User Guide | PUBLIC
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Decision Support Service Apps

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Content

1 Overview

Get an idea of how Decision Support Service can help you run your business.

> **i** Note
>
> **Important**: All apps and APIs related to SAP IoT Decision Support Service are deprecated as of November 2021 and will be decommissioned in the future (details to be communicated as soon as possible). In case you've used any of the apps in your SAP IoT system landscape, we recommend getting in touch with SAP support in order to find an alternative solution.

Introduction

In the Internet of Things (IoT), most business scenarios are dealing with the collection of big amounts of sensor data that are monitored and, under certain circumstances, lead to an automatic response. Such responses may target at completing a purchasing process as well as preventing damage to some technical equipment, for example by lowering the drive of a motor when a predefined temperature is exceeded.

However, situations can easily occur where there are multiple possible reactions without clear priority. Also, depending on the business scenario, there can be situations where the system could, in principle, take a decision based on the data available, but the impact on affected persons may be so critical that you prefer to always let a human expert decide (e.g., traffic conflicts, insurance contract requests, purchases exceeding a certain amount of money, etc.).

This is where the Decision Support Service of SAP IoT comes in handy. With this service, you can define sets of possible alternative reactions to a certain event. When the event is triggered, the system presents the various alternatives to the person in charge of handling the situation who can then choose the appropriate measure (e.g., ordering a spare part, calling a service technician, asking a colleague for a second opinion, etc.).

> **i** Note
>
> In a future release, SAP IoT will provide a dedicated template for SAP Web IDE that lets you very easily set up a web application for end users in charge of handling situations presented by the Decision Support Service.

Overall Process

Here is an overview of the entire process with participation of the Decision Support Service:

1. Sensor data is measured and sent by a device.
2. Sensor data is received by the IoT Gateway component of SAP IoT services for SAP BTP.
3. Sensor data is transferred to the data ingestion pipeline of SAP IoT.

4. Incoming data is checked by the rule processing framework.
5. If the rule processing framework detects any critical or unusual values, the respective rule triggers an action.
6. The triggered action is configured such that the Decision Support Service is invoked.
7. The recommendation presents the predefined possible actions for handling the situation to the person in charge.
8. The possible actions in turn may invoke further actions or call some application.
9. Once done, the system logs a timestamp indicating when the situation has been resolved.

2 Recommendation Definition

An app for creating and maintaining recommendations for handling business situations.

Overview

You use this app for setting up types of recommendations. In SAP IoT, a recommendation is an element used to address the manual resolution of a business situation where an automatic system reaction is either not possible or not desired for different reasons. However, in order to still provide the best possible support for persons in charge to find a solution, the system presents various possible actions that a user could take to solve the situation in question. The possible actions are predefined by an administrator based on business knowledge and best practices. The possible actions proposed by the Decision Support Service may, e.g., fall into one of the following categories:

- Start an action that triggers a transaction in an ERP system.
- Start an action that displays a website with helpful information for the end user.
- Send an e-mail alert to a help desk or to a person who is known as an expert for situations like the one defined by the recommendation instance.
- Involve another colleague in a discussion on how to proceed best (four-eyes principle).

As you can see from the examples listed above, some possible actions for solving a business situation may be purely based on business knowledge and don't need any technical settings of whatever kind. Other, however, may require some technical preparations in advance, especially in terms of actions that you define with the help of the Action Modeler app, which is part of SAP IoT. For more information, see Actions and Notifications: Overview.

Related Information

Actions and Notifications: Overview

2.1 Create a Recommendation

Process steps for creating a recommendation.

Context

As an administrator, you want to define a recommendation of different possible solutions for a particular business situation.

> **Example**
>
> A temperature sensor attached to a server rack in a data center has detected a continuous temperature increase over the last hour. At the same time, the fans of the cooling system are already running with maximum speed. For this situation, a recommendation might offer the following solutions:
>
> - Conduct a visual inspection of the server rack to check if air convection works properly.
> - Check the mounting position and temperature calibration of the sensor.
> - Create a purchase order for buying a more powerful fan.
> - Send an e-mail alert to a colleague asking for advice.
> - Call a service technician.

Procedure

1. From the launchpad, start the *Decision Support Definition* app.

   The system presents the list of recommendations hat are already available.
2. From the header bar of the list, choose *Create*.

   The system presents the *General Information* section.
3. Enter a *Name*, *Description*, and *Alias* for the recommendation.

   > **Note**
   >
   > The *Name* can contain not only static text, but also placeholders for property values derived from the assigned thing properties. Such dynamic content must be enclosed in curly brackets within the *Name* string, e. g. {properties.timestamp}.
   >
   > The *Alias* is used as an identifier of the recommendation. You can freely define the alias, but you should make sure the alias string is unique in the system for proper operation.
4. Decide whether the recommendation shall be *Active* or not.
5. Decide whether the Action service shall be used as an access control instance for accessing the recommendation. If you want to use the Action service for that purpose, tick the *Action Service as Access Manager* checkbox.
6. Choose Save.

   The system takes you back to the list of available recommendations.

7. In the list, click the entry of the newly created recommendation.

   The system navigates you back to the recommendation details screen. In addition to the *General Information* section, three more sections are now presented: *Possible Actions*, *Externalized Data*, and *Translations*.
8. Choose *Edit*.
9. In the *Possible Actions* section, choose *Create*.

   The system presents the *Possible Action Defintion* screen. For details about how to define a possible action, see Create a Possible Action [page 7].
10. In the *Externalized Data* section, choose *Create*.

    The system presents the *Externalized Data Definition* screen.

    With this option, you can make additional data sent from the device available to the Decision Support Service.
11. For the new data object, define an *Alias* and the *Data Binding*.
12. Decide whether the data object is *User Interface-Relevant* or not. If yes, you can use the external data for presenting them to the end user.
13. Choose *Save*.

    The system returns to the *Decision Support Definition* screen.
14. If you have to provide recommendations in different languages, go to the *Translations* section and choose *Create*.

    The system presents the *Translation* screen.
15. Choose a Property from the list of available properties, choose the target Language for which you want to provide a translation and enter the translated text into the Value field.
16. Choose *Save*.

    The system returns to the *Decision Support Definition* screen.

Results

You are now done with defining the recommendation.

2.1.1 Create a Possible Action

Process steps for creating a possible action that is suggested by a recommendation.

Context

As an administrator, you want to define various alternative actions that a person in charge can choose from in order to react to a specific business situation defined by the recommendation to which the action is assigned.

Procedure

1. In the *Possible Actions* section of a recommendation, choose *Create*.

   The system presents the *Possible Action Definition* screen.
2. Define an *Alias*, a *Title*, and a *Description* for the action.

   > **i Note**
   >
   > The *Title* cannot only contain static text, but also placeholders for property values derived from the assigned thing properties. Such dynamic content must be enclosed in curly brackets within the *Title* string, e. g. {properties.alm_order.SHORT_TEXT}. You can also use some formatting options for emphasizing certain parts of speech, for example, `<strong>Emphasized Text</strong>`.
   >
   > The *Alias* is used as an identifier of the recommendation. You can freely define the alias, but you should make sure that the alias string is unique in the system for proper operation.
3. Enter a *Sequence* number to specify the position at which the action shall appear in the list of possible actions.

   > **→ Tip**
   >
   > It is a good idea to sort the possible actions by priority (lowest number = highest priority). With that, you may best support the person in charge to solve the situation by putting the action that is most likely to solve the situation on top of the list.
4. Decide whether the action shall be *Visible* or not. If you decide to leave this field unchecked, the action is **not** displayed in the list of possible actions.
5. In the *Action Mode* section, choose the desired *Action Mode*.

   You can choose from the following action modes:

   - *Action Service*: You can assign any of the actions that you have modeled with the Action Modeler of SAP IoT, and for which the *Triggered By* setting has been defined as **`Decision Support`**.

     > **i Note**
     >
     > If you have previously defined a possible action that refers to an action with a trigger other than "Decision Support", you have the following options:
     >
     > - Leave the existing possible action untouched. The possible action remains valid and works as before.
     > - Update the referred action to trigger type "Decision Support" and assign the desired thing type. With that, the action is offered in the list of actions that can be assigned to possible actions for decision support.
   - *Fiori Navigation*: Use this option to simply navigate to a certain app that might help the user solve the situation. For the app to be displayed, you need to enter a proper *Fiori Intent*, such as **`RSDefinitionApp-display`**.
   - *Quick Create*: Use this option, for example, for creating a service ticket in SAP Cloud for Customer. For that, you pass a *Quick Create Intent* such as **`serviceticketQC-quickcreate`** and an appropriate JSON payload used for the *Quick Create Binding* from the payload received by the Decision Support Service to the respective Quick Create properties.

- *Workflow*: With this option, you can assign a workflow to a possible action. This is useful for handling business situations that require a sequence of various activities in a fixed order.

  > **i Note**
  >
  > The Workflow action mode is only available if the system has been configured accordingly. For more information, see Workflow Configuration for Decision Support [page 19].

6. Optional: Decide whether you want to specify a business *Intent* or a *URL* for the *Action History*:
   - With an intent, you can provide a link as part of the action history entry that the system creates for each possible action that the employee in charge has actually chosen from the list of possible actions. With the help of this link, users can directly navigate from the action history to the business transaction associated with the chosen action, for example, a plant maintenance order.

     > **Example**
     >
     > Here is a sample URL for navigating to the plant maintenance transaction in an SAP S/4HANA system. Note that you can directly address a particular plant maintenance order by passing the respective business object as a URL parameter. To accomplish that, use the following pattern, including the curly brackets: `{result.<fieldname>}`. In the following sample URL, this generic pattern is instantiated as `{result.OrderNumber}` (with the enclosing curly brackets given as hex codes %7b and %7d):
     >
     > ```
     > https://<server path>?sap-system-login-basic_auth=X&sap-client=003&sap-language=EN&~TRANSACTION=IW33%20CAUFVD-AUFNR=%7bresult.OrderNumber%7d&~OKCODE=/00
     > ```

   - With a URL, you can provide a link to any page or app that can be addressed via the HTTP(S) protocol. This option may be useful, for example, if the recommended action simply recommends looking up some information on a Web site maintained by the help desk organization of the customer. However, this option is also the right choice for a more complex app such as creating a service ticket for a thing whose sensors have determined a value outside of the tolerance range. For details, see the separate example topic in the *Related Information* section.

   > **i Note**
   >
   > As mentioned above, this step is optional, and you are free to decide not to provide any intent or URL for the action history. However, keep in mind that this feature adds a lot of comfort to users and makes it much easier for them to understand where the initial issue originated from and what further actions may have been taken.

Related Information

Example: SAP C4/HANA Service Ticket [page 10]

2.1.1.1 Example: SAP C4/HANA Service Ticket

Configuration of an action to create a service ticket for equipment showing unusual sensor data.

Introduction

In this chapter, we explain how you can set up a possible action in a decision support scenario. In particular, you can learn how to pass the relevant technical data of a device to a service ticket so that the person taking care of the service request has a clear understanding of which device needs to be checked.

The service tickets offered by SAP C4/HANA are a powerful tool to request a service of whatever kind for solving all kinds of issues that you may face in the context of your daily business. Therefore, for setting up a decision support system, it is a good idea to always offer a possible action that recommends creating a service ticket. The service ticket then serves as a generic vehicle that can be used for addressing an issue, letting the system find an expert who is specialized on the issue in question, and for keeping track of the entire process from ticket creation to problem solution.

Configuring a Service Request as a Possible Action

Once you have done the first general settings for a new possible action that shall recommend creating a service ticket, you may proceed by providing the following settings for the new action:

1. For the *Descriptive Text*, you may make use of the possibility to include dynamic content by providing a text like this:
   Create Service Ticket in SAP Cloud for Customer for Equipment {properties.equipmentId}.
   In this sample text, the variable part `{properties.equipmentId}` is replaced at runtime with the ID of the device for which a service is required
2. As *Action Mode*, choose **`Quick Create`**.
3. For the *Quick Create Intent*, enter **`ServiceTicketQC-quickcreate`**.
4. For the *Quick Create Binding*, enter the following payload in JSON format:

```
{
    "Name": "{properties.device.exception}",
    "ServicePriorityCode": "{properties.device.ServicePriorityCode}",
    "ProcessingTypeCode": "{properties.device.ProcessingTypeCode}",
    "CustomerID": "{properties.device.CustomerID}",
    "InstallationPointID": "{properties.device.InstallationPointID}",
    "SerialID": "{properties.device.SerialID}",
    "DataOriginTypeCode": "{properties.device.DataOriginTypeCode}"
}
```

5. As *Action History Intent or URL*, enter the following URL (make sure you adapt the `<server path>` part to your landscape):
   `https://<server path>.crm.ondemand.com/sap/ap/ui/clogin?bo_ns=http%3a%2f%2fsap.com%2fthingTypes&bo=COD_GENERIC&node=Root&operation=OnExtInspect&param.InternalID={result.ObjectID}&param.Type=COD_SRQ_AGENT_TT&sapbyd-agent=TAB&OBNRedirect=X`

With this URL, users will find a link in the action history that lets them navigate directly to the service ticket that has been created for the device by the decision support system.

2.2 Maintain a Recommendation

Process steps for updating a recommendation.

Context

As an administrator, you want to modify a recommendation of different possible solutions for a particular business situation, e.g., by adding more suggestions of possible actions that a person in charge could perform to handle a critical business situation.

> **i** Note
>
> For an existing recommendation, you can only change the assigned possible actions, externalized data, or translations. As opposed to that, the settings in the *General Information* section cannot be changed.

Procedure

1. From the launchpad, start the *Recommendation Definition* app.

   The system presents the list of recommendations hat are already available.
2. Click the recommendation that you want to maintain.

   The system presents the *Definition* screen.
3. Make the desired changes and choose *Save*.

   The system takes you back to the entry screen.

2.3 Delete a Recommendation

Process steps for updating a recommendation.

Context

As an administrator, you want to delete a recommendation. This can be useful for various reasons, e.g.:

- The root cause for a critical business situation has been detected, and a solution has been implemented that ensures this kind of situation cannot occur anymore.
- Your organization has found a way to automate the decision process for the situation in question so that manual intervention by a human expert is not needed anymore.

Procedure

1. From the launchpad, start the *Recommendation Definition* app.

   The system presents the list of the available recommendations.
2. In the left-most column of the list of available recommendations, click the entry you want to delete.

   The marked entry is now highlighted in the list.
3. In the toolbar on top of the list, choose *Delete*.

   The system presents a confirmation dialog.
4. If you are sure you want to delete the entry, choose *Delete*.

3 Recommendation Screen

An app for monitoring incoming recommendations for the person in charge to handle the situation.

Overview

You use this app to gain an overview of the business situations for which the system has generated a recommendation. To find out whether there are any new recommendations for you available, it is sufficient to just have a look at the Fiori Launchpad: Here, in the upper right corner, the system presents a notification icon indicating that you should have a look at what has arrived in your worklist. You can then walk through the recommendations, check the suggested actions for handling the situation and finally decide for one of the alternatives.

In the detail screen for each recommendation, the system presents certain information on the device where a problem has occurred, the failure information that the system has collected, as well as the possible actions that the system suggests for handling the situation.

Once you have decided for an action, select the suggestion and choose *Initiate Action*. The system starts the assigned action and logs an entry in the *Action History*.

4 Decision Support Extension for SAP Web IDE

Build a decision support application to resolve device alerts in SAP Web IDE.

Overview

At first glance, accessing sensor data from an IoT-enabled device and deriving business decisions based on the incoming values may look like a challenging task. However, SAP IoT helps you getting this task done very easily by providing a ready-to-use template in SAP Web IDE that you can use for that purpose. With that, the following scenarios are covered:

- Building an application that leverages UI controls and data from SAP IoT.
- Using templates to speed up developing prototypes for certain use cases.

Creating a decision support app based on the SAP IoT template for SAP Web IDE comprises the following subtasks:

- Creating an app and defining initial settings.
- Setting up a destination that the app can use to access sensor data (only required if no such destination has been set up before).
- Test drive the newly created app.

Prerequisites

You have been provided a link for logging on to SAP Web IDE by your system administrator.

Related Information

Create a Template-Based Decision Support Application [page 15]
Set up a Destination for Decision Support Application [page 16]
Run the Decision Support Application [page 17]

4.1 Create a Template-Based Decision Support Application

Process steps for creating a template-based decision support application in SAP Web IDE

Context

As a developer, you want to set up a decision support application that makes use of the template provided by SAP IoT for easy access to sensor data sent by physical devices that are connected to the Internet of Things.

Procedure

1. Log on to SAP Web IDE Full Stack.
   To log on, use the same credentials as the ones that you use for logging on to the Thing Modeler.
2. Choose ⚙ *Preferences*.
3. Choose *Extensions*.
4. Activate the following extensions: *SAP Leonardo IoT*, *Web IDE Layout Editor*, *Storyboard*.
5. Choose *Save*.
   The system prompts you that the settings need to be refreshed for the changes to take effect. Choose *Refresh*.
6. Choose ⌂ *Home*.
7. In the *Create a Project* section of the homepage, choose *New Project from Template*.

   The system presents the application wizard.
8. From the *Category* dropdown list, choose *Internet of Things*.

   This category is available only if the *Environment* has been set to *Cloud Foundry*.
9. From the available templates, choose *IoT Decision Support Application*.
10. Choose *Next*.
11. In the *Basic Information* step, enter a (technical) *Module Name* and a *Title* in natural language.
12. Choose *Next*.

    The system takes you to the *Confirmation* step.
13. Choose *Finish* to start the generation of the new application.

    The system generates the code and opens the new application in the code editor. The generated files are displayed in the folder tree as subentries of the node that is named like the *Module Name* that you previously entered in the *Basic Information* step of the wizard.

Results

You are now done with the initial steps for creating the application. Next, continue with setting up a destination for the new application.

> **i** Note
>
> If you have already set up a destination before, you can skip the next subtask.

Related Information

Set up a Destination for Decision Support Application [page 16]

4.2 Set up a Destination for Decision Support Application

Connect the application to your tenant.

Context

As a developer, you have performed the initial steps for setting up a new decision support application based on the respective template. Now, you want to test drive the new application. To do so, you first need to define a destination in SAP BTP Cockpit that points to your tenant, which contains all your things and their sensor data:

Procedure

1. Log on to SAP BTP Cockpit.
2. Navigate to the subaccount that you want to use as your data source.
3. From the menu pane, choose *Destinations*.
4. On the *Subaccount - Destinations* page, choose *New Destination*.
5. Configure the new destination as follows:

Field	Value
Name	`IOT_LAUNCHPAD`
Type	`HTTP`
Description	`IoT Launchpad`

Field	Value
URL	URL of the IoT Fiori Launchpad for your tenant, for example: `https://<your-tenant>.leonardo-iot.cfapps.eu10.hana.ondemand.com`
Proxy Type	**`Internet`**
Authentication	**`NoAuthentication`**

6. Choose *Save*.
7. Choose *Check Connection* to see if the new destination works as desired.

Results

Once the system has successfully established a connection to your tenant via the newly created destination, you are done with this task. You can now switch back to SAP Web IDE to start a test run of your new application.

Related Information

Run the Decision Support Application [page 17]

4.3 Run the Decision Support Application

Test drive the newly created application.

Context

As a developer, you have performed the initial steps for creating a new decision support application and you have provided a destination for accessing the data in your tenant.

Procedure

1. Log on to SAP Web IDE Full Stack.
2. Choose <> *Development*.
3. In the folder tree, right-click the top-level node that is named like the *Module Name* that you have provided during the initial steps.

4. From the context menu, choose *Run* > *Run Configurations*.
5. Choose + to open a list of different run modes for the new run configuration.
6. From the dropdown list, choose *Run as Web Application*.
   The system presents the configuration details screen.
7. On the configuration details screen, make the following settings:

Field	Value
Name	`Preview Configuration`
File Name	`flpSandboxMockServer.html` **i Note** As soon as you start typing the file name, the system autmatically completes the entire path so that you only need to confim this setting.
Target Environment	`Run on Neo`

8. Choose *Save and Run*.
   The application starts in a new browser tab.
9. On the application start screen, choose *Go*.
   The app displays an entry in the list of already prepared IoT-related business situations, e.g. "Temperature exceeded threshold"
10. In the list click the notification text.
    The system presents the new Decision Support app running with sample data. By default, the system offers three possible actions to handle the situations plus an "Execution Result" section used for logging the action that was actually chosen by the employee in charge.

5 Workflow Configuration for Decision Support

How to enable workflow as an additional action mode for possible actions.

Overview

For many business situations, it is sufficient to respond with just one single action. However, for numerous other situations, the recommended action may comprise a higher number of activities and process steps in a well-defined sequence. Such predefined sequences are referred to as workflow. In an SAP BTP environment, you can set up and execute workflows with the help of the SAP BTP Workflow service. Once you have defined a workflow, you can extend the list of supported action modes for possible actions offered in a recommendation of the Decision Support Service.

Prerequisites

You have made sure that your SAP BTP license covers usage of the SAP BTP Workflow service. Also, before starting workflow configuration for the Decision Support Service, you have created a workflow service instance in the space that is assigned to your SAP BTP subaccount. Finally, before defining a possible action with action mode *Workflow*, you have to define the respective workflow with the SAP BTP Workflow service.

Procedure

To configure workflow support for the Decision Support Service, proceed as follows:

1. In SAP BTP Cockpit, navigate to the workflow instance that you have subscribed from your subaccount.
2. Note down the values of the following properties of your workflow service instance service key:
   - `endpoints->workflow_rest_url`
   - `uaa->url`
   - `uaa->clientid`
   - `uaa->clientsecret`
3. In SAP BTP Cockpit, navigate to the subaccount in which you have subscribed to SAP IoT.
4. Choose *Connectivity* > *Destinations*.
5. Choose *New Destination*.
6. Enter the following values:
   - *Name*: **`scpworkflow`**
   - *URL*: The Workflow Service Instance `workflow_rest_url` without the trailing path, for example: `https://api.workflow-sap.cfapps.eu10.hana.ondemand.com`.
   - *Authentication*: **`OAuth2ClientCredentials`**
   - *Client ID*: Value of `uaa->clientid`

- *Client Secret*: Value of `uaa->clientsecret`
- *Token Service URL*: Workflow service instance `uaa->url`, appended by `/oauth/token`, for example: `https://my-tenant.authentication.eu10.hana.ondemand.com/oauth/token`

> **i** Note
>
> For all other fields that are **not** listed above, leave the default values unchanged.

7. Choose *Save*.

Test the Workflow Configuration

Once you are done with the configuration settings, we recommend taking the following steps to verify that the workflow configuration is correct and everything works fine:

1. From the launchpad, start the Decision Support Definition app.
2. Choose any of the already existing recommendations from the list.
3. On the recommendation detail screen, scroll to the *Possible Actions* section and choose *Create*.
4. Expand the *Action Mode* dropdown list and check if the list contains an entry for the *Workflow* action mode.

Related Information

SAP BTP Workflow

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