGroupAssignment
	ObjectGroupCollection
	ObjectGroupCollectionItem
	Capability
Location	All services
Value Helps	All services

Details

Parameter: `$filter`

The format of valid filter conditions is as follows:

- Single filter condition:

```
<filter_property_name> <filter_operator> <filter_operand>
```

- Multiple filter conditions:

```
<filter_property_name> <filter_operator> <filter_operand> and
<filter_property_name> <filter_operator> <filter_operand>
```

Filter Parameter	Values														
<code><filter_property_name></code>	Any of the properties on which filter condition is allowed. Any invalid property name is a bad request.														
<code><filter_operator></code>	The following binary filter operators are supported: <table> <tr> <th>Operator</th><th>Description</th></tr> <tr> <td><code>eq</code></td><td>is equal</td></tr> <tr> <td><code>ne</code></td><td>is not equal</td></tr> <tr> <td><code>gt</code></td><td>is greater than</td></tr> <tr> <td><code>ge</code></td><td>is greater than or equal</td></tr> <tr> <td><code>lt</code></td><td>is less than</td></tr> <tr> <td><code>le</code></td><td>is less than or equal</td></tr> </table>	Operator	Description	<code>eq</code>	is equal	<code>ne</code>	is not equal	<code>gt</code>	is greater than	<code>ge</code>	is greater than or equal	<code>lt</code>	is less than	<code>le</code>	is less than or equal
Operator	Description														
<code>eq</code>	is equal														
<code>ne</code>	is not equal														
<code>gt</code>	is greater than														
<code>ge</code>	is greater than or equal														
<code>lt</code>	is less than														
<code>le</code>	is less than or equal														
<code><filter_operand></code>	Valid operands are <i>string</i> , <i>integer</i> , <i>float</i> , <i>true</i> , <i>false</i> , <i>null</i> , <i>date</i> , <i>datetime</i> , and <i>timestamp</i> .														

In a single method call, you can combine any number of filter conditions with the operators listed above with the `and` or the `or` operator. Any other join condition is a bad request.

The filter parameters are validated as follows:

- If `<filter_operand>` is null, the only supported operators are `eq` and `ne`.
- The `<filter_operand>` of type string is always enclosed within single quotes and the only special characters not supported are forward slash (/) and caret (^).
- The `<filter_operand>` of type `integer`, `float`, `null`, `true`, `false`, `date`, `datetime`, and `timestamp` are not enclosed within quotes. If these are enclosed within single quotes, it is treated as string.
- The `<filter_operand>` cannot contain special characters ampersand (&) and pound character (#). For example, `$filter=myString eq 'something1&something2'` is an invalid filter condition.
 - The special character & is used to separate query parameters, for example, `?query1=value&query2=value`.
 - The special character # is used as an anchor tag in URLs to navigate directly to a specific section in an html page or a document, for example, `http://<baseURL>/<resourcePath>#<element>`.
 - However, you can use `%26` instead of & and `%23` instead of #. For example, `$filter=myString eq 'something1%26something2'` is a valid filter condition.
- The type of `<filter_property_name>` and `<filter_operand>` should be the same.

Note

- Any filter condition in an invalid format is a bad request.
- A filter condition without the filter parameters such as filter property, filter operator, and filter operand in the request is not supported. For example, `/Things?$orderby=_thingID asc&$filter=()` is an invalid request.
- Data types `JSON`, `ByteArray`, and `LargeString` are not supported in `$filter`.
- The filter operator `eq` in combination with filter operand `true` is not mandatory in a filter condition. For example, the filter conditions `substringof(<'search string'>,<string field>) eq 'true'` and `substringof(<'search string'>,<string field>)` are valid. However, if you opt to use the filter operator `eq` with the filter operand `true`, the representation is supported as follows:
 - In `OData` service, you must not specify the filter operand `true` within quotes. For example, `substringof(<'search string'>,<string field>) eq 'true'` is invalid.

Grouping Multiple Filter Conditions

You can define multiple filter conditions using the separators `and` and `or`. You can use the parenthesis to group the filter conditions to execute them in a particular order of sequence. This way, the result set gets well defined.

For example, the query with filter condition `/Things?$top=50&$filter=_id eq '327036AE27D94E9B9B85FC91A3ED0BC0' and _thingType eq 'core.automobiles:ABC2Series' or _name eq 'ABC2Series'` is executed as follows:

- **Result 1:** Retrieve a thing with ID '327036AE27D94E9B9B85FC91A3ED0BC0' and thing type name 'core.automobiles:ABC2Series'.
- **Result 2:** Retrieve all things with name 'ABC2Series'.
- **Result 3:** Result 1 or Result 2.

On the other hand, the query with filter condition `/Things?$top=50&$filter=_id eq '327036AE27D94E9B9B85FC91A3ED0BC0' and (_thingType eq 'core.automobiles:ABC2Series' or _name eq 'ABC2Series') eq true` is executed as follows:

- **Result 1:** Retrieve a thing with thing type name `'core.automobiles:ABC2Series'` or with name `'ABC2Series'`.
- **Result 2:** Retrieve a thing with ID `'327036AE27D94E9B9B85FC91A3ED0BC0'`.
- **Result 3:** Result 1 and Result 2.

Examples

```
/Things?$filter=_thingType eq 'core.automobiles:ABC2Series' and _location ne DE
```

Retrieves all things that belong to the thing type `core.automobiles:ABC2Series` but not located in Germany.

```
/Things?$filter=( _thingType eq 'core.automobiles:ABC2Series' or _name eq 'ABC2Series') eq true) and Capacity lt 1000
```

- Firstly, retrieves all things that belong to the thing type `core.automobiles:ABC2Series` or with the name `'ABC2Series'`.
- From the result set, retrieves only those things with the property `Capacity` less than 1000.

```
/Things?$filter=((_thingType eq 'core.automobiles:ABC2Series' or _thingType eq 'core.automobiles:ABCSeries') or _name eq 'ABC2Series') eq true
```

- Retrieves all things that belong to the thing type `core.automobiles:ABC2Series` or `core.automobiles:ABCSeries`
- If there are no things found, the system retrieves all things with name `'ABC2Series'`

```
/Things/?$filter=_thingType ne 'core.automobiles:ABC2Series' and thingType ne 'core.automobiles:ABCSeries'
```

Retrieves all things that does not belong to thing types `core.automobiles:ABC2Series` and `core.automobiles:ABCSeries`.

Search String Data Using \$filter

You can use string functions such as [substringof](#), [startswith](#), and [endswith](#) in filter conditions to search data of type string. You can filter data using a combination of these functions, for example `/Configuration/ThingTypes?$filter=substringof(<'search string'>,<string field>) eq 'true' or startswith(<string field>,<'search string'>) eq 'true'` is a valid filter condition.

Note

Data search using string functions such as [substringof](#), [startswith](#), and [endswith](#) in `$filter` condition is not case-sensitive. For example, the requests `/Configuration/ThingTypes?$filter=startswith(Name, 'ABC')` and `/Configuration/ThingTypes?$filter=startswith(Name, 'abc')` retrieves identical results.

Following are a few examples of valid filter conditions using these string functions:

- /Configuration/ThingTypes?\$filter=startswith(<string field>,<'search string'>)
- /Configuration/ThingTypes?\$filter=startswith(<string field>,<'search string'>) eq 'true' and endswith(<string field>,<'search string'>) eq 'true'
- /Configuration/ThingTypes?\$filter=substringof(<'search string'>,<string field>) eq 'true' or endswith(<string field>,<'search string'>) eq 'true'
- /Configuration/ThingTypes?\$filter=substringof(<'search string'>,<string field1>) eq 'true' or substringof(<'search string'>,<string field2>) eq 'true'
- /Configuration/ThingTypes?\$filter= startswith(<string field1>,<'search string'>) eq 'true' or endswith(<string field2>,<'search string'>) eq 'true'
- /Configuration/ThingTypes?\$filter= startswith(<string field1>,<'search string'>) eq 'true' and endswith(<string field2>,<'search string'>) eq 'true' and substringof(<'search string'>,<string field3>)

Filter Data Using Date Functions

You can use date functions such as *day*, *hour*, *minute*, *second*, *month*, and *year* in filter conditions to search data. These functions are supported only for the property type of data type *DateTime*. You can use the date functions only in the following APIs:

- /CompositeEvents/v1/<'property set type name'>?\$filter=Path eq <'property set ID'>
- /CompositeEvents/v2/<'property set type name'>?\$filter=Path eq <'property set ID'>
- /CompositeThings/v1/'<property set type name>'?\$filter=Path eq '<property set ID>'

Following are a few examples of valid filter conditions using these date functions:

- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and At_DateTime eq datetime'2018-09-10T10:15:40'
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and day(At_DateTime) eq 10
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and month(At_DateTime) eq 9
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and year(At_DateTime) eq 2018
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and hour(At_DateTime) eq 10
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and minute(At_DateTime) eq 15
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'engine_temp' and second(At_DateTime) eq 40
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'eventData' and BusinessTimestamp eq datetimeoffset'2015-08-02T09:00:00Z'
- /CompositeEvents/v2/PST_com_abc_core__engine?\$filter=Path eq 'eventData' and BusinessTimestamp gt datetimeoffset'2015-08-02T09:00:00Z' and BusinessTimestamp lt datetimeoffset'2015-10-02T09:00:00Z'

- `/CompositeEvents/v2/PST_com_abc_core__engine?$filter=Path eq 'eventData' and BusinessTimestamp eq null`

Examples

The following are a few examples of valid filter conditions:

Operand	Example
<i>Null</i>	<code>/Things/PropertySet/<property set type name>? \$filter=<property name> eq null</code>
<i>String</i>	<code>/Things/PropertySet/<property set type name>? \$filter=<property name> eq 'Tenant'</code>
<i>ThingId or BPID</i>	<code>/Things/PropertySet/<property set type name>?\$filter=_thingId eq '327036AE27D94E9B9B85FC91A3ED0BC0'</code>
<i>Numeric</i> • <i>Decimal</i>	REST-based API: <code>/Things/PropertySet/<property set type name>? \$filter=<property name> eq 9.01</code> OData-based API: <code>/CompositeThings/v1/Things? \$expand=DYN_ENT_core_automobiles__CarInfo& \$filter=DYN_ENT_core_automobiles__CarInfo/CMaster.prop3ND eq 9.01d</code>
<i>Numeric</i> • <i>Integer</i>	<code>/Things/PropertySet/<property set type name>? \$filter=<property name> eq 9</code>
<i>NumericFlexible</i>	REST-based API: <code>Things/PropertySet/<property set type name>? \$filter=<property name> eq 924.5</code> OData-based API: <code>/CompositeThings/v1/Things? \$expand=DYN_ENT_core_automobiles__CarInfo& \$filter=DYN_ENT_core_automobiles__CarInfo/CMaster.prop2NF eq 924.5d</code>
i Note The input value for the property prop2NF is 9.245E+2	

Operand	Example
<i>Timestamp or DateTime</i>	REST-based API: /Things ('335DA717E1324BEE8EB29211D8B4170E') /<thing type name>/<property set name>? timerange=2020-10-27T00:00:00Z-2020-10-29T18:00:00Z& \$filter=<property name> eq 2015-08-12T10:00:00.000Z OData-based API: /CompositeThings/v1/Things? \$expand=DYN_ENT_core_automobiles__CarInfo& \$filter=DYN_ENT_core_automobiles__CarInfo/CMaster.prop4DT eq datetime'2015-08-12T10:00:00'
<i>Date</i>	REST-based API: /Things ('335DA717E1324BEE8EB29211D8B4170E') /<thing type name>/<property set name>? timerange=2020-10-27T00:00:00Z-2020-10-29T18:00:00Z& \$filter=<property name> eq 2015-08-12 OData-based API: /CompositeThings/v1/Things? \$expand=DYN_ENT_core_automobiles__CarInfo& \$filter=DYN_ENT_core_automobiles__CarInfo/propsetmd.prop5D eq datetime'2015-08-12T00:00:00'
<i>Boolean</i>	Things/PropertySet/<property set type name>? \$filter=myBoolean eq true

27 Retrieving List of Records

There are API endpoints available to retrieve a list of records. Some of the API endpoints, by default retrieve 100 or 500 records per response. If there are more records available, a **__next** link is available at the end of the response payload to navigate to the next set of records. The following is a snippet of response payload in [JSON](#) format with **__next** link.

```
{
  "d": {
    "results": [
      {
        ...
      },
      ...
      {
        ...
      }
    ],
    "__next": "https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com/ThingGroup/v1/ThingGroup?$skiptoken=20"
  }
}
```

The following is a snippet of response payload in [XML](#) format with **__next** link.

```
<entry>
  ...
</entry>

<entry>
  ...
</entry>
<link href="https://apiot-thing-group-ci.cfapps.sap.hana.ondemand.com/ThingGroup/v1/ThingGroup?$skiptoken=20" rel="next"></link>
```

However, with REST services, the response payload contains **__next** and **__prev** link. The following is a snippet of response payload in JSON format with **__next** and **__prev** links.

```
{
  "value": [
    {
      ...
    },
    ...
    {
      ...
    }
  ],
  "next": "https://apiot-mds-ci.cfapps.sap.hana.ondemand.com/Things?$skip=1000",
  "prev": "https://apiot-mds-ci.cfapps.sap.hana.ondemand.com/Things?$skip=0"
}
```

To retrieve a list of records, we recommend you avoid using `$count` with every service request. Instead, use `$top` and `$skip` in the service request, thereby reducing the server load.

For example, assume you have configured 1000 thing types. You want to retrieve thing types using the application `config-thing-sap`. This application, by default retrieves 500 records per response and displays the **__next** link in the response payload.

- If you try retrieving 750 thing types using the URL `/ThingConfiguration/v1/ThingTypes?$top=750`, the service retrieves first 500 records along with the **__next** link in the response payload. You can use the **__next** link to retrieve the next 250 records and repeat calling the service request until all records are retrieved, if there are any.
- If you try retrieving 10 thing types using the URL `/ThingConfiguration/v1/ThingTypes?$top=10`, the service retries 10 thing types and the **__next** link will not be displayed in the response payload.

28 Draft Mode for Service Requests

A request parameter to avoid data being written to the database

Overview

Many of the SAP IoT services support a special request parameter that you can use to ensure that during the request, no data is actually written to, or modified in, the database. This is helpful when you want to call a service which by definition can modify the database (HTTP types POST, PUT, and DELETE), but for certain reasons you want to avoid that anything is actually written to the database. Here are some examples of test scenarios where this can be useful or even required:

- You might want to create a temporary BPRelationship object instance without defining the IDs of Persons or Companies that are related via the object. Providing the corresponding object IDs is normally mandatory, and trying to save a BPRelationship object without these values would lead to an error message. Calling a service with the draft parameter provided helps you to avoid such error messages.
- You have to deal with a use case where several different services are involved, which are mutually dependent so that the entire use case can only be solved if certain values are present in the database. With the draft mode, you can first check the presence of the required data and, in case they are missing, cancel the processing in a controlled manner.

Availability

Services With Draft Mode Support

Area	Services
Business Partner	All services
Authorization	All services
Location	All services

Details

Parameter: `draft=true`

Request Example

```
/Persons ('adbb2c0fdb0a4b9e99327a52c41fc720')?draft=true
```

This request simulates creating or updating a person with the specified ID without actually creating or updating that person. Also, if a Person object with that ID already exists in the database, the draft parameter protects you from creating any inconsistencies with that call.

29 Reserved Keywords for Configuration and Thing Services

There are reserved keywords that must not be used while defining the configuration or thing content.

Following are the list of reserved keywords for use within the Configuration and Thing Services. These keywords, in any textual case, are considered as reserved keywords. For example ATTRIBUTETYPE, attributetype, and AttributeType are all reserved keywords.

_externalId	_objectGroup	_thingType
_name	_QC	_time
		_SAPIOT_Monitoring_Thing
a		
addresspresentation	annotation	authObjectGroup
addressrepresentationisocode	attributetype	bpaddressrepresentation
b		
bpcountry	bpmobilephonenumber	bporganizationname4
bpcountrydescription	bpname	businesspartnercategory
bpfamilyname	bporganizationname1	businesspartnerid
bpgivenname	bporganizationname2	businesstimestamp
bplandlinephonenumber	bporganizationname3	
c		
children	comment	countrydescription
cityname	correlationid	curr_version
code	country	customer

d

datatype	dependencies	descriptionpt
datacategory_referencepst	description	descriptionshort
dataCategory	description_referencepst	descriptiontt
dataService	description_referringpst	descriptionttpst
default_id	descriptionlanguage	distance
delete	descriptionpst	district
deletable		

e

enddatetime	etlanguage	eventseverity2count
entity_used	etptdescription	eventseverity3count
entity_used_by	etptlanguage	eventstatuscode
entity_used_by_type	etsdescription	eventtype
entity_used_id	etslanguage	eventtypecode
entity_used_type	etsvdescription	eventtypepropertyset
etag	etsvlanguage	eventtypeseverity
etagversion	event	eventtypestatus
etcdescription	eventexternalid	extendedThingCategory
etclanguage	eventseverity	extendedThingType
etdescription	eventseverity1count	externalid

f

familyname

g

givenname

h

hasdecimals	hierarchyetagversion	hierarchynodeid
haslength	hierarchyexternalid	hierarchytenant
hierarchydescisocode	hierarchyid	hierarchytype
hierarchydescription	hierarchyname	housenumber
hierarchydescriptionlanguage	hierarchynodedescription	

i

id	isocode	isocodett
is_cycle	isocode_referencepst	isocodettpst
is_leaf	isocodepst	isodescriptionpt
iscompleted	isocodept	

l

landlinephonenumber	latitude	level_name
language	length	location
languagecode	level	longitude

m

maxdecimals		
maxlength		
migrationid		
mobilephonenumber		

n

name	nodesdescriptionlanguage	nodessemantic
nationality	nodeid	
nodesdescription	nodesdescisocode	

o

objectgroup	objectType_1	organizationname1
objectgroup_1	openevents	organizationname2
objectid	openeventscount	organizationname3
objectType	ordinal	organizationname4

p

package	postalcodelength	propertySetTypes
parentobjectid	pred_node	propertysettypepackage
parentobjecttype	propdescription	propertyTypes
parents	property	proplanguage
parentthing	propertydatatype	pst
parentthingdescription	propertydatatypepelength	pstdescription
parentthingname	propertyhasqualitycode	pstlanguage
path	propertyname	pstversion
position	propertyset_id	pt_id
postalcode	propertySetType	

q

qualityCode
query_node
query_node_name

r

read	referringproperty	resolution
readable	referringpst	result_node
referencepropertytype	region	result_node_name
referredproperty	regiondescription	retentionperiod
referredpst	regionlanguage	rootthing
		runid

s

schema	sourceId	systemadministratedata_creationdate
scope	sourceversion	
sequence	startdatetime	systemadministratedata_lastchange- datetime
servicename	status	systemadministratedata_lastchan- gedbyuser_id
services	streetname	
severity	systemadministratedata_created- byuser_id	systemadministratedata_lastchan- gedbyuser_tenant
source	systemadministratedata_created- byuser_tenant	systemstatus

t

tablename	thingdescription	thingregiondescription
targetversion	thingdistrict	thingstreetname
tenant	thingexternalid	thingTypes
thing	thinghouseNumber	thingtypepackage
thingaddressrepresentation	thingid	thingvalidityenddatetime
thingaddressrepresentationisocode	thinglocationid	thingvaliditystartdatetime
thingCategories	thingmodel_used_by_package	thingwrite
thingcityname	thingmodel_used_package	time
thingcountry	thingname	timeDependency
thingcountrydescription	thingpostalcode	timedepresolution
thingcustomerid	thingread	timestamp
thingdelete	thingregion	type

u

user		
userGroup		

v

validityenddatetime	value_datatype	valuedatatype
validitystartdatetime	value_hasqualitycode	value_unitofmeasure
value	value_length	version
		viewname

w

writable

write

30 Value Data Types for Property Types and Properties

Value Data Type	Data Type	Length Mandatory	Value
String	String	No	i Note Maximum permissible length is 254 characters. You can increase the length for a property type even if the data already exists for this property. However, you cannot decrease the length for a property regardless of whether the data exists or not. Special characters forward slash (/) and caret (^) are not supported. i Note Default length is 127 characters.
LargeString	LargeString	No	Maximum permissible limit is 512k.
Numeric	Integer	No	i Note Maximum permissible value is 2,147,483,647. Minimum permissible value is -2,147,483,648

Value Data Type	Data Type	Length Mandatory	Value
Numeric	Decimal	Yes	i Note When you set a decimal value for a property type, you must indicate the precision (X) and scale (Y) according to your business needs. The length of the value is defined in the format (X,Y), where: - Precision (X) indicates the total number of digits in the value. - Scale (Y) indicates the number of decimal or fractional digits in the value. If the number of decimal digits exceed beyond the configured value, the system truncates the additional decimal digits. - Number of digits before the decimal point must be less than or equal to X-Y. For example, - for a format defined as (4,2), the permissible value for the property is from -99.99 to +99.99. A value 100 for the property is invalid and an error message is written in the error log. - for a format defined as (4,2), few valid values are 0.34, 32.45, or 3.45. - for a format defined as (4,2), the value 123.4, 1234, or 100.1 is invalid. As a result, an error message is written in the error log. - for a format defined as (4,2), the value 1.23456 will be stored as 1.234 and a value 0.001 will be stored as 0.0 as the scale (Y) is defined as 2. The system truncates the additional decimal digits.
NumericFlexible	Float	No	i Note This is used to store 32 bit floating point values. Value range is -3.4E+38 to +3.4E+38

Value Data Type	Data Type	Length Mandatory	Value
ThingID	String This is used to store 32 character ThingID.	No	Default is 32 characters
BPID	String	No	Default is 32 characters
Timestamp	Timestamp Corresponds to UTC date and time (with a precision of 0.1 microseconds).	No	Value range is 0001-01-01 00:00:00 to 9999-12-31 23:59:59.9999999
DateTime	Date time Corresponds to UTC date and time (with seconds precision)	No	Values range is 0001-01-01 00:00:00 to 9999-12-31 23:59:59
Date	Date	No	Value range is 0001-01-01 to 9999-12-31
JSON	String	No	For a property set type of data category <i>TimeSeriesData</i> or <i>DerivedData</i>, the permissible string value can be up to 1024 characters. For a property set type of data category <i>MasterData</i> or <i>Parameters</i>, the permissible string value can be up to a size of 64K.
Boolean	Boolean	No	Values supported are true and false. Note You cannot change a Boolean data type to another data type and vice versa.

Value Data Type	Data Type	Length Mandatory	Value
ByteArray	ByteArray	No	Default length is 300 bytes.

i Note

Maximum permissible length is 1024 bytes.

Minimum permissible value is 0.

Maximum permissible value is 255.

Value Data Type	Data Type	Length Mandatory	Value
GeoJSON	JSON	No	You can only store latitude, longitude, and geometry type values. The first value in the coordinates represents the latitude and the second value represents the longitude.

i Note

- The only supported geometry type is Point.
- If you're subscribed to SAP IoT (one-product service plan), you can create time series data or derived data for a property of type GeoJSON, for example, using the Device Connectivity endpoints as described in the [Send Measures using REST](#) or [Send Measures using MQTT](#) topics.
- However, if you're subscribed to SAP Leonardo IoT (standard service plan), you can create time ser-

Value Data Type	Data Type	Length Mandatory	Value
			ies data or derived data for a property of type Geo-JSON only via data ingestion from SAP IoT services for SAP BTP for the Cloud Foundry Environment(Internet of Things Service). In both the cases you need to configure a Device Model property of data type String which needs to be mapped to the GeoJSON property.

Examples for Property Definition

Value Data Type	Payload Type	Example
Numeric: Integer	Configuration	<pre>"Properties": [{ "Name": "Pressure", "Type": "Numeric" }]</pre>
	Thing	<pre>{ "value": [{ "Pressure": 100, "time": "2015-08-01T09:00:00.000Z" }] }</pre>

Value Data Type	Payload Type	Example
Numeric: Decimal	Configuration	<pre>"Properties": [{ "Name": "Temperature", "Type": "Numeric", "PropertyLength": "4,2" }]</pre>
	Thing	<pre>{ "value": [{ "Temperature": 99.99, "_time": "2015-08-01T09:00:00.000Z" }] }</pre>
NumericFlexible	Configuration	<pre>"Properties": [{ "Name": "MachineReading", "Type": "NumericFlexible" }]</pre>
	Thing	<pre>"value": [{ "MachineReading": -3.4E+38, "_time": "2015-08-01T09:00:00.000Z" }]</pre>
Boolean	Configuration	<pre>"Properties": [{ "Name": "MachineRunningStatus", "Type": "Boolean" }]</pre>
	Thing	<pre>{ "value": [{ "MachineRunningStatus": true, "_time": "2015-08-01T09:00:00.000Z" }] }</pre>
String (without a specified length)	Configuration	<pre>"Properties": [{ "Name": "MachingID", "Type": "String" }]</pre>
	Thing	<pre>{ "value": [{ "MachineID": "6493474340414429B89B844B0758ACC5", "_time": "2015-08-01T09:00:00.000Z" }] }</pre>

Value Data Type	Payload Type	Example
String (with a specified length)	Configuration	<pre>"Properties": [{ "Name": "MachingID", "Type": "String", "PropertyLength": 60 }]</pre>
	Thing	<pre>{ "value": [{ "MachineID": "6493474340414429B89B844B0758ACC5", "_time": "2015-08-01T09:00:00.000Z" }] }</pre>
ThingID	Configuration	<pre>"Properties": [{ "Name": "MachingID", "Type": "ThingID" }]</pre>
	Thing	<pre>{ "value": [{ "MachineID": "6493474340414429B89B844B0758ACC5", "_time": "2015-08-01T09:00:00.000Z" }] }</pre>
BPID	Configuration	<pre>"Properties": [{ "Name": "ContanctPersonID", "Type": "BPID" }]</pre>
	Thing	<pre>{ "value": [{ "ContactPersonId": "6493474340414429B89B844B0758ACC5", "_time": "2015-08-01T09:00:00.000Z" }] }</pre>
Timestamp	Configuration	<pre>"Properties": [{ "Name": "timeReceived", "Type": "timestamp" }]</pre>

Value Data Type	Payload Type	Example
	Thing	<pre>{ "value": [{ "timeReceived": "2015-08-01T09:00:00.000Z", "_time": "2016-01-01T09:00:00.000Z" }] }</pre>
DateTime	Configuration	<pre>"Properties": [{ "Name": "timeReceived", "Type": "DateTime" }]</pre>
	Thing	<pre>{ "value": [{ "timeReceived": "2015-08-01T09:00:00Z", "_time": "2016-01-01T09:00:00.000Z" }] }</pre>
Date	Configuration	<pre>"Properties": [{ "Name": "dateReceived", "Type": "Date" }]</pre>
	Thing	<pre>{ "value": [{ "dateReceived": "2015-08-01", "_time": "2016-01-01T09:00:00.000Z" }] }</pre>
JSON	Configuration	<pre>"Properties": [{ "Name": "data", "Type": "JSON" }]</pre>

Value Data Type	Payload Type	Example
	Thing	<pre>{ "value": [{ "data": "{\n \"name\": \"machinepack-foobar\",\n \n \"description\": \"Interact with the foobar API; assign foos, list bars, etc.\",\n\n \"version\": \"0.0.1\",\n\n \"keywords\": [\"machinepack\", \"machines\"],\n\n \"dependencies\": { 'machine': '^1.2.0' }, \n\n \"machinepack\": {\n \"friendlyName\": \"Foobar\",\n \"machines \": [\n \"assign-foos\",\n \"list-bars\",\n \"add-something-to-whatever\",\n \"do-something- else\",\n \"list-other-things\"\n] ,\n \"machineDir\": \"machines/\"\n }\n }", "time": "2016-01-01T09:00:00.000Z" }] }</pre>
ByteArray	Configuration	<pre>"Properties": [{ "Name": "Byte1", "Type": "ByteArray", "PropertyLength": 100 }]</pre>
	TimeSeries	<pre>{ "value": [{ "Byte1": [0, 1, 2, 3, 100, 255] }] }</pre>
GeoJSON	Configuration	<pre>"Properties": [{ "Name": "geolocation", "Type": "GeoJSON" }]</pre>
	Thing	<pre>"geolocation": { "type": "Point", "coordinates": [78.47444, 17.37528] }</pre>

31 Value Helps

Describes the value help services available for SAP IoT.

i Note

Important: The value help services of SAP IoT are deprecated as of October 2021 and will be decommissioned in the future (details to be communicated as soon as possible). In case you've used any of the affected services in your applications based on SAP IoT, we recommend getting in touch with SAP support in order to find an alternative solution. The following services are affected:

- [ISO Language Codes \[page 1581\]](#)
- [Country Codes \[page 1583\]](#)

For SAP IoT, a number of generic services are available that provide lists of predefined values that can be used for various purposes within the platform, especially for the sake of providing value helps from which a user can pick the desired value. The following value help services are currently available:

- Countries
- Regions
- Languages
- Units of Measure
- Academic Titles
- Forms of Address

The following applies for all value help services:

- Each value entry is organized as a pair of an internal technical key and a descriptive value name in natural language. For the language, the system uses the following approach:
 1. Only languages that are explicitly mentioned in the relevant whitelist for the Cloud Foundry environment can be displayed, regardless of all other preconditions.
 2. If a value help service is called by an application running in a web browser, the system presents the value names in the language that has been defined in the browser settings.
 3. You can explicitly specify the desired language by adding an `Accept-Language` header parameter to the service call.
 4. If the browser language isn't available for a value help, or if a value help service is called by a backend application (that is, no web browser involved), the system falls back to English as the default language.The four ways of language determination are given with descending priority. That is, the system first checks the whitelist, then tries to deliver the required data according to the browser settings, then tries to fulfill the `Accept-Language` header, and finally (if all fails) falls back to English.

❖ Example

Let's assume the value help data in the system has been shipped in three languages, English, German, and French. When you call the value help service for languages, the language names are presented as follows, depending on the language determination conditions outlined above:

Language Value Help in Different Languages

ISO language code	Determined Display Language		
	English	German	French
en-EN	English	Englisch	Anglais
de-DE	German	Deutsch	Allemand
fr-FR	French	Französisch	Français

i Note

The language determination logic as outlined above as well as the given example can of course only work as described under the prerequisite that the necessary string resources are all present in the system. SAP starts the first generally available deliveries of SAP IoT with string resources in English only, followed by string resources in German, which have been released in late 2016. Further languages may follow in the future.

- The values contained in all value help services are offered in read-only mode. There is no way of modifying single values or extending the list of values.
- From a technical point of view, all value help services consist of a single HTTP GET method and return a collection of values. Picking a single value from the lists is only possible by applying a filter that restricts the service response to a single list entry.

i Note

There's one exception to this rule: In contrast to all other value help services, you request a single value with the UnitsOfMeasure service, for example, `/UnitsOfMeasure('KG')`.

If the desired unit of measure contains special characters that are not allowed in a URL, these characters must be masked. For example, to retrieve the percentage sign (%) from the database, you need to use the following syntax: `/UnitsOfMeasure('%25')`. Units of measure that contain a dash sign (for example, "m/s" for speed), need to be given with a double mask like this: `/UnitsOfMeasure('m%252Fs')`. Here, "%25" refers to the hexadecimal code of the percentage sign needed in the URL to indicate that another hexadecimal code is following, while "2F" is the hexadecimal code of the dash sign (ASCII code 47).

- All value help services are available throughout the entire system. That is, there's no tenant dependency for accessing these services.
- The value help services are called without parameters except for sorting and filtering. The only exception is the Regions service, which requires a country code as a parameter in order to restrict the list of regions returned to that country.
- None of the value help services do take any payload data in the HTTP request.

Base URI:

- Formal description: `http://<server address>[:<port number>][<path>]<value help service>`
- Example for a base URI in a cloud foundry environment: `http://business-partner.cfapps.neo.ondemand.com/<value help service>`

Permissions: `<bp>.r`, `<bp>.vh.r`

Note

Since the `<bp>.r` scope is the absolute minimum prerequisite for any user who is supposed to do productive work in the SAP IoT framework, this permission may be considered as always granted (but still must be explicitly assigned to a user).

Methods

HTTP Method	URI
GET	/Countries
GET	/Regions ('<countryCode>')
GET	/Languages
GET	/UnitsOfMeasure
	/UnitsOfMeasure ('<UoM>')
GET	/AcademicTitles
GET	/FormOfAddresses

Note

The formulation of the service names follows the common practice for collective requests by putting a plural-s at the end of the service name. Here, the UnitsOfMeasure service is an exception to this rule as the service name contains the plural-s at the linguistically correct position within this composite noun (that is, the plural-s follows the term "Unit" rather than the term "Measure").

Also, the UnitsOfMeasure service stands out of the other value helps with respect to the following feature: As you can see in the table above, the UnitsOfMeasure service can be requested with two different calling conventions:

- Collective GET request: `/UnitsOfMeasure`
- Single GET request: `/UnitsOfMeasure ('<UoM>')`

While the collective GET request works the same as all the other value help services, the single GET request for a particular unit of measure is in place to return the full record of data that is kept in the database for a particular unit of measure. These additional data comprises, for example, the number of decimals used for rounding, the dimension to which a unit of measure belongs (e.g., weight, length, speed), conversion factors, ISO code.

The predefined unit of measure values are available in the Thing Modeler app. You can choose one of the predefined values when you define the properties of a property set.

Request

URI: /<value help service>

HTTP Method: *GET*

Permissions:

<bp>.r (Country, Region, Language, Academic Title, Form Of Address)

<bp>.vh.r (only Units of Measure)

Query String Parameters

Name	Required	Data Type	Description
\$skip	No	integer	Number of the first n records to be excluded from the result set
\$top	No	integer	Number of records to include in the result set
\$orderby	No	string	Field name to be used for sorting the result set in ascending or descending order; for valid fields of the different value help services, see the table below.
\$filter	No	string	Filter condition to be applied; for valid fields of the different value help services, see the table below.

Valid Fields for Sorting and Filtering Value Help Result Lists

Value Help	Valid Fields
Country	isoCode
Region	countryIsoCode regionCode
Language	isoCode

Value Help	Valid Fields
Unit of Measure	unitOfMeasure noDecimalForRounding unitOfMeasureDimension numeratorForConversion denominatorForConversion baseTenExponentForConversion numberOfDecimalPlaces unitOfMeasureISOCODE isPrimaryUnitForISOCODEConversion additiveConstantForConversion baseTenExponentFloatDsip
Academic Title	academicTitleCode
Form of Address	formOfAddressCode

Request Example

```
/Regions('DE')
```

Retrieves all regions that are defined for the Federal Republic of Germany.

```
/Languages?$top=25&$orderby=isoCode
```

Retrieves the first 25 languages, sorted by the language ISO code.

Response

Response Status and Error Codes

Code	Description
200	Value list retrieved successfully

Related Information

[ISO Language Codes \[page 1581\]](#)

[Country Codes \[page 1583\]](#)

31.1 ISO Language Codes

List of supported language codes for SAP IoT

In the following table, you find the list of supported languages for SAP IoT and the corresponding ISO codes that you need to tell the system which language shall be used in a particular service request.

Note

Note that this list of languages is only meant as an overview of the language codes that SAP IoT can handle. It does of course **not** mean that all the texts or messages that may occur in the context of SAP IoT are already available in these languages, be it at design time or at runtime of the applications that you build on the basis of the services.

ISO Language Codes

Description	ISO Code
Afrikaans	af
Arabic	ar
Bulgarian	bg
Catalan	ca
Chinese	zh
Croatian	hr
Czech	cs
Danish	da
Dutch	nl
English	en
Estonian	et
Finnish	fi
French	fr
German	de
Greek	el
Hebrew	he
Hindi	hi

Description	ISO Code
Hungarian	hu
Icelandic	is
Indonesian	id
Italian	it
Japanese	ja
Korean	ko
Latvian	lv
Lithuanian	lt
Malaysian	ms
Norwegian	no
Polish	pl
Portuguese	pt
Romanian	ro
Russian	ru
Serbian	sr
Slovakian	sk
Slovenian	sl
Spanish	es
Swedish	sv
Thai	th
Turkish	tr
Ukrainian	uk
Vietnamese	vi

Related Information

[Value Helps \[page 1576\]](#)

31.2 Country Codes

List of supported country codes for SAP IoT.

In the following table, you find the list of supported countries for SAP IoT and the corresponding country codes (according to ISO 3166-1) that you need, for example, to provide the location of a particular business partner.

Countries and Regions

Most countries of the world have defined regions to further specify a particular part of the country. It depends on the political and administrative structure of each country to specify what exactly a region for a given country refers to. For example, in country DE (Federal Republic of Germany), the regions reflect the 16 federal states like Bavaria or Lower Saxony. The country codes returned by this value help service also serve as input parameters for the Regions service, which returns the set of regions that exist in a particular country.

i Note

The country codes as defined in this table are also needed for specifying the country-specific dialing prefix in the payload for communication data of persons and organizations.

Country Codes

Country/Region	Country Code
Afghanistan	AF
Åland Islands	AX
Albania	AL
Algeria	DZ
America	AS
American Minor Outlying Islands	UM
American Virgin Islands	VI
Andorra	AD
Angola	AO
Anguilla	AI
Antarctica	AQ
Antigua and Barbuda	AG
Argentina	AR
Armenia	AM

Country/Region	Country Code
Aruba	AW
Australia	AU
Austria	AT
Azerbaijan	AZ
Bahamas	BS
Bahrain	BH
Bangladesh	BD
Barbados	BB
Belarus	BY
Belgium	BE
Belize	BZ
Benin	BJ
Bermuda	BM
Bhutan	BT
Bolivia	BO
Bosnia and Herzegovina	BA
Botswana	BW
Bouvet Islands	BV
Brazil	BR
British Indian Ocean Territory	IO
British Virgin Islands	VG
Brunei Darussalam	BN
Bulgaria	BG
Burkina Faso	BF
Burma	MM
Burundi	BI

Country/Region	Country Code
Cambodia	KH
Cameroon	CM
Canada	CA
Cape Verde	CV
Cayman Islands	KY
Central African Republic	CF
Chad	TD
Chile	CL
China	CN
Christmas Island	CX
Coconut Islands	CC
Colombia	CO
Comoros	KM
Cook Islands	CK
Costa Rica	CR
Côte d'Ivoire	CI
Croatia	HR
Cuba	CU
Curaçao	CW
Cyprus	CY
Czech Republic	CZ
Democratic Republic of the Congo	CD
Denmark	DK
Djibouti	DJ
Dominica	DM
Dominican Republic	DO

Country/Region	Country Code
East Timor	TL
East Timor (deprecated)	TP
Ecuador	EC
Egypt	EG
El Salvador	SV
Equatorial Guinea	GQ
Eritrea	ER
Estonia	EE
Ethiopia	ET
Falkland Islands	FK
Faroe Islands	FO
Fiji	FJ
Finland	FI
France	FR
French Guyana	GF
French Polynesia	PF
French Southern and Antarctic Lands	TF
Gabon	GA
Gambia	GM
Georgia	GE
Germany	DE
Ghana	GH
Gibraltar	GI
Greece	GR
Greenland	GL
Grenada	GD

Country/Region	Country Code
Guadeloupe	GP
Guam	GU
Guatemala	GT
Guernsey (Channel Islands)	GG
Guinea	GN
Guinea-Bissau	GW
Guyana	GY
Haiti	HT
Heard and McDonald Islands	HM
Honduras	HN
Hong Kong	HK
Hungary	HU
Iceland	IS
India	IN
Indonesia	ID
Iran	IR
Iraq	IQ
Ireland	IE
Isle of Man	IM
Israel	IL
Italy	IT
Jamaica	JM
Japan	JP
Jersey	JE
Jordan	JO
Kazakhstan	KZ

Country/Region	Country Code
Kenya	KE
Kiribati	KI
Kuwait	KW
Kyrgyzstan	KG
Laos	LA
Latvia	LV
Lebanon	LB
Lesotho	LS
Liberia	LR
Libya	LY
Liechtenstein	LI
Lithuania	LT
Luxembourg	LU
Macau	MO
Macedonia	MK
Madagascar	MG
Malawi	MW
Malaysia	MY
Maldives	MV
Mali	ML
Malta	MT
Marshall Islands	MH
Martinique	MQ
Mauritania	MR
Mauritius	MU
Mayotte	YT

Country/Region	Country Code
Mexico	MX
Micronesia	FM
Moldova	MD
Monaco	MC
Mongolia	MN
Montenegro	ME
Montserrat	MS
Morocco	MA
Mozambique	MZ
Namibia	NA
Nauru	NR
Nepal	NP
Netherlands	NL
New Caledonia	NC
New Zealand	NZ
Nicaragua	NI
Niger	NE
Nigeria	NG
Niue	NU
Norfolk Islands	NF
North Korea	KP
North Mariana Islands	MP
Norway	NO
Oman	OM
Pakistan	PK
Palau	PW

Country/Region	Country Code
Palestine	PS
Panama	PA
Papua New Guinea	PG
Paraguay	PY
Peru	PE
Philippines	PH
Pitcairn Islands	PN
Poland	PL
Portugal	PT
Puerto Rico	PR
Qatar	QA
Republic of the Congo	CG
Reunion	RE
Romania	RO
Russian Federation	RU
Rwanda	RW
Saba	BQ
Saint Helena	SH
Saint Kitts and Nevis	KN
Samoa	WS
San Marino	SM
Sao Tome and Principe	ST
Saudi Arabia	SA
Senegal	SN
Serbia	RS
Serbia and Montenegro	CS

Country/Region	Country Code
Seychelles	SC
Sierra Leone	SL
Singapore	SG
Sint Maarten (Dutch part)	SX
Slovakia	SK
Slovenia	SI
Solomon Islands	SB
Somalia	SO
South Africa	ZA
South Georgia and the Southern Sandwich Islands	GS
South Korea	KR
South Sudan	SS
Spain	ES
Sri Lanka	LK
St. Lucia	LC
Saint Martin (French part)	MF
St. Pierre and Miquelon	PM
St. Vincent and the Grenadines	VC
Sudan	SD
Suriname	SR
Svalbard	SJ
Swaziland	SZ
Sweden	SE
Switzerland	CH
Syria	SY
Taiwan	TW

Country/Region	Country Code
Tajikistan	TJ
Tanzania	TZ
Thailand	TH
Togo	TG
Tokelau Islands	TK
Tonga	TO
Trinidad and Tobago	TT
Tunisia	TN
Turkey	TR
Turkmenistan	TM
Turks and Caicos Islands	TC
Tuvalu	TV
Uganda	UG
Ukraine	UA
United Arab Emirates	AE
United Kingdom	GB
Uruguay	UY
USA	US
Uzbekistan	UZ
Vanuatu	VU
Vatican City	VA
Venezuela	VE
Vietnam	VN
Wallis and Futuna Islands	WF
West Sahara	EH
Yemen	YE

Country/Region	Country Code
Zambia	ZM
Zimbabwe	ZW

Related Information

[Value Helps \[page 1576\]](#)

32 HTTP Status Codes

List of status codes for SAP IoT

Status Codes

In the following table, you find the list of HTTP status codes that are used by SAP IoT:

HTTP Status Codes

Post	Put	Delete	Get (single value)	Get (collection)	Description
201	200	204	200	200	Success
n/a	404	404	404	n/a	Not found
n/a	409	409	n/a	n/a	Conflict (If-Match condition failed)
403	403	403	403	403	Forbidden (insufficient authorization)
400	400	400	400	400	Bad request (for example: header field missing, wrong filter, validation failed)
Various error codes					Not allowed
500	500	500	500	500	Internal server error

The different response codes used by SAP IoT can be grouped into three categories that differ with respect to the question of whether a user action is required or not:

Response Code Categories

Number Range	Category	User Action
200..299	Success	No action required
400..499	Client-side error	Error can be solved by ensuring valid and correct call parameters.

Number Range	Category	User Action
500..599	Server-side error	Error occurred on server backend system. Call the system administrator for support.

Tracking Errors by Correlation ID

Whenever an error occurs during the execution of an application that is based on the API services described in this reference, you will notice that by either seeing one of the error codes listed above in your browser, or by finding that error code in the error logs that have been recorded for your application. The problem here, however, is that the activity that actually triggered the error message may only accidentally be responsible for the error to occur. It is much more likely that this final step only unveiled a problem for which the root cause may be hidden in any of the numerous software layers or instances, or be limited to a certain physical machine in your system landscape on which the code was executed. Because of the complexity of common system landscapes it must be counted as the rule rather than an exception that the root cause of an error is typically hard to trace back.

To overcome the problem of tracing back well-hidden root causes for the problems that may appear on the surface, SAP has implemented a tracking mechanism that gives service departments a chance to find their way from the surface down to the ground from where an error originated. This is accomplished by attaching an individual ID to each service request. The system architecture can then make sure that the attached ID is handed over from one service to another. As a result, all service requests that are involved in the execution of a particular task can be identified by their ID (that is, all services in the call stack that are involved in that task carry the same ID). With that, an administrator can easily identify the relevant requests and filter out all the noise that stems from other, unrelated system activities.

Solution

To overcome the problem of identifying the root cause for a problem that has occurred during execution of your application, proceed as follows:

1. We recommend that in your project, you have included a library that enables you to record the correlation ID in your error logs. Here are some examples of open-source libraries that you might want to use:
 - Java applications: <https://github.com/SAP/cf-java-logging-support>
 - NodeJS applications: <https://github.com/SAP/cf-nodejs-logging-support>
2. Whenever you call a service in your application, make sure that the following HTTP header parameter is passed along with the request: `X-CorrelationID`
3. Before actually sending the request, assign a unique value to the `X-CorrelationID` parameter (for example a combination of a timestamp and a random number).

As a result, the `X-CorrelationID` with the assigned individual value is automatically passed on to all subsequent service requests so that an administrator can easily isolate the complete request chain for further investigations.

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