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SAP Market Rates Management, Bring Your Own Rates data option

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1 What is Market Rates, Bring Your Own Rates

Upload, download, and distribute your own market data in your landscapes.

The SAP Market Rates Management, Bring Your Own Rates data option allows you to upload and download your own market rates licensed from third party data providers. It includes upload and download APIs that enable you to upload and download market data in a format compatible with an SAP S/4HANA system. You can distribute the downloaded rates in all connected systems in your landscape. The application supports 12 market data types.

You specify a unique code for each market data type in the payloads.

You can upload and download up to 1,500 records at a time (in one request) and 300,000 records per [global account](#). A global account can make up to 6,000 upload and download requests (respectively), per month. If you get an internal server error as a response to a request, that request will not be counted as a valid request and, therefore, will not be subtracted from your total quota.

i Note

This guide describes the features of the default plan of SAP Market Rates Management, Bring Your Own Rates.

SAP Market Rates Management, Bring Your Own Rates provides also a free plan. For more information, see [Free Plan \[page 5\]](#). The free plan doesn't support all of the features that are included in the default plan.

Environment

This service runs in the Cloud Foundry environment.

Features

Bring Your Own Rates	Upload market rates from your own sources and download them in the SAP S/4HANA or JSON format.
Upload Once to Download Many Times	Upload your market rates once and manage your downloads by using SAP S/4HANA. Multiple SAP S/4HANA on-premise or cloud instances can download data from the application at the same time.
Add Up To 12 Data Types	Upload up to 12 market data types using a single upload API and download any or all market rates using one download API.

Use the Manage Market Rates Application	Read, query, and delete your market data information by using the Manage Market Rates application. Sort through market data categories, and view records for each category.
Access Business Logging	Access business messages about your market data uploads, downloads, and delete operations.

Restrictions

- If you make a call with a date range specified, you must wait until that request is processed before making another call with date ranges, whether or not they are for latest rates or other date ranges. Daily calls with no dates will work concurrently.
- To download data from SAP S/4HANA systems, ensure that the `<key1>` and `<key2>` fields combined do not exceed 15 characters while you upload data.
- The tilde (~) and the colon (:) are reserved characters. Do not use these characters in your upload payloads.
- If a market data type contains values for both the `key1` and `key2` fields, the download request must be written in the following format: `<key1>~<key2>:<market data category>`. If the request does not have a `key2` field, the format must be as follows: `<key1>:<market data category>`. To see code samples for individual market data types, see [Market Data Types \[page 22\]](#).

Related Information

[Free Plan \[page 5\]](#)

You can use a free version for the SAP Market Rates Management, Bring Your Own Rates.

1.1 Free Plan

You can use a free version for the SAP Market Rates Management, Bring Your Own Rates.

SAP Market Rates Management, Bring Your Own Rates provides a free plan that allows you to upload and download your own market data licensed from third party data providers. It includes upload and download APIs that enable you to upload and download market data in a format compatible with an SAP S/4HANA system. You can distribute the downloaded rates in all connected systems in your landscape. The free plan supports exchange rates market data.

You can upload and download up to 100 records at a time within one request and 1200 records per global account. A global account can make up to 100 upload and download requests per month. If you receive an internal server error as a response to a request, then this request will not be counted as a valid request and, therefore, will not be subtracted from your total quota.

Compare the Features Included in the Free Plan and in the Default Plan

The following features included in the free plan are limited compared to the default plan:

Feature	Free Plan	Default Plan
Market data types	Only exchange rates are supported	12 market data types [page 22] including exchange rates are supported.
Records: Upload / download limit per month	100 records	No restrictions
Requests: Upload / download limit per month	100 requests	6000 requests
Storage limit per global account	1200 records	300,000 records
Manage market rates with the Manage Market Rates SAP Fiori app	Not available	Available
Alerts and notifications	Not available	Available

Related Information

[Global Accounts](#)

2 What's New for Market Rates, Bring Your Own Rates

2021

Capability	Environment	Title	Description	Type	Available as of (YYYY-MM-DD)
Rates and Measures	Cloud Foundry	Free plan	The free plan allows you to upload and download your own market data licensed from third party data providers. It includes upload and download APIs that enable you to upload and download market data in a format compatible with an SAP S/4HANA system. For more information, see Free Plan [page 5] .	New	2021-07-01

2020

Capability	Environment	Title	Description	Type	Available as of (YYYY-MM-DD)
Rates and Measures	Cloud Foundry	Alerts and Notifications for Data Upload	You can now receive alerts and notifications to check whether your market data uploads have been successful. To do this, you must provision the SAP Alert Notification service. For more information, see .	New	2020-04-27

2019

Capability	Environment	Title	Description	Type	Available as of (YYYY-MM-DD)
Rates and Measures	Cloud Foundry	New market data categories added: Exchange Rate Volatilities, Securities, Interest Rates, Volatilities, and Indexes.	Five new market data categories have been added. You can find code examples for it in the Code Samples [page 33] section.	New	2019-11-14
Rates and Measures	Cloud Foundry	Delete capability added for the Manage Market Rates application.	You can now delete records by using the Manage Market Rates application.	Changed	2019-08-14
Rates and Measures	Cloud Foundry	UI for Managing Market Rates.	The Manage Market Rates application has been added. It allows you to view, query, and delete market data. Record details for each market data category are shown. You can drill down to the individual record and see its details. For more information, see Using the Manage Market Rates Application [page 77] .	New	2019-05-14

2018

Capability	Environment	Title	Description	Type	Available as of (YYYY-MM-DD)
Rates and Measures	Cloud Foundry	Support for more market data categories added	You can now use the data option to upload and download market data for several market data categories. For more information, see Market Data Types [page 22] and Code Samples [page 33] .	New	2018-10-29

3 Accessibility Features in Market Rates, Bring Your Own Rates

To optimize your experience of SAP Market Rates Management, Bring your Own Rates data option, the following features and settings help you use the software efficiently.

i Note

Market Rates, Bring Your Own Rates is based on SAPUI5. For this reason, accessibility features for SAPUI5 also apply. See the accessibility documentation for SAPUI5 on SAP Help Portal at [Accessibility for End Users](#).

For more information on screen reader support and keyboard shortcuts, see [Screen-Reader Support for SAPUI5 Controls](#) and [Keyboard Handling for SAPUI5 Elements](#).

4 Initial Setup

i Note

The following sections assume that you have purchased the SAP Market Rates Management, Bring Your Own Rates data option on the SAP Store or by using a sales order.

You can get started with the Bring Your Own Rates data option by using the standard procedures for the Cloud Foundry environment.

Prerequisites

You have set up your global account and subaccount on SAP BTP. For an overview of the required steps, see [Getting Started with a Customer Account: Workflow in the Cloud Foundry Environment](#) in the SAP BTP documentation.

Procedure For Initial Setup

These are the configuration steps that have to be carried out in order to set up the integration between SAP S/4HANA Cloud and SAP Business Technology Platform (SAP BTP). The settings are to be made in the SAP S/4HANA Cloud.

Assigning Entitlements

To start using the data option's APIs, you must first assign entitlements to your subaccount. For more information, see [Assign Entitlements to Subaccounts](#). You can find the *MRM - Bring Your Own Rates* tile on the service marketplace.

Creating a Space in Subaccount

You are already a member of an organization and have the Organization Manager role. You create a space to enable users to develop and maintain applications.

1. Go to your [Subaccount](#).
2. Navigate to [Spaces](#).
3. On the [Spaces](#) screen, choose [New Space](#).

4. Provide the following details:

User Interface Element	Description
Space Name	Provide a name for the space. This field is mandatory.
Assign space roles	This is a self-service option for assigning one or all of the roles. You need to have these roles to perform space-related tasks.

The new space is created.

Creating a Service Instance and Service Key via Password

To use the data option, you must create a service instance for either the default plan or the free plan. You can create a service key to communicate directly with the service instance.

1. Create an instance of the Bring Your Own Rates data option service.
2. Create a service key.
3. Get the `uploadURL`, `downloadURL`, `client_id`, and `client_secret` from the service key. You can view a sample collection on the SAP Market Rates Management, Bring Your Own Rates data option [product page](#).

Setting Up Authentication with x509 Certificates (optional)

As an alternative to authentication with the `client_id` and `client_secret` from the service key, you can set up the authentication with x509 certificates.

To use the Bring Your Own Rates data option and authenticate using x509, you need to get the required key, certificate, and base URLs. These are provided when you create an instance of the Bring Your Own Rates data option service and a service key for the instance.

When you create the service key, provide the following object as input:

```
{
  "xsuaa": {
    "credential-type": "x509",
    "x509": {
      "key-length": 2048, // specifies the byte length of the generated private
key, // defaults to 2048
      "validity": 7, // specifies the number of time units in validity-type,
// defaults to 7, thus the complete validity defaults to 7
days
      "validity-type": "DAYS" // specifies the validity time unit,
// only DAYS, MONTHS and YEARS are supported,
// defaults to DAYS
    }
  }
}
```

This is an example of the JSON input for credential type "x509" in the service key:

Sample Code

```
{
  "xsuaa": {
    "credential-type": "x509",
    "x509": {
      "key-length": 2048,
      "validity": 7,
      "validity-type": "DAYS"
    }
  }
}
```

Extract the following information from the binding / service key:

- clientid
- certurl
- key
- certificate
- uploadURL
- downloadURL

Save the `certificate` and `key` values in a `cert.pem` and `key.pem` files.

Note

- If the `certificate` and `key` values contain the new line string `"\n"`, you must replace each one with a real new line `\n`. Example using the `awk` command:

```
awk '{gsub(/\n/, "\n")}1' cert.pem
```

This will output the edited value to your terminal to be copied and pasted back to the file.

- Unbinding or deleting the service key will result in the certificate stopping to working immediately.

To authenticate your requests, you need to get an **OAuth token** to use in each API call. Execute this request using the parameters you acquired from the service key:

```
curl --cert cert.pem --key key.pem -XPOST <certurl>/oauth/token -d
'grant_type=client_credentials&client_id=<clientid>'
```

The required token is acquired in the **"access_token"** field.

Note

The consumption limit for the Bring Your Own Rates data option is 300,000 records per global account for the default plan and 1,200 records per global account for the free plan. To help manage this consumption quota, market rates are deleted after 90 days by default. However, you can increase or decrease this time period by adjusting the retention period using the MRM - Configure Default Values app.

Related Information

[Uploading Rates \[page 14\]](#)

[Setting Up Roles and Authorizations \(BYOR\) \[page 19\]](#)

[Set Up Connectivity \[page 21\]](#)

[Creating Service Instances](#)

[Creating Service Keys](#)

4.1 Uploading Rates

Market data can be obtained from various sources like banks, stock exchanges, and third party aggregators. These sources export data in their own formats. You can upload market rates from any source to the SAP Market Rates Management, Bring Your Own Rates data option APIs. To use this data within the SAP S/4HANA system, you must convert the rates into the JSON or text/csv format.

i Note

The system from which you upload market data must support OAuth and HTTPS calls.

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Upload Rates in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>
```

Headers

```
Authorization: Bearer <Previously generated JWT.>  
Content-Type: text/csv
```

Body

```
Y001,BYOR,01,EUR,INR,CMID,2018-10-12,00:00:00,82.121  
Y001,BYOR,02,BOND123,NYSE,03,2018-10-12,00:00:00,1.02  
Y001,BYOR,03,EURIBOR1MD,,IMID,2018-10-12,00:00:00,1.101  
Y001,BYOR,10,CC_0001,MONTH_03,MID,2018-10-12,00:00:00,550  
Y001,BYOR,09,CZK3M6M01Y,,ASK,2018-10-12,00:00:00,1.5  
Y001,BYOR,21,EUR,CNY,C,2018-10-12,00:00:00,1.101,,,,,30  
Y001,BYOR,04,DAX,,1,2018-10-12,00:00:00,20000  
Y001,BYOR,30,FX_VOL_MN,FX_120,1,2018-10-12,00:00:00,1.02  
Y001,BYOR,31,EUR,JPY,1,2018-10-12,00:00:00,1.06,,,,,30
```

```

Y001,BYOR,32,EBT_BOND,,1,2018-10-12,00:00:00,1.02,,,,,30
Y001,BYOR,33,EURIBEUR12,,002,2018-10-12,00:00:00,2.02,,,,,60
Y001,BYOR,34,DAX,,1,2018-10-12,00:00:00,2.05,,,,,60

```

The following is a sample CSV structure:

Sample Upload Rates

Data Provider	Data Source	Market Data Category	Key1	Key2	Market Data Property	Effective Date	Effective Time	Market Data Value	Security Currency	From Factor	To Factor	Price Quotation	Additional Key	Status	Message
Y001	BYOR	01	EUR	INR	CMID	2018-10-12	00:00:00	82.121							
Y001	BYOR	02	BOND123	NYSE	03	2018-10-12	00:00:00	1.02							

Upload Rates in the JSON Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT you previously generated.>
  Content-Type: application/json
Body
  [
    {
      "providerCode": "Y001",
      "marketDataSource": "BYOR",
      "marketDataCategory": "01",
      "key1": "EUR",
      "key2": "INR",
      "marketDataProperty": "CMID",
      "effectiveDate": "2018-10-12",
      "effectiveTime": "00:00:00",
      "marketDataValue": 82.121,
      "securityCurrency": null,
      "fromFactor": null,
      "toFactor": null,
      "priceQuotation": null,
      "additionalKey": null
    },
    {
      "providerCode": "Y001",
      "marketDataSource": "BYOR",
      "marketDataCategory": "02",
      "key1": "BOND123",
      "key2": "NYSE",
      "marketDataProperty": "03",
      "effectiveDate": "2018-10-12",
      "effectiveTime": "00:00:00",
      "marketDataValue": 1.02,

```

```

    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "03",
    "key1": "EURIBOR1MD",
    "key2": "",
    "marketDataProperty": "IMID",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "10",
    "key1": "CC_0001",
    "key2": "MONTH_03",
    "marketDataProperty": "MID",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 550,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "09",
    "key1": "CZK3M6M01Y",
    "key2": "",
    "marketDataProperty": "ASK",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.5,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "21",
    "key1": "EUR",
    "key2": "CNY",
    "marketDataProperty": "C",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
  }

```



```

    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "04",
    "key1": "DAX",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 20000,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "30",
    "key1": "FX_VOL_MN",
    "key2": "FX_120",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "31",
    "key1": "EUR",
    "key2": "JPY",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.06,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "32",
    "key1": "EBT_BOND",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",

```

```

    "marketDataSource": "BYOR",
    "marketDataCategory": "33",
    "key1": "EURIBEUR12",
    "key2": "",
    "marketDataProperty": "002",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 2.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "60"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "34",
    "key1": "DAX",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 2.05,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "60"
  }
]

```

Field Descriptions for Upload Rates

Field	Description
<i>Data Provider</i>	The market data provider from whom you are fetching your data, for example, the European Central Bank or Thomson Reuters.
<i>Data Source</i>	The direct source from which your data provider gets their market data, for example, NYSE.
<i>Market Data Category</i>	The identifier for the type of market data. For example, 01 for exchange rates, 03 for interest rates, and so on.
<i>Key1</i>	Use as a Placeholder1 for a key you can assign to a market data type. For example, the <From> currency type when you are using the exchange rates data type, or <Reference Interest Rates> when you are using the interest rates data type.
<i>Key2</i>	Use as a Placeholder2 for a key you can assign to a market data type. It is usually the <To> currency type for when you are using a currency exchange transaction. When you are making a call for interest rates, this field is empty.

Field	Description
<i>Market Data Property</i>	The specific kind of market data that you are requesting. For example, <CMID> is the midday value for currency data.
<i>Effective Date</i>	The effective date on which the market data value is valid.
<i>Effective Time</i>	The effective time from which the market data value is valid. The time zone must be GMT.
<i>Market Data Value</i>	The actual value of the market data.
<i>Security Currency</i>	The currency information for security prices.
<i>From Factor</i>	The translation ratio used in currency conversion for the <From> currency. For more information on translation ratios, see Translation Ratios for Currencies .
<i>To Factor</i>	The translation ratio used in currency conversion for the <To> currency.
<i>Price Quotation</i>	The type of quotation you want to use for your currency exchange transactions. You can use either direct or indirect quotations. For more information, see Direct and Indirect Quotation for Exchange Rates .
<i>Additional Key</i>	Additional information for some instruments, for example, <Term In Days> for volatilities.

4.2 Setting Up Roles and Authorizations (BYOR)

To use the Manage Market Rates application, you must first subscribe to the [SAP Market Rates Management](#) data option by accessing the [Market Rates Management](#) tile and choosing *mrwr* plan. For the full procedure, see [Subscribe to Multitenant Business Applications in the Cloud Foundry Environment Using the Cockpit](#).

User Mangement

This section describes how to configure user management for your application. As a prerequisite, you have created business users and user groups in your identity provider (IdP). SAP ID service is configured as the default IdP, but you can also add your instance of Identity Authentication service or a different IdP.

If you use the Identity Authentication service, you can find more information in the SAP BTP documentation under [Manually Establish Trust and Federation Between UAA and Identity Authentication](#).

If you use a different IdP, you can find more information under [Establish Trust and Federation with UAA Using Any SAML Identity Provider](#).

Defining and Bundling Roles

Market Rates, Bring Your Own Rates provides the following role templates.

Role Collection	Application Identifier	Role Template	Description	Role	Tiles on SAP Fiori Launchpad
Any name of your choice.	Choose the value that contains <i>market-rates-ux</i> from the drop-down.	MarketRatesDisplay	This role provides read access.	Same as the <i>Role Template</i> or any name of your choice.	Manage Market Rates
Any name of your choice	Choose the value that contains <i>market-rates-ux</i> from the drop-down.	MarketRatesDelete	This role provides read and delete access.	Same as the <i>Role Template</i> or any name of your choice.	Manage Market Rates
Any name of your choice	N/A	Business_Process_Specialist_BI_AccessAll	This role provides read access to business messages pertinent to your market rates.	Same as the <i>Role Template</i> or any name of your choice.	Monitor Business Logs
Any name of your choice.	Choose the value that contains <i>market-rates-ux</i> from the drop-down.	ConfigurationRead	This role provides read access.	Same as the <i>Role Template</i> or any name of your choice.	MRM - Configure Default Values
Any name of your choice	Choose the value that contains <i>market-rates-ux</i> from the drop-down.	ConfigurationEdit	This role provides read and edit access.	Same as the <i>Role Template</i> or any name of your choice.	MRM - Configure Default Values

If the role template doesn't have any attributes, then the corresponding roles are identical to the role templates and are created automatically. If the role template has one or more attributes, you must create roles based on the role templates and provide the attribute values.

As a prerequisite for assigning roles to IdP users or user groups, you also need to configure role collections. A role collection consists of one or more roles from one or more applications and can be used to bundle authorizations within and across applications.

For more information about how to create roles and how to bundle them in role collections using the SAP BTP cockpit, see [Building Roles and Role Collections for Applications](#).

Assigning Role Collections to Users

In the SAP BTP cockpit, you must assign role collections to IdP users or user groups. As a prerequisite, users and user groups must have been created in the Identity Authentication service or another IdP.

i Note

If you use the SAP ID service, you assign role collections to individual users. If you use the Identity Authentication service or another IdP, you assign them either to individual users or to user groups.

For more information about how to assign role collections to users or user groups using the SAP BTP cockpit, see [Assigning Role Collections](#).

4.3 Set Up Connectivity

You can connect the SAP Market Rates Management, Bring Your Own Rates data option service to an SAP S/4HANA or SAP S/4HANA Cloud system.

Connecting to an SAP S/4HANA System

Implement the configurations described in the [SAP Note 2431370](#). All the steps required to connect to the download API are described in the SAP Note. Once you implement it, there are no additional configurations needed.

Connecting to an SAP S/4HANA Cloud System

Ensure that you complete the set-up instructions in the *Details* section as listed in the [Best Practices Explorer](#).

i Note

You must be logged in to see this content.

1. Ensure that you have the user role that contains the business catalog `SAP_CORE_BC_COM` for communication management.
2. Ensure that you have obtained the `<downloadUrl>`, `<clientId>`, `<clientSecret>`, and `<URL>` information from the service key.
3. [Maintain the communication user](#). You need this for inbound communication and message processing in the system.
4. [Maintain communication arrangements](#). Ensure that you enter the `<downloadUrl>` when required.
5. [Maintain communication systems](#). Ensure that you copy the `<clientId>`, `<clientSecret>`, and `<URL>` information into the communication system.
6. Maintain market data types as described in [Datafeed](#).

5 Market Data Types

The Market Rates, Bring Your Own Rates provides you with support for 12 market data types. They are as follows:

- Exchange Rates
- Securities
- Interest Rates
- Credit Spreads
- Basis Spreads
- Forex swap rates
- Indexes
- General volatilities (volatilities with moneyness)
- Exchange rates volatilities
- Security price volatilities
- Interest rate volatilities
- Index volatilities

i Note

The free plan supports only exchange rates.

Market Data Codes

Each market data type is identified by a unique code in the download request payload. The following table provides a list of the data type codes you must use.

Market Data Codes

Market Data Category	Market Data Code for JSON or CSV Transactions
Exchange Rates	01
Securities	02
Interest Rates	03
Indexes	04
Basis Spread	09
Credit Spread	10
Forex Swap Rates	21
General Volatilities (Volatilities with Moneyness)	30
Exchange Rate Volatilities	31

Market Data Category	Market Data Code for JSON or CSV Transactions
Security Price Volatilities	32
Interest Rate Volatilities	33
Index Volatilities	34

Field Descriptions for Upload Payloads

Field Descriptions for Upload Rates

Field	Description
<i>Provider Code</i>	The market data provider from whom you are fetching your data, for example, the European Central Bank or Thomson Reuters.
<i>Data Source</i>	The direct source from which your data provider gets their market data, for example, NYSE.
<i>Market Data Category</i>	The identifier for the type of market data. For example, 01 for the exchange rates data type, 03 for interest rates data type, and so on.
<i>Key1</i>	Use this as Placeholder1 for a key you can assign to a market data type. This is usually the <From> currency type for when you are using a currency exchange transaction.
<i>Key2</i>	Use this as Placeholder2 for a key you can assign to a market data type. This is usually the <To> currency type for when you are using a currency exchange transaction. When you are making a call for interest rates, this field is empty.
<i>Market Data Property</i>	The specific kind of market data you are requesting. For example, <CMID> is the midday value for currency data.
<i>Effective Date</i>	The effective date on which the market data value is valid.
<i>Effective Time</i>	The effective time from which the market data value is valid
<i>Market Data Value</i>	The actual value of the market data.
<i>Security Currency</i>	The currency information for security prices.
<i>From Factor</i>	The translation ratio used in currency conversion for the <From> currency. For more information on translation ratios, see Translation Ratios for Currencies .

Field	Description
<i>To Factor</i>	The translation ratio used in currency conversion for the <To> currency.
<i>Price Quotation</i>	The type of quotation you want to use for your currency exchange transactions. You can use either direct or indirect quotations. For more information, see Direct and Indirect Quotation for Exchange Rates .
<i>Additional Key</i>	Additional information that you can provide for some data types. The following is a list of the supported data types and their corresponding additional keys. <ul style="list-style-type: none"> • Securities - Price Notation • Forex Swap Rates - Term in Days • Exchange Rate Volatilities - Term in Days • Security Price Volatilities - Term in Days • Interest rate Volatilities - Term in Days • Index Volatilities - Term in Days

Field Descriptions for TBD4 Data

The following table contains descriptions for fields in both request and response bodies. The length of each component is important, which makes the spacing of the request and response bodies relevant.

Field Descriptions for TBD4 Data

Field Name	Example	Definition	Length
<i>Instrument Name</i>	EUR~INR:01	Market data category: 01 Key1: EUR Key2: INR	20
<i>Data Source</i>	ECB	The source of the market data.	15
<i>Instrument Property</i>	C	The market data property or value.	15
<i>Historical Data Start Date</i>	20180324	The <From> date in the request.	8
<i>Historical Data Start Time</i>	000000	The <From> time in the request.	6

Field Name	Example	Definition	Length
<i>Historical Data End Date</i>		The <To> date in the request.	8
<i>Historical Data End Time</i>	000000	The <To> time in the request.	6
<i>SAP User</i>	<SAPUSERNAME>	Your SAP username.	12
<i>Status</i>	E	The status of your request after it is processed. For example, <Error>, <Warning>, or <Success>.	2
<i>Message</i>	Your request was not processed.	The message associated with the Status field explaining the nature or reasons for the given status.	80
<i>Supplier ID</i>		The supplier ID for your request.	10
<i>Contributor Identification</i>			10
<i>Contributor Country Identification</i>			
<i>Effective Date</i>	DDMMYYYY		8
<i>Effective Time</i>	HHMMSS		6
<i>Value</i>	12345678.2345	The actual value of the market data.	20
<i>Security Currency</i>	<SCURR>	The currency information for security prices.	5
<i>Market Indicator</i>	MINDC	The market indicator for security prices.	5
<i>From Factor</i>	<FFACTOR>		7
<i>To Factor</i>	<TFACTOR>		7
<i>User Name</i>			12
<i>Number of Days</i>		An additional key field that you might have requested, for example, the number of days for the <Volatilities> field.	10

6 Developing Applications Using the Service

You can consume the SAP Market Rates Management, Bring Your Own Rates data option application by using the `TBD4` transaction in SAP S/4HANA On-Premise systems, or within the *Import Market Data* application on SAP S/4HANA Cloud. The SAP S/4HANA system communicates with the service in a text or HTML format that is referred to the TBD4 format for the request and response service. To know learn about this transaction, see [Datafeed](#).

Related Information

[Uploading Rates \[page 26\]](#)

[Downloading Rates \[page 32\]](#)

[Deleting Records \[page 32\]](#)

[Code Samples \[page 33\]](#)

[Consuming the Service at Application Runtime \[page 76\]](#)

6.1 Uploading Rates

Market data can be obtained from various sources like banks, stock exchanges, and third party aggregators. These sources export data in their own formats. You can upload market rates from any source to the SAP Market Rates Management, Bring Your Own Rates data option APIs. To use this data within the SAP S/4HANA system, you must convert the rates into the JSON or text/csv format.

i Note

The system from which you upload market data must support OAuth and HTTPS calls.

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Upload Rates in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <Previously generated JWT.>
  Content-Type: text/csv
Body
Y001,BYOR,01,EUR,INR,CMID,2018-10-12,00:00:00,82.121
Y001,BYOR,02,BOND123,NYSE,03,2018-10-12,00:00:00,1.02
Y001,BYOR,03,EURIBOR1MD,,IMID,2018-10-12,00:00:00,1.101
Y001,BYOR,10,CC_0001,MONTH_03,MID,2018-10-12,00:00:00,550
Y001,BYOR,09,CZK3M6M01Y,,ASK,2018-10-12,00:00:00,1.5
Y001,BYOR,21,EUR,CNY,C,2018-10-12,00:00:00,1.101,,,,,30
Y001,BYOR,04,DAX,,1,2018-10-12,00:00:00,20000
Y001,BYOR,30,FX_VOL_MN,FX_120,1,2018-10-12,00:00:00,1.02
Y001,BYOR,31,EUR,JPY,1,2018-10-12,00:00:00,1.06,,,,,30
Y001,BYOR,32,EBT_BOND,,1,2018-10-12,00:00:00,1.02,,,,,30
Y001,BYOR,33,EURIBEUR12,,002,2018-10-12,00:00:00,2.02,,,,,60
Y001,BYOR,34,DAX,,1,2018-10-12,00:00:00,2.05,,,,,60
```

The following is a sample CSV structure:

Sample Upload Rates

Data Provider	Data Source	Market Data Category	Market Data Key1	Market Data Key2	Market Data Property	Effective Date	Effective Time	Market Data Value	Security Currency	From Factor	To Factor	Price Quotation	Additional Key	Status	Message
Y001	BYOR	01	EUR	INR	CMID	2018-10-12	00:00:00	82.121							
Y001	BYOR	02	BOND123	NYSE	03	2018-10-12	00:00:00	1.02							

Upload Rates in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT you previously generated.>
  Content-Type: application/json
Body
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "01",
```

```

    "key1": "EUR",
    "key2": "INR",
    "marketDataProperty": "CMID",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 82.121,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "02",
    "key1": "BOND123",
    "key2": "NYSE",
    "marketDataProperty": "03",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "03",
    "key1": "EURIBOR1MD",
    "key2": "",
    "marketDataProperty": "IMID",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "10",
    "key1": "CC_0001",
    "key2": "MONTH_03",
    "marketDataProperty": "MID",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 550,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "09",
    "key1": "CZK3M6M01Y",
    "key2": "",
    "marketDataProperty": "ASK",
    "effectiveDate": "2018-10-12",

```

```

    "effectiveTime": "00:00:00",
    "marketDataValue": 1.5,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "21",
    "key1": "EUR",
    "key2": "CNY",
    "marketDataProperty": "C",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "04",
    "key1": "DAX",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 20000,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "30",
    "key1": "FX_VOL_MN",
    "key2": "FX_120",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "31",
    "key1": "EUR",
    "key2": "JPY",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.06,
    "securityCurrency": null,
    "fromFactor": null,

```

```

    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "32",
    "key1": "EBT_BOND",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "33",
    "key1": "EURIBEUR12",
    "key2": "",
    "marketDataProperty": "002",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 2.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "60"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "34",
    "key1": "DAX",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-10-12",
    "effectiveTime": "00:00:00",
    "marketDataValue": 2.05,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "60"
  }
]

```

Field Descriptions for Upload Rates

Field	Description
<i>Data Provider</i>	The market data provider from whom you are fetching your data, for example, the European Central Bank or Thomson Reuters.

Field	Description
<i>Data Source</i>	The direct source from which your data provider gets their market data, for example, NYSE.
<i>Market Data Category</i>	The identifier for the type of market data. For example, 01 for exchange rates, 03 for interest rates, and so on.
<i>Key1</i>	Use as a Placeholder1 for a key you can assign to a market data type. For example, the <From> currency type when you are using the exchange rates data type, or <Reference Interest Rates> when you are using the interest rates data type.
<i>Key2</i>	Use as a Placeholder2 for a key you can assign to a market data type. It is usually the <To> currency type for when you are using a currency exchange transaction. When you are making a call for interest rates, this field is empty.
<i>Market Data Property</i>	The specific kind of market data that you are requesting. For example, <CMID> is the midday value for currency data.
<i>Effective Date</i>	The effective date on which the market data value is valid.
<i>Effective Time</i>	The effective time from which the market data value is valid. The time zone must be GMT.
<i>Market Data Value</i>	The actual value of the market data.
<i>Security Currency</i>	The currency information for security prices.
<i>From Factor</i>	The translation ratio used in currency conversion for the <From> currency. For more information on translation ratios, see Translation Ratios for Currencies .
<i>To Factor</i>	The translation ratio used in currency conversion for the <To> currency.
<i>Price Quotation</i>	The type of quotation you want to use for your currency exchange transactions. You can use either direct or indirect quotations. For more information, see Direct and Indirect Quotation for Exchange Rates .
<i>Additional Key</i>	Additional information for some instruments, for example, <Term In Days> for volatilities.

6.2 Downloading Rates

Market rates are automatically downloaded via the `TBD4` transaction or the [Request Current Market Data](#) application on SAP S/4HANA Cloud. To test if your setup is correct, generate the JWT for the service by using the `url`, `clientid`, and `clientsecret`. The following is a sample HTTP call. You may need to adapt it to fit your needs.

Sample Code

```
URL: 'url' from the service key
POST: /oauth/token
Body:
client_id:<clientid from the service key>
client_secret: <clientsecret from the service key>
grant_type:client_credentials
response_type:token
Content-Type:application/x-www-form-urlencoded
```

For examples of download rates, see [Code Samples \[page 33\]](#).

6.3 Deleting Records

The consumption limit for the Bring Your Own Rates data option is 300,000 records, per global account. The Bring Your Own Rates data option helps you manage this limit by deleting market data records older than 90 days. This means that the default retention period for all market data is 90 days. After the retention period, all records are deleted.

The default value will also apply to existing service instances. To change the retention period for an existing service instance, create an incident by using the `LOD-CBS-CS` component with the following details:

- Your subaccount ID
- A retention period of your choice (in days)

A daily delete operation is performed at 11:30 AM UTC.

To delete records, use the Manage Market Rates application. For more information, see [Using the Manage Market Rates Application \[page 77\]](#).

Right to Forget

Individual users can request to have their data removed. To do this, they can raise an incident report on the `LOD-CBS-CS` component with the required information.

6.4 Code Samples

This section contains code examples for each market data type for upload and download requests.

i Note

The free plan supports only exchange rates.

Related Information

[Exchange Rates \[page 33\]](#)

[Securities \[page 37\]](#)

[Interest Rates \[page 41\]](#)

[Credit Spreads \[page 45\]](#)

[Basis Spreads \[page 48\]](#)

[Forex Swap Rates \[page 52\]](#)

[Indexes \[page 56\]](#)

[General Volatilities \[page 59\]](#)

[Exchange Rate Volatilities \[page 62\]](#)

[Security Price Volatilities \[page 66\]](#)

[Interest Rate Volatilities \[page 69\]](#)

[Index Volatilities \[page 73\]](#)

6.4.1 Exchange Rates

You can use the market data APIs to upload and download exchange rates. You can get daily rates as well as rates for a specified date range.

The following code samples are examples of upload and download API calls for exchange rates. You may need to adapt them according to your needs.

i Note

If you call the download API with 0000-00-00 in the from-date and to-date to get the current rates, it will return future rates that have been uploaded. For example, if you uploaded the rates for 30-12-2022 and you request current market data on 01-12-2022, the rates for the date 30-12-2022 are returned.

Upload Exchange Rates in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  ECB,ECB,01,EUR,JPY,C,2018-05-11,00:00:00,129.2
  ECB,ECB,01,EUR,INR,C,2018-05-11,00:00:00,82.12
```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sourc e	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Secur- ity Cur- rency	From Factor	To Factor	Status	Mes- sage
ECB	ECB	01	USD	EUR	M	2018-0	5-01	1.2		1	1		

Upload Exchange Rates in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: application/json
Body
  [
    {
      "providerCode": "ECB",
      "marketDataSource": "ECB",
      "marketDataCategory": "01",
      "key1": "EUR",
      "key2": "USD",
      "marketDataProperty": "C",
      "effectiveDate": "2018-05-01",
      "effectiveTime": "00:00:00",
      "marketDataValue": 1.231,
      "securityCurrency": null,
      "fromFactor": null,
      "toFactor": null,
    },
    {
      "providerCode": "ECB",
      "marketDataSource": "ECB",
      "marketDataCategory": "01",
```

```

        "key1": "EUR",
        "key2": "INR",
        "marketDataProperty": "C",
        "effectiveDate": "2018-05-01",
        "effectiveTime": "00:00:00",
        "marketDataValue": 0.852,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": 100,
    },
    {
        "providerCode": "ECB",
        "marketDataSource": "ECB",
        "marketDataCategory": "01",
        "key1": "EUR",
        "key2": "JPY",
        "marketDataProperty": "C",
        "effectiveDate": "2018-05-01",
        "effectiveTime": "00:00:00",
        "marketDataValue": 129.2,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
    }
]

```

i Note

Only use the parameters listed in the sample code above.

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Exchange Rates in the TBD4 Format for a Date Range

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EUR~INR:01          ECB          C
2018031500000020180413000000

```

```

EUR~JPY:01          ECB          C
2018031500000020180413000000
EUR~USD:01          ECB          C
2018031500000020180413000000
</body>
</html>

```

Download Latest Exchange Rates in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
    USD~EUR:01          ECB          C
00000000000000000000000000000000
    EUR~INR:01          ECB          C
00000000000000000000000000000000
    EUR~JPY:01          ECB          C
00000000000000000000000000000000
    EUR~USD:01          ECB          C
00000000000000000000000000000000
    </body>
    </html>

```

Download Exchange Rates in the JSON Format

Note

If you enter a date for the from-date (`fromDate`) and leave the to-date (`toDate`) as `0000-00-00`, the service returns the rates only for the from-date (`fromDate`).

Sample Code

```

[
  {
    "marketDataSource": "ECB",
    "marketDataCategory": "01",
    "marketDataKey": "EUR~INR",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",

```

```

    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataSource": "ECB",
    "marketDataCategory": "01",
    "marketDataKey": "EUR~USD",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataSource": "ECB",
    "marketDataCategory": "01",
    "marketDataKey": "EUR~JPY",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.2 Securities

The following code samples are examples of upload and download API calls for securities. You may need to adapt them according to your needs.

Upload Securities in the CSV Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  Y001,BYOR,02,GVIXX_01,SMMF,1,2018-05-11,00:00:00,1.2
  Y001,ECB,02,GVIXX_01,SMMF,2,2018-05-11,00:00:00,1.05

```

The following is a sample CSV structure:

Sample Upload Rates

Provider Code	Data Source	Market Data Category	Key1	Key2	Property	Effective Date	Effective Time	Market Data Value	Security Currency	From Factor	To Factor	Price Quotation	Additional Key	Status	Message
Y001	BYOR	02	GVIX X_01	SMM F	1	2018-05-11	00:00:00	1.02							
Y001	BYOR	02	GVIX X_01	SMM F	2	2018-05-11	00:00:00	1.05							

Upload Securities in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

Authorization: Bearer <JWT.>
Content-Type: application/json

Body

```
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "02",
    "key1": "GVIXX_01",
    "key2": "SMMF",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.02,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "02",
    "key1": "GVIXX_01",
    "key2": "SMMF",
    "marketDataProperty": "2",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.05,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
```

```

        "marketDataSource": "BYOR",
        "marketDataCategory": "02",
        "key1": "GVIXX_01",
        "key2": "SMMF",
        "marketDataProperty": "3",
        "effectiveDate": "2018-05-01",
        "effectiveTime": "00:00:00",
        "marketDataValue": 1.08,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": null
    }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Securities in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/plain
  Accept-Language: en

Body
  <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
  <html>
  <head>
  <title>SAP Market Data Datafeed Interface Version 1.0</title>
  <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
  </head>
  <body>
    GVIXX_01~SMMF:02      BYOR      1
00000000000000000000000000000000
    GVIXX_01~SMMF:02      BYOR      2
00000000000000000000000000000000
    GVIXX_01~SMMF:02      BYOR      3
00000000000000000000000000000000
  </body>
  </html>

```

Download Securities in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      GVIXX_01~SMMF:02      BYOR      1
20160101000000201601310000000
      GVIXX_01~SMMF:02      BYOR      2
20160101000000201601310000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Securities in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "02",
    "marketDataSource": "BYOR",
    "marketDataKey": " GVIXX_01~SMMF",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "02",
    "marketDataSource": "BYOR",
    "marketDataKey": "GVIXX_01~SMMF",
    "marketDataProperty": "2",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "02",
    "marketDataSource": "BYOR",
```



```

    "marketDataKey": "GVIXX_01~SMMF",
    "marketDataProperty": "3",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.3 Interest Rates

The following code samples are examples of upload and download API calls for interest rates. You may need to adapt them according to your needs.

Upload Interest Rates in the CSV Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  Y001,BYOR,03,EURIBOR1MD,,C,2018-05-11,00:00:00,1.101
  Y001,BYOR,03,USDLIBOR3MD,,C,2018-05-01,00:00:00,0.44
  Y001,BYOR,03,EURIBOR1YD,,C,2018-05-05,00:00:00,1.601

```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sou- rce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- c- urity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	03	EURI- BOR1 MD		C	2018- 05-11	00:0 0:00	1.101							
Y001	BYOR	03	US- DLI- BOR3 MD		C	2018- 05-11	00:0 0:00	0.404							

Upload Interest Rates in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

```
Authorization: Bearer <JWT.>  
Content-Type: application/json
```

Body

```
[  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "03",  
    "key1": "EURIBOR1MD",  
    "key2": "",  
    "marketDataProperty": "C",  
    "effectiveDate": "2018-05-11",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 1.101,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": null  
  },  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "03",  
    "key1": "USDLIBOR3MD",  
    "key2": "",  
    "marketDataProperty": "C",  
    "effectiveDate": "2018-05-01",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 0.404,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": null  
  },  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "03",  
    "key1": "EURIBOR1YD",  
    "key2": "",  
    "marketDataProperty": "C",  
    "effectiveDate": "2018-05-05",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 1.601,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": null  
  }  
]
```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Interest Rates in the TBD4 Format

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EURIBOR1MD:03          BYOR          C
00000000000000000000000000000000
      USDLIBOR3MD:03        BYOR          C
00000000000000000000000000000000
      EIRIBOR1YD:03         BYOR          C
00000000000000000000000000000000
    </body>
    </html>
```

Download Interest Rates in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
```

```

        <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
        EURIBOR1MD:03          BYOR          C
20180501000000201804010000000
        EURIBOR1YD:03        BYOR          C
20180501000000201806210000000
    </body>
</html>

```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Interest Rates in the JSON Format

Sample Code

```

[
  {
    "marketDataCategory": "03",
    "marketDataSource": "BYOR",
    "marketDataKey": "EURIBOR1MD",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "03",
    "marketDataSource": "BYOR",
    "marketDataKey": "USDLIBOR3MD",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "03",
    "marketDataSource": "BYOR",
    "marketDataKey": "EURIBOR1YD",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.4 Credit Spreads

The following code samples are examples of upload and download API calls for credit spreads. You may need to adapt them according to your needs.

Upload Credit Spreads in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/csv
  Body
    Y001,BYOR,10,7001,Y03,C,2018-08-17,00:00:00,550
    Y001,BYOR,10,7001,Y02,C,2018-05-01,00:00:00,500
    Y001,BYOR,10,7001,Y01,C,2018-05-05,00:00:00,400
```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- curity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	10	7001	Y03	C	2018- 08-17	00:0 0:00	550							
Y001	BYOR	10	7001	Y02	C	2018- 05-01	00:0 0:00	500							

Upload Credit Spreads in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

  Headers
    Authorization: Bearer <JWT>
    Content-Type: application/json
  Body
    [
      {
        "providerCode": "Y001",
```

```

    "marketDataSource": "BYOR",
    "marketDataCategory": "10",
    "key1": "7001",
    "key2": "Y03",
    "marketDataProperty": "C",
    "effectiveDate": "2018-08-17",
    "effectiveTime": "00:00:00",
    "marketDataValue": 550,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "10",
    "key1": "7001",
    "key2": "Y02",
    "marketDataProperty": "C",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 500,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "10",
    "key1": "7001",
    "key2": "Y01",
    "marketDataProperty": "C",
    "effectiveDate": "2018-05-05",
    "effectiveTime": "00:00:00",
    "marketDataValue": 400,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Credit Spreads in the TBD4 Format

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
    7001~Y03:10          BYOR          CMID
00000000000000000000000000000000
    7001~Y02:10          BYOR          CMID
00000000000000000000000000000000
    7001~Y01:10          BYOR          CMID
00000000000000000000000000000000

    </body>
    </html>
```

Download Credit Spreads in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT>
    Content-Type: text/plain
    Accept-Language: en

  EN">
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
    7001~Y02:10          BYOR          CMID
201601010000002016013100000000
    7001~Y03:10          BYOR          CMID
201601010000002016013100000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Credit Spreads in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "10",
    "marketDataSource": "BYOR",
    "marketDataKey": "7001~Y01",
    "marketDataProperty": "CMID",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "10",
    "marketDataSource": "BYOR",
    "marketDataKey": "7001~Y03",
    "marketDataProperty": "CMID",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "10",
    "marketDataSource": "BYOR",
    "marketDataKey": "7001~Y02",
    "marketDataProperty": "CMID",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]
```

6.4.5 Basis Spreads

The following code samples are examples of upload and download API calls for basis spreads. You may need to adapt them according to your needs.

Upload Basis Spreads in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  Y001,BYOR,09,CEURUSD3M01Y,,1,2018-05-11,00:00:00,1.5
```



```
Y001,BYOR,09,TEUR6M3M01Y,,1,2018-05-01,00:00:00,3.3
Y001,BYOR,09,CEURUSD3M06M,,1,2018-05-05,00:00:00,2.1
```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- curity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	09	CEUR		1	2018-05-11	00:00:00	1.5							
			USD3												
			M01Y												
Y001	BYOR	09	TEUR		1	2018-05-01	00:00:00	3.3							
			6M3												
			M01Y												

Upload Basis Spreads in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: application/json
Body
  [
    {
      "providerCode": "Y001",
      "marketDataSource": "BYOR",
      "marketDataCategory": "09",
      "key1": "CEURUSD3M01Y",
      "key2": "",
      "marketDataProperty": "1",
      "effectiveDate": "2018-05-11",
      "effectiveTime": "00:00:00",
      "marketDataValue": 1.5,
      "securityCurrency": null,
      "fromFactor": null,
      "toFactor": null,
      "priceQuotation": null,
      "additionalKey": null
    },
    {
      "providerCode": "Y001",
      "marketDataSource": "BYOR",
      "marketDataCategory": "09",
      "key1": "TEUR6M3M01Y",
      "key2": "",
      "marketDataProperty": "1",
      "effectiveDate": "2018-05-01",
```

```

        "effectiveTime": "00:00:00",
        "marketDataValue": 3.3,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": null
    },
    {
        "providerCode": "Y001",
        "marketDataSource": "BYOR",
        "marketDataCategory": "09",
        "key1": "CEURUSD3M06M",
        "key2": "",
        "marketDataProperty": "1",
        "effectiveDate": "2018-05-05",
        "effectiveTime": "00:00:00",
        "marketDataValue": 2.1,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": null
    }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Basis Spreads in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      CEURUSD3M01Y:09      BYOR      1
0000000000000000000000000000000000000000000000000000000
      TEUR6M3M01Y:09      BYOR      1
0000000000000000000000000000000000000000000000000000000
      CEURUSD3M06M:09      BYOR      1
0000000000000000000000000000000000000000000000000000000

```

```
</body>
</html>
```

Download Basis Spreads in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      CEURUSD3M01Y:09      BYOR      1
20160101000000201601310000000
      TEUR6M3M01Y:09      BYOR      1
20160101000000201601310000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Basis Spreads in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "09",
    "marketDataSource": "BYOR",
    "marketDataKey": "CEURUSD3M01Y",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "09",
    "marketDataSource": "BYOR",
    "marketDataKey": "TEUR6M3M01Y",
    "marketDataProperty": "1",
```

```

    },
    {
        "marketDataCategory": "09",
        "marketDataSource": "BYOR",
        "marketDataKey": "CEURUSD3M06M",
        "marketDataProperty": "1",
        "fromDate": "0000-00-00",
        "fromTime": "00:00:00",
        "toDate": "0000-00-00",
        "toTime": "00:00:00"
    }
]

```

6.4.6 Forex Swap Rates

The following code samples are examples of upload and download API calls for forex swap rates. You may need to adapt them according to your needs.

Upload Forex Swap Rates in the CSV Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
Y001,BYOR,21,EUR,CNY,C,2018-05-11,00:00:00,1.101,,,,,30
Y001,BYOR,21,EUR,USD,C,2018-05-11,00:00:00,0.404,,,,,30
Y001,BYOR,21,EUR,CNY,C,2018-05-11,00:00:00,1.601,,,,,60

```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour- ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- cure- ncy	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	21	EUR	CNY	C	2018- 05-11	00:0 0:00	1.101					30		

Provider Code	Data Source	Market Data Category	Key1	Key2	Property	Effective Date	Effective Time	Market Data Value	Security Currency	From Factor	To Factor	Price Quotation	Additional Key	Status	Message
Y001	BYOR	21	EUR	USD	C	2018-05-11	00:00:00	0.404					30		

Upload Forex Swap Rates in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

Authorization: Bearer <JWT.>

Content-Type: application/json

Body

```
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "21",
    "key1": "EUR",
    "key2": "CNY",
    "marketDataProperty": "C",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "21",
    "key1": "EUR",
    "key2": "USD",
    "marketDataProperty": "C",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 0.404,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "21",
    "key1": "EUR",
    "key2": "CNY",
    "marketDataProperty": "C",
```

```

        "effectiveDate": "2018-05-11",
        "effectiveTime": "00:00:00",
        "marketDataValue": 1.601,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": "60"
    }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Forex Swap Rates in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EUR~CNY:21          BYOR          C
00000000000000000000000000000000
      EUR~USD:21         BYOR          C
00000000000000000000000000000000

    </body>
    </html>

```

Download Forex Swap Rates in the TBD4 Format for a Date Range

Sample Code

```

URL: <downloadUrl from the service key>
  Headers

```

```

Authorization: Bearer <JWT.>
Content-Type: text/plain
Accept-Language: en

Body
EN">
  <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
  <html>
  <head>
  <title>SAP Market Data Datafeed Interface Version 1.0</title>
  <meta name="SAP_Internet_Market_Data_Request_Format_Version"
  content="text/html 1.0">
  </head>
  <body>
    EUR~CNY:21          BYOR          C
    20160101000000201601310000000
    EUR~USD:21         BYOR          C
    20160101000000201601310000000
  </body>
  </html>

```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Forex Swap Rates in the JSON Format

Sample Code

```

[
  {
    "marketDataCategory": "21",
    "marketDataSource": "BYOR",
    "marketDataKey": "EUR~CNY",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "21",
    "marketDataSource": "BYOR",
    "marketDataKey": "EUR~USD",
    "marketDataProperty": "C",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.7 Indexes

The following code samples are examples of upload and download API calls for indexes. You may need to adapt them according to your needs.

Upload Indexes in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/csv
  Body
    Y001,BYOR,04,DAX,,1,2018-05-11,00:00:00,20000
    Y001,BYOR,04,DOW-I,,1,2018-05-01,00:00:00,15500
```

The following is a sample CSV structure:

Sample Upload Indexes

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- cure- ncy	From Fac- tor	To Fac- tor	Price Quo- ta- tional Key	Addi- tional Sta- tus	Mes- sage
Y001	BYOR	04	DAX		1	2018- 05-11	00:0 0:00	2000 0						
Y001	BYOR	04	DOW- I		1	2018- 05-01	00:0 0:00	1550 0						

Upload Indexes in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

  Headers
    Authorization: Bearer <JWT.>
    Content-Type: application/json
  Body
    [
      {
        "providerCode": "Y001",
        "marketDataSource": "BYOR",
```



```

    "marketDataCategory": "04",
    "key1": "DAX",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 20000,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "04",
    "key1": "DOW-I",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 15500,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  }
]

```

Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Indexes in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>

```

```

DAX:04 BYOR 1
00000000000000000000000000000000
DOW-I:04 BYOR 1
00000000000000000000000000000000

</body>
</html>

```

Download Indexes in the TBD4 Format for a Date Range

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
    DAX:04 BYOR 1
20160101000000201601310000000
    DOW-I:04 BYOR 1
20160101000000201601310000000
    </body>
    </html>

```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Indexes in the JSON Format

Sample Code

```

[
  {
    "marketDataCategory": "04",
    "marketDataSource": "BYOR",
    "marketDataKey": "DAX",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {

```

```

    "marketDataCategory": "04",
    "marketDataSource": "BYOR",
    "marketDataKey": "DOW-I",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.8 General Volatilities

The following code samples are examples of upload and download API calls for general volatilities (volatilities with moneyness). You may need to adapt them according to your needs.

Upload General Volatility Rates in the CSV Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
Y001,BYOR,30,FX_VOL_MN,FX_120,1,2018-05-11,00:00:00,1.101
Y001,BYOR,30,FX_VOL_MN,FX_120,1,2018-05-01,00:00:00,0.404
Y001,BYOR,30,FX_VOL_MN,FX_120,2,2018-05-05,00:00:00,1.601

```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- cure- ncy	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	30	FX_V OL_M	FX_12 0	1	2018- 05-11	00:0 0:00	1.101							
Y001	BYOR	30	FX_V OL_M	FX_12 0	1	2018- 05-01	00:0 0:00	0.404							

Upload General Volatility Rates in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

Authorization: Bearer <JWT.>
Content-Type: application/json

Body

```
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "30",
    "key1": "FX_VOL_MN",
    "key2": "FX_120",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "30",
    "key1": "FX_VOL_MN",
    "key2": "FX_120",
    "marketDataProperty": "2",
    "effectiveDate": "2018-05-05",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.601,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": null
  }
]
```

Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download General Volatility Rates in the TBD4 Format

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      FX_VOL_MN~FX_120:30 BYOR          1
00000000000000000000000000000000
      FX_VOL_MN~FX_120:30 BYOR          2
00000000000000000000000000000000

    </body>
    </html>
```

Download General Volatility Rates in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      FX_VOL_MN~FX_120:30 BYOR          1
2016010100000020160131000000
      FX_VOL_MN~FX_120:30 BYOR          2
2016010100000020160131000000

    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download General Volatility Rates in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "30",
    "marketDataSource": "BYOR",
    "marketDataKey": "FX_VOL_MN~FX_120",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "30",
    "marketDataSource": "BYOR",
    "marketDataKey": "FX_VOL_MN~FX_120",
    "marketDataProperty": "2",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]
```

6.4.9 Exchange Rate Volatilities

The following code samples are examples of upload and download API calls for exchange rate volatilities. You may need to adapt them according to your needs.

Upload Exchange Rate Volatilities in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  Y001,BYOR,31,EUR,JPY,1,2018-05-11,00:00:00,1.101,,,,,30
  Y001,BYOR,31,EUR,USD,1,2018-05-01,00:00:00,0.404,,,,,30
  Y001,BYOR,31,EUR,USD,1,2018-05-05,00:00:00,1.601,,,,,60
```

The following is a sample CSV structure:

Sample Upload Rates

Provider Code	Data Source	Market Data Category	Key1	Key2	Property	Effective Date	Effective Time	Market Data Value	Security Currency	From Factor	To Factor	Price Quotation	Additional Key	Status	Message
Y001	BYOR	31	EUR	JPY	1	2018-05-11	00:00:00	1.101					30		
Y001	BYOR	31	EUR	USD	1	2018-05-01	00:00:00	0.404					30		

Upload Exchange Rate Volatilities in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

Authorization: Bearer <JWT.>
Content-Type: application/json

Body

```
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "31",
    "key1": "EUR",
    "key2": "JPY",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "31",
    "key1": "EUR",
    "key2": "USD",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 0.404,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
```

```

        "marketDataSource": "BYOR",
        "marketDataCategory": "31",
        "key1": "EUR",
        "key2": "USD",
        "marketDataProperty": "1",
        "effectiveDate": "2018-05-05",
        "effectiveTime": "00:00:00",
        "marketDataValue": 1.601,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": "60"
    }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Exchange Rate Volatilities in the TBD4 Format

Sample Code

```

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EUR~JPY:31          BYOR          1
00000000000000000000000000000000
      EUR~USD:31         BYOR          1
00000000000000000000000000000000
    </body>
    </html>

```


Download Exchange Rate Volatilities in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EUR~JPY:31          BYOR          1
20160101000000201601310000000
      EUR~USD:31         BYOR          1
20160101000000201601310000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Exchange Rate Volatilities in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "31",
    "marketDataSource": "BYOR",
    "marketDataKey": "EUR~JPY",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "31",
    "marketDataSource": "BYOR",
    "marketDataKey": "EUR~USD",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]
```

6.4.10 Security Price Volatilities

The following code samples are examples of upload and download API calls for security price volatilities. You may need to adapt them according to your needs.

Upload Security Price Volatilities in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
Y001,BYOR,32,MMF_DE2,,1,2018-05-11,00:00:00,1.1,,,,,30
Y001,BYOR,32,MMF_DE2,,1,2018-05-01,00:00:00,0.4,,,,,60
Y001,BYOR,32,MMF_DE2,,2,2018-05-05,00:00:00,1.6,,,,,30
```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Data Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- curity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	32	MMF _DE2		1	2018- 05-11	00:0 0:00	1.1					30		
Y001	BYOR	32	MMF _DE2		1	2018- 05-01	00:0 0:00	0.4					60		

Upload Security Price Volatilities in the JSON Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: application/json
Body
[
  {
    "providerCode": "Y001",
```

```

    "marketDataSource": "BYOR",
    "marketDataCategory": "32",
    "key1": "MMF_DE2",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.1,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "32",
    "key1": "MMF_DE2",
    "key2": "",
    "marketDataProperty": "1",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 0.4,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "60"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "32",
    "key1": "MMF_DE2",
    "key2": "",
    "marketDataProperty": "2",
    "effectiveDate": "2018-05-05",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.601,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  }
]

```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Security Price Volatilities in the TBD4 Format

```
Sample Code

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      MMF_DE2:32           BYOR           1
0000000000000000000000000000000000000000000000000000000000000000
      MMF_DE2:32           BYOR           2
0000000000000000000000000000000000000000000000000000000000000000
    </body>
    </html>
```

Download Security Price Volatilities in the TBD4 Format for a Date Range

```
Sample Code

URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      MMF_DE2:32           BYOR           1
20160101000000201601310000000
      MMF_DE2:32           BYOR           2
20160101000000201601310000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Security Price Volatilities in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "32",
    "marketDataSource": "BYOR",
    "marketDataKey": "MMF_DE2",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "32",
    "marketDataSource": "BYOR",
    "marketDataKey": "MMF_DE2",
    "marketDataProperty": "2",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]
```

6.4.11 Interest Rate Volatilities

The following code samples are examples of upload and download API calls for interest rate volatilities. You may need to adapt them according to your needs.

Upload Interest Rate Volatilities in the CSV Format

Sample Code

```
URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
  Y001,BYOR,33,EURIBOR1MD,,002,2018-05-11,00:00:00,1.101,,,,,30
  Y001,BYOR,33,USDLIBOR3MD,,002,2018-05-01,00:00:00,0.404,,,,,30
  Y001,BYOR,33,EURIBOR1YD,,002,2018-05-05,00:00:00,1.601,,,,,30
```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour- ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- curity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tion	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	33	EURI- BOR1 MD		002	2018- 05-11	00:0 0:00	1.101					30		
Y001	BYOR	33	US- DLI- BOR3 MD		002	2018- 05-01	00:0 0:00	0.404					30		

Upload Interest Rate Volatilities in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

Authorization: Bearer <JWT.>

Content-Type: application/json

Body

```
[
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "33",
    "key1": "EURIBOR1MD",
    "key2": "",
    "marketDataProperty": "002",
    "effectiveDate": "2018-05-11",
    "effectiveTime": "00:00:00",
    "marketDataValue": 1.101,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
    "additionalKey": "30"
  },
  {
    "providerCode": "Y001",
    "marketDataSource": "BYOR",
    "marketDataCategory": "33",
    "key1": "USDLIBOR3MD",
    "key2": "",
    "marketDataProperty": "002",
    "effectiveDate": "2018-05-01",
    "effectiveTime": "00:00:00",
    "marketDataValue": 0.404,
    "securityCurrency": null,
    "fromFactor": null,
    "toFactor": null,
    "priceQuotation": null,
  }
]
```

```
        "additionalKey": "30"
    },
    {
        "providerCode": "Y001",
        "marketDataSource": "BYOR",
        "marketDataCategory": "33",
        "key1": "EURIBOR1YD",
        "key2": "",
        "marketDataProperty": "002",
        "effectiveDate": "2018-05-05",
        "effectiveTime": "00:00:00",
        "marketDataValue": 1.601,
        "securityCurrency": null,
        "fromFactor": null,
        "toFactor": null,
        "priceQuotation": null,
        "additionalKey": "30"
    }
]
```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the `Data Source` field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Interest Rate Volatilities in the TBD4 Format

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      EURIBOR1MD:33          BYOR          002
000000000000000000000000000000
      USDLIBOR3MD:33        BYOR          002
000000000000000000000000000000
      EURIBOR1YD:33         BYOR          002
000000000000000000000000000000
    </body>
    </html>
```

Download Interest Rate Volatilities in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
    <title>SAP Market Data Datafeed Interface Version 1.0</title>
    <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
    EURIBOR1MD:33      BYOR      002
20160101000000201601310000000
    USDLIBOR3MD:33   BYOR      002
20160101000000201601310000000
    </body>
    </html>
```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Interest Rate Volatilities in the JSON Format

Sample Code

```
[
  {
    "marketDataCategory": "33",
    "marketDataSource": "BYOR",
    "marketDataKey": "EURIBOR1MD",
    "marketDataProperty": "002",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "33",
    "marketDataSource": "BYOR",
    "marketDataKey": "USDLIBOR3MD",
    "marketDataProperty": "002",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "33",
    "marketDataSource": "BYOR",
```



```

    "marketDataKey": "EURIBOR1YD",
    "marketDataProperty": "002",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.4.12 Index Volatilities

The following code samples are examples of upload and download API calls for index volatilities. You may need to adapt them according to your needs.

Upload Index Volatilities in the CSV Format

Sample Code

```

URL: <uploadUrl from the service key>

Headers
  Authorization: Bearer <JWT.>
  Content-Type: text/csv
Body
Y001,BYOR,34,DAX,,1,2018-05-11,00:00:00,1.101,,,,,30
Y001,BYOR,34,DAX,,1,2018-05-01,00:00:00,0.404,,,,,60
Y001,BYOR,34,DAX,,2,2018-05-05,00:00:00,1.601,,,,,30

```

The following is a sample CSV structure:

Sample Upload Rates

Pro- vider Code	Data Sour ce	Mar- ket Data Cate- gory	Key1	Key2	Prop- erty	Effec- tive Date	Time	Mar- ket Data Value	Se- curity Cur- rency	From Fac- tor	To Fac- tor	Price Quo- ta- tional	Addi- tional Key	Sta- tus	Mes- sage
Y001	BYOR	34	DAX		1	2018- 05-11	00:0 0:00	1.101					30		
Y001	BYOR	34	DAX		1	2018- 05-01	00:0 0:00	0.404					60		

Upload Index Volatilities in the JSON Format

Sample Code

URL: <uploadUrl from the service key>

Headers

```
Authorization: Bearer <JWT.>  
Content-Type: application/json
```

Body

```
[  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "34",  
    "key1": "DAX",  
    "key2": "",  
    "marketDataProperty": "1",  
    "effectiveDate": "2018-05-11",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 1.101,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": "30"  
  },  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "34",  
    "key1": "DAX",  
    "key2": "",  
    "marketDataProperty": "1",  
    "effectiveDate": "2018-05-01",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 0.404,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": "60"  
  },  
  {  
    "providerCode": "Y001",  
    "marketDataSource": "BYOR",  
    "marketDataCategory": "34",  
    "key1": "DAX",  
    "key2": "",  
    "marketDataProperty": "2",  
    "effectiveDate": "2018-05-05",  
    "effectiveTime": "00:00:00",  
    "marketDataValue": 1.601,  
    "securityCurrency": null,  
    "fromFactor": null,  
    "toFactor": null,  
    "priceQuotation": null,  
    "additionalKey": "30"  
  }  
]
```

i Note

If you intend to consume the option on an SAP S/4HANA system, the data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange from both Thomson Reuters and the European Central Bank, you must enter unique names in each record in the Data Source field. However, if you intend to consume the download service through an SAP S/4HANA Cloud system, the data source in your upload request must be **BYOR**.

Download Index Volatilities in the TBD4 Format

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //EN">
    <html>
    <head>
      <title>SAP Market Data Datafeed Interface Version 1.0</title>
      <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
    <body>
      DAX:34           BYOR           1
00000000000000000000000000000000
      DAX:34           BYOR           2
00000000000000000000000000000000
    </body>
    </html>
```

Download Index Volatilities in the TBD4 Format for a Date Range

Sample Code

```
URL: <downloadUrl from the service key>
  Headers
    Authorization: Bearer <JWT.>
    Content-Type: text/plain
    Accept-Language: en

  Body
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 //
EN">
    <html>
    <head>
      <title>SAP Market Data Datafeed Interface Version 1.0</title>
      <meta name="SAP_Internet_Market_Data_Request_Format_Version"
content="text/html 1.0">
    </head>
```

```

<body>
  DAX:34          BYOR          1
20160101000000201601310000000
  DAX:34          BYOR          2
20160101000000201601310000000
</body>
</html>

```

The length of each component is important, which makes the spacing of the request and response bodies relevant.

Download Index Volatilities in the JSON Format

Sample Code

```

[
  {
    "marketDataCategory": "34",
    "marketDataSource": "BYOR",
    "marketDataKey": "DAX",
    "marketDataProperty": "1",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  },
  {
    "marketDataCategory": "34",
    "marketDataSource": "BYOR",
    "marketDataKey": "DAX",
    "marketDataProperty": "2",
    "fromDate": "0000-00-00",
    "fromTime": "00:00:00",
    "toDate": "0000-00-00",
    "toTime": "00:00:00"
  }
]

```

6.5 Consuming the Service at Application Runtime

The following sections provide information for application developers and administrators who consume the Bring Your Own Rates data option.

The Bring Your Own Rates data option provides REST APIs that enable you to upload, download, and manage your own market data. Additionally, you can use the Manage Market Rates application to display your data and make queries about your market data categories and records.

The Monitor Business Logs application provides access to business messages. Business messages contain records about upload, download, and delete operations a user has performed. You can access the Monitor Business Logs application on your SAP Fiori Launchpad cockpit, provided you have the required roles to access this application.

Related Information

[Using the MRM - Configure Default Values Application \[page 77\]](#)

Read and change default value configurations for your market data.

[Using the Manage Market Rates Application \[page 77\]](#)

Read, query, and delete your market data.

[Using the Monitor Business Logs Application \[page 78\]](#)

Read and query your business messages.

6.5.1 Using the MRM - Configure Default Values Application

Read and change default value configurations for your market data.

The MRM - Configure Default Values application allows you to read and change configurations for the Bring Your Own Rates data option and the Refinitiv data option if you use its capabilities with your market rates data.

Application Details

The MRM - Configure Default Values application shows you the categories available under the market rates data options. If you have enabled the capabilities for the Bring Your Own Rates data option, it is listed as a category in addition to the Refinitiv data option.

To change default values for the Bring Your Own Rates data option:

1. Choose the Bring Your Own Rates data option from the navigation pane on the left. All available configuration settings are displayed on the right with the following columns:

- *Setting*
- *Default Value*
- *Current Value*

The setting available for the Bring Your Own Rates data option is *Retention Period in Days*.

The default value for *Retention Period in Days* is **90** (90 days). You can set a value between **1** and **365**.

2. Choose the setting you want to change the default value for, and choose *Edit*.
A dialog box appears.
3. From the dropdown in the dialog box, make a selection for the value that you want to set.

6.5.2 Using the Manage Market Rates Application

Read, query, and delete your market data.

The Bring Your Own Rates data option provides you with the Manage Market Rates application.

Application Details

The Manage Market Rates application shows you all *Market Data Categories* available as well as the *Total Records* present within each category. The market data code is displayed with the category, for example, **01 - Exchange Rates**.

You can choose any category to view record details. The record details are displayed with the following default headers: *Provider Code*, *Market Data Source*, *Key 1*, *Key 2*, *Market Data Property*, and *Valid From*. You can view the *Market Data Value* for each record in the record details.

To delete one or more records, select the checkbox next to the record and choose *Delete*. To select all records for deletion, select the checkbox in the header column.

To search for a record, use the search box and enter any information about the record. Both string and number values are supported.

To view your latest market data information, use the *Refresh* button. Once you upload or delete any records, the Manage Market Rates application displays your changed data only after this button is used.

i Note

The Manage Market Rates application is not available in the free plan.

6.5.3 Using the *Monitor Business Logs* Application

Read and query your business messages.

You can use the *Monitor Business Logs* application to read and monitor business messages, make advanced queries, and view record details.

Prerequisites

To access the *Monitor Business Logs* application, follow these steps:

1. Create a business user or user group in the Identity Authentication service or another IdP. SAP ID service is configured as the default IdP, but you can also add your instance of SAP Cloud Identity Services - Identity Authentication or a different IdP.

→ Tip

If you use the Identity Authentication service, you can find more information in the SAP BTP documentation under [Manually Establish Trust and Federation Between UAA and Identity Authentication](#).

If you use a different IdP, you can find more information under [Establish Trust and Federation with UAA Using Any SAML Identity Provider](#).

2. In the SAP BTP cockpit, configure a role collection, and assign the role **Business_Process_Specialist_BL_AccessAll** to it.

For more information about how to create roles and how to bundle them in role collections using the SAP BTP cockpit, see [Building Roles and Role Collections for Applications](#).

3. In the SAP BTP cockpit, assign the role collection from the previous step to your idP user.

For more information about how to assign role collections to users or user groups using the SAP BTP cockpit, see [Assigning Role Collections](#).

i Note

If you use the SAP ID service, you assign role collections to individual users. If you use the Identity Authentication service or another IdP, you assign them either to individual users or to user groups.

Read and Monitor Business Messages

The Monitor Business Logs application displays a list of business messages created in the last 15 minutes. If no business messages are displayed, you can adjust the filter settings to display more messages.

You can filter using the following default options:

- [Message Contains](#)
 - The possible values for [Message Contains](#) are [Success](#), [Information](#), [Warning](#), and [Error](#).
- [Created On](#)
- [Created By](#)

The message list appears with the following default columns:

- [Created On](#)
- [Created By](#)
- [Error](#)
- [Warning](#)
- [Information](#)
- [Success](#)
- [Number of Records](#)

The [Error](#), [Warning](#), [Information](#) and [Success](#) columns indicate the total record count for each type of record in the business message.

Some business messages may contain information relevant to data protection and privacy. Such messages are masked by default. To display them, choose the [Show Sensitive Data](#) button.

You can download all messages along with the records by pressing the [Download](#) button. If the number of messages exceeds the limit of 10,000 messages as defined by the service, you will be prompted with an error message. In this case, you can restrict the time range using the [Created on](#) field in the filter bar. You can also choose to enter values for the [Message Contains](#) and [Created By](#) fields to further narrow down your selection. The logs will be downloaded into a ZIP file which may contain one or more CSV files depending on the number of logs.

To view the records in a message, choose any message in the list to display message and record details.

7 Security

Auditing and Logging

Market Rates APIs use application and audit logs.

Application Logging

Application logs capture the technical flow of the code. They log exceptions and the technical reasons behind them. They are deleted in 7 days and do not capture any personally identifiable information.

Audit Logging

The Bring Your Own Rates data option uses the audit logging capability provided by SAP BTP. Audit logs consist of the following:

- Security audit logs
- Configuration change logs
- Data access logs

Security audit logs are captured when security-related actions occur, for example, when someone tries to access the service by using an invalid JWT.

Configuration changes are also logged. For example, when there is a change in the retention period for the Bring Your Own Rates data option.

Data access logs capture information about successful market data downloads and valid or invalid market data pairs used in downloads.

For information about accessing these logs, see [Audit Log Viewer for the Cloud Foundry Environment](#).

Business Logging

Business logs capture the flow of your application to track what went wrong or right. They are written for the following scenarios:

- Market data downloads
- Market data uploads
- Configuration changes (same as the aforementioned scenarios for audit logging)
- Data accessed through the Manage Market Rates application

Business logs are also written for the following errors:

- Incorrect credentials used while accessing the APIs
- Empty response to a query
- Incorrect JSON formatting or processing error in the request payload
- Requests for daily and historic market rates in the same payload

You can access your business logs by subscribing to Business Logging and adding the relevant roles to your role collection. For more information, see and [Using the Monitor Business Logs Application \[page 78\]](#).

Identity and Access Management

SAP BTP standard security concepts are incorporated to protect the SAP Market Rates Management, Bring Your Own Rates data option application to avoid unauthorized access. Applications that use SAP Market Rates Management, Bring Your Own Rates data option are responsible for authorizing calls to the API instances with a valid JWT in the authorization headers. The information extracted from the JWT is validated before the incoming request is served.

For more information, see [Security on SAP BTP](#).

As both data upload and download operations are allowed with these credentials, please ensure that the users are provided with the right roles and authorisation access to the credentials to perform upload operation.

For more information, see [General terms and conditions](#) in the SAP Trust Center.

Network and Communication Security

The SAP Market Rates Management, Bring Your Own Rates data option application uses the HTTPS protocol to encrypt communication between the browser and the application.

Secure Delivery, Configuration, and Change Management

The SAP Market Rates Management, Bring Your Own Rates data option application uses standard SAP security features.

Operational Security

For operational security details, see [SAP Data Center Security](#).

Related Information

[Auditing and Logging Information \[page 82\]](#)

Here you can find a list of the security events that are logged by SAP Market Rates Management, Bring Your Own Rates data option.

7.1 Auditing and Logging Information

Here you can find a list of the security events that are logged by SAP Market Rates Management, Bring Your Own Rates data option.

Security events written in audit logs

Event grouping	What events are logged	How to identify related log events	Additional information
Provider Tenant related events	Authorization failures on MRM download and upload API	Request does not have required scope.	Entries are logged as <code>SecurityEventAuditMessage</code> .
	When the retention period value and master data cache is updated	Configuration Old Value, New Value and Attribute that's changed.	Entries are logged as <code>ConfigurationChangeAuditMessage</code> .
Events related to service broker	Service broker	Access broker API with wrong credentials - Failed login attempt.	Entries are logged as <code>SecurityEventAuditMessage</code> .
	Access broker API	If header is provided, X-Broker-API-Originating-Identity , else, <authenticated user that calls the service broker> - Service <service-ID> with plan <plan-ID> is being provisioned.	Provider tenant ID is logged as tenant ID of the event.
	Create service instance	<broker-registration-user> - Service <service-ID> with plan <plan-ID> is being Last operation was called.	As the service instance creation/deletion is an asynchronous operation, the broker is queried for the status recurrently until the instance creation/deletion is successful or failure. So, the corresponding audit log event is also logged every time the query is executed.
	Fetch service instance creation status	If header is provided, X-Broker-API-Originating-Identity , else, <authenticated user that calls the service broker> - Service <service-ID> with plan <plan-ID> is being provisioned.	

Event grouping	What events are logged	How to identify related log events	Additional information
	Delete service instance	<broker-registration-user> - Service <service-ID> with plan <plan-ID> is being Last operation was called.	
	Fetch service instance deletion status	<broker-registration-user> - Service <service-ID> with plan <plan-ID> is being Last operation was called.	
Events related to runtime data deletion	Orphan Data deletion	Valid authorization not available for url DELETE/orphan-data called.	Entries are logged as <code>SecurityEventAuditMessage</code> .

Related Information

[Audit Logging in the Cloud Foundry Environment](#)

8 Data Protection and Privacy

For general information about data protection and privacy on SAP BTP, see SAP BTP documentation under [Data Protection and Privacy](#).

Business Logging

When you delete market data records, the Market Rates, Bring Your Own Rates data option processes your user ID and uses the Business Logging service to store it.

To know more, see [Data Protection and Privacy](#) in the Business Logging service guide.

i Note

All user information is deleted when your application is offboarded from the Market Rates, Bring Your Own Rates data option. However, individual user information is retained, even when the corresponding user ID loses access to the data option.

Right to Forget

As an individual user, you can request the removal of your data. To do this, you can raise an incident on the LOD-CBS-CS component with the required information. The Business Logging service is used to carry out this transaction.

Right to Information

When you log in to the Manage Market Rates application, your user ID is stored and recorded through the Business Logging service if you perform a delete operation. You can access the details written in the business messages by using the [Created By](#) field in the Monitor Business Logs application.

9 Troubleshooting and FAQs

This section provides information about some known issues and their workarounds.

Bad Request Error Message When Testing RFC

This may not necessarily be an indication of issues with your setup. Continue with the remaining setup activities and make a call to both the `Upload` and `Download` APIs to check whether your requests work.

Destination Host Unreachable While Making OAuth Calls

To solve this issue, complete the following steps:

1. Check the proxy configurations in your SAP S/4HANA landscape to see whether your systems can call external services.
2. Check your firewall settings. The upload and download OAuth URLs must be whitelisted by an administrator.
3. Check your trust setup with the SAP BTP host `*.hana.ondemand.com`. An administrator must import the certificates required to access the SAP BTP domain in the trust configurations of the SAP S/4HANA system.

Multiple Results for the Same Data Pair

This occurs when you have defined the same data source code across different data providers. The data source must be unique across different data providers. For example, if you are retrieving market rates from the same stock exchange across Refinitiv and the European Central Bank, you must enter unique names for each record in the *Data Source* field.

Unauthorized Error Message When Downloading Market Rates from SAP S/4HANA

1. Confirm that the URLs and client credentials are configured correctly.
2. Confirm that the OAuth path is `/oauth/token`. For more information, see the *Set-Up Instructions* section on [SAP Best Practices Explorer](#). Note that you must be logged in to see this section.

Uploaded `fromFactor` and `toFactor` Not Reflected in SAP S/4HANA

If you are using SAP S/4HANA to download your data, the `fromFactor` and `toFactor` parameters must be configured in the SAP S/4HANA system. Only this configuration will be considered. You can do this by using the configurations available in [Datafeed](#).

"No Connection to Database" Error While Opening the Manage Market Rates Application

Before using the Manage Market Rates application, you must have a service instance for the [Bring Your Own Rates](#) data option. Please confirm if you have a valid service instance before accessing the application.

Error: Request Entity Too Large

The service allows you to download up to 1,500 records in one request. If your request is over this limit, you must distribute the requested records across multiple requests.

Frequently Asked Questions

General

Q: Which component should I use to raise a ticket for any issues?

A: LOD-CBS-CS

Q: What are the rate types supported in your application?

A: We support 12 data types for the default plan. Exchange rates are supported for the free plan. For more information, see [Market Data Types \[page 22\]](#).

Q: Why is your service not listed on the Cloud Foundry marketplace?

A: You might not see it because your entitlements are not set correctly. For more information, see [Create and Edit Entitlements](#).

Q: Is the billing dependent on the usage?

A: No, for the default plan, it's a monthly flat fee. (The free plan is for free.)

Uploads

Q: What system should I use to upload rates?

A: There is no restriction on what system you can use, as long as the system can handle OAuth and HTTPS calls.

Q: How do I convert external data source formats to match the format of the upload API?

A: Write the conversion logic to map fields from other formats to SAP-mandated formats.

Technical Questions

Q: Can I delete the records that I have uploaded?

A: Yes, you have some options for deleting records. For more information, see [Deleting Records \[page 32\]](#).

Q: How do I automate market rates transfers to my system?

A: You can use transaction `TBD4` to schedule the downloading of market rates. Similarly, data uploads can be scheduled by using time-based scheduling based on data source.

Q: How many records can I upload or download in one call?

A: You can go up to 1,500 records per call with the default plan. Larger data sets must be split into two or more service calls. With the free plan, you can upload 100 records per month.

Q: Can I download data for a date range?

A: Yes. You can enter date ranges by using the `fromDate`, `fromTime`, `toDate`, and `toTime` fields.

Q: Can I use the download API to connect non-SAP systems to download data?

A: Yes, as long as the connected system can handle OAuth and HTTPS calls.

Q: Can I schedule my imports in SAP S/4HANA Cloud?

A: Yes. Use the [Schedule Treasury Back Office Jobs](#) application to do this.

Q: Can I import each market rate type with a different frequency in SAP S/4HANA?

A: Yes. In SAP S/4HANA, the datafeed configurations for each market data type differs. In SAP S/4HANA Cloud, use the [Schedule Treasury Back Office Jobs](#) application to create market data-specific configurations.

Q: Do I have the right to request my information and to have my user details forgotten?



A: Yes. For more information, see [Data Protection and Privacy \[page 84\]](#).

Important Disclaimers and Legal Information

Hyperlinks

Some links are classified by an icon and/or a mouseover text. These links provide additional information.

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