Extensibility Guide | PUBLIC

Quick Time Entry for SAP S/4HANA Cloud Time Recording

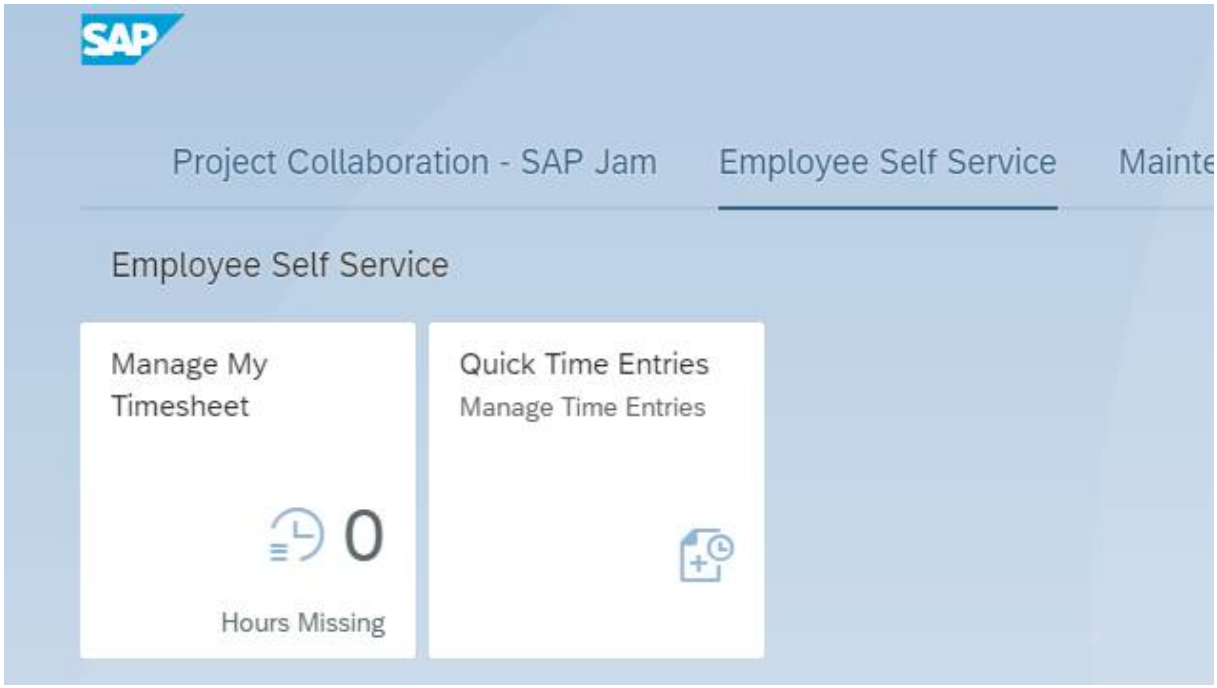
THE BEST RUN SAP

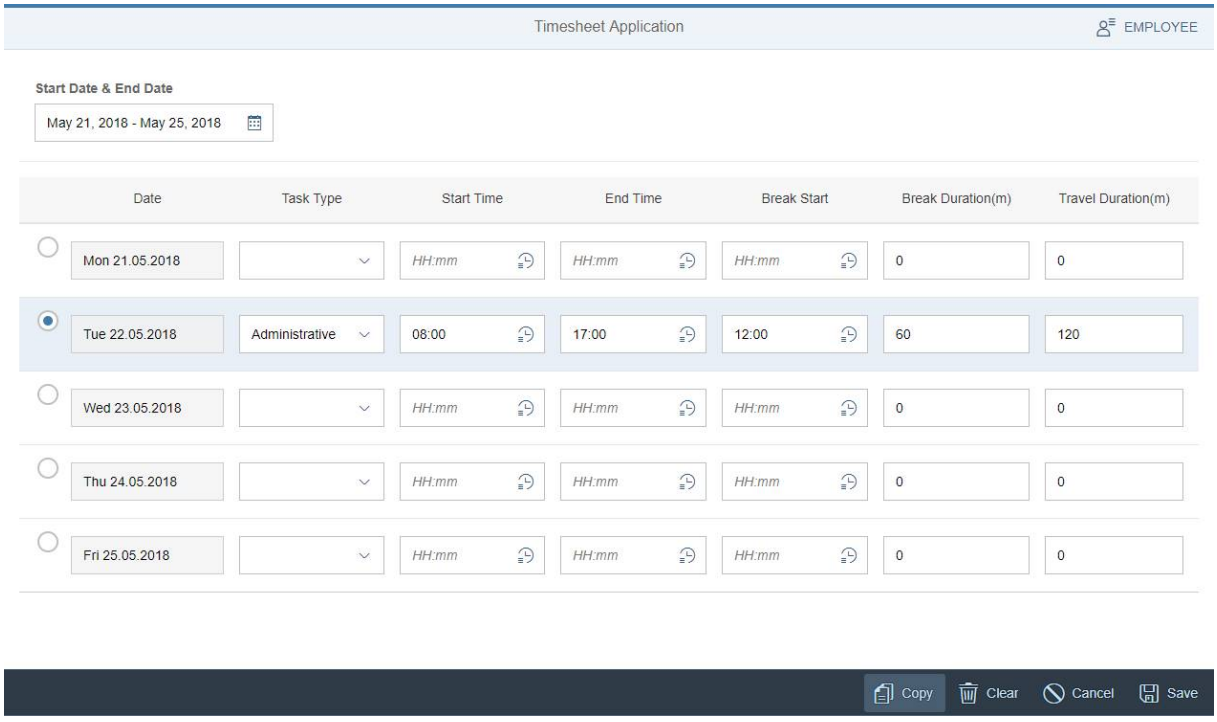
Content

1 Scenario Description

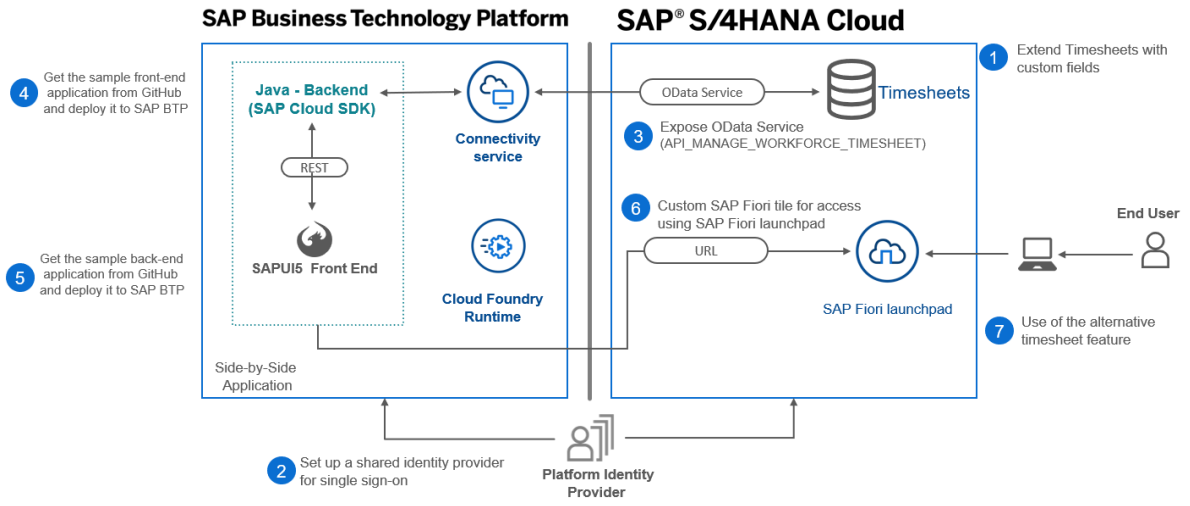
> **i** Note
>
> This sample scenario is for learning purposes only. It is intended to give you an understanding of the various technical aspects related to extending SAP S/4HANA Cloud. The sample scenario may not always be available in a readily consumable state due to the continuous improvements being made in the underlying products or services. If this is the case, appropriate adaptations based on the latest documentation of the respective products or services are required.

Scenario Description	Focal Points	Notes and Limitations
This simple time-recording app allows your employees to record their working time in a fast and efficient way. They record only one task type per day. In doing so, they record their full labor time including start, end, and break times. They can enter their time in a clear, table-based format and can easily add travel times and break times to their recorded days. Additional features such as copy & paste, consistency validations, and a responsive UI for mobile usage further enhance the user experience.	• Target group: SAP S/4HANA users who want to record times in a different way to the standard UI • Connection setup of the SAP S/4HANA Cloud system and the SAP Business Technology Platform • Cloud Identity setup for securing the application with the same user that is used for SAP S/4HANA Cloud • Creation of a freestyle sample Java web-application with REST services using Spring with a simple SAP Fiori UI • Deployment of the app to the SAP Business Technology Platform • Exposure of standard APIs that are provided by SAP S/4HANA Cloud for consumption • Reading data from SAP S/4HANA Cloud (based on the logged-on user) • Writing back data to SAP S/4HANA Cloud	• This sample application reads and writes data from the SAP S/4HANA Cloud back-end system. • A technical user enables communication.


Project Collaboration - SAP Jam
Employee Self Service
Maint
Employee Self Service
Manage My Timesheet
0
Hours Missing
Quick Time Entries
Manage Time Entries


Timesheet Application
EMPLOYEE
Start Date & End Date
May 21, 2018 - May 25, 2018
Date
Task Type
Start Time
End Time
Break Start
Break Duration(m)
Travel Duration(m)
Mon 21.05.2018
Tue 22.05.2018
Administrative
08:00
17:00
12:00
60
120
Wed 23.05.2018
Thu 24.05.2018
Fri 25.05.2018
HH:mm
0
Copy
Clear
Cancel
Save

2 Overview



The following table provides you with a short overview of the major steps executed in this scenario:

Step	Section	Details
1	Creating Custom Fields for Timesheet [page 9]	You're adding custom fields to the SAP S/4HANA Cloud system that are required for this use case. You'll enhance the standard timesheet by adding information about start, end, and break times.
2	Configuring Single Sign-On [page 10] (Optional)	In this step, you're learning how to configure the same Identity Provider (IdP) for the SAP S/4HANA Cloud and for an SAP Business Technology Platform account that hosts the sample application. **i Note** This step is optional. Alternatively, you could use any identity provider for your SAP Business Technology Platform. However, it's crucial that the identity provider user ID that is used for authentication is the same as the SAP S/4HANA Cloud Employee ID that is used for the Timesheet OData service call. The Java application will use the ID of the user who's currently logged on from the configured identity provider for all the CRUD operations against the SAP S/4HANA Cloud Timesheet API.
3	Communication Arrangement [page 11]	Using a technical user (communication user), the communication arrangement authorizes an external system (communication system) to call a defined API (communication scenario).

Step	Section	Details
4	Timesheet – Build the Sample Application and Deploy to SAP BTP [page 13]	In this step, you're downloading, adapting, and deploying the sample app to your SAP Business Technology Platform account.
5	Adding a Custom Tile to the SAP Fiori Launchpad [page 18]	You can add the app that is hosted by SAP Business Technology Platform to your SAP Fiori launchpad. The app will be displayed as a tile (you've linked the tile to the app) to make it easily accessible.
6	Use the SAP Business Technology Platform Application [page 19]	By accessing your SAP Business Technology Platform app using the custom tile, you can now use the alternative Timesheet application.

3 Preparation

To be able to perform the steps in this document, you need to make sure that the following prerequisites have been met:

Prerequisites	Details
SAP S/4HANA Cloud system	You have access to an SAP S/4HANA Cloud system with all the necessary users and authorizations (refer to the following prerequisites).
SAP Business Technology Platform, Cloud Foundry environment	You have an SAP Business Technology Platform account. For more information on SAP Business Technology Platform accounts, refer to SAP Business Technology Platform Accounts. **i Note** For non-productive/testing purposes, you can use an SAP Business Technology Platform trial account. Find more information on how to get a trial account. However, if want to try out this sample scenario, you need to have a productive SAP BTP, Cloud Foundry subaccount.

Prerequisites	Details
Personas/users and authorizations	The following personas can be involved in the scenarios. However, depending on your use case, there might be differences. **SAP S/4HANA key users**: They have the key user authorizations in the SAP S/4HANA Cloud system that are required to create key user extensions (for example, they can create custom fields and so on). The SAP_BCR_CORE_EXT (Extensibility) business role must have been assigned to these users. **SAP S/4HANA administrators**: They have the administration authorizations in the SAP S/4HANA Cloud system that are required, for example, to create communication arrangements, or to assign business roles to users. The SAP_BCR_CORE_COM (Communication Management) and the SAP_BCR_CORE_IAM (Identity and Access Management) business roles must have been assigned to these users. If the roles mentioned above are not available, make sure that the following business catalogs are assigned to the roles that the users do have. This ensures that users have the necessary authorizations and can access the respective SAP Fiori launchpad apps. • `SAP_CORE_BC_EXT` (for the key user) • `SAP_CORE_BC_COM` (for the communication management) • `SAP_CORE_BC_IAM` (for the identity and access management; only if needed) • `SAP_BR_EMPLOYEE (for the standard my timesheet application)` You can, for example, create a new custom business role if necessary. Use the *Maintain Business Roles* app. Add the business catalogs on the *Assigned Business Catalogs* tab. **SAP Business Technology Platform administrators**: They have the administration authorizations that are required, for example, to set up the account in general, to add developers as members to the account, or to create destinations. **Developers**: Java developers, SAP Fiori developers, or both who use, for example, Eclipse and/or SAP Web IDE to develop the extension app.
Business data in the SAP S/4HANA Cloud system	**Appropriate business data must be available** in the SAP S/4HANA Cloud system to make sure that you can follow the examples.

4 Implementation Steps

4.1 Creating Custom Fields for Timesheet

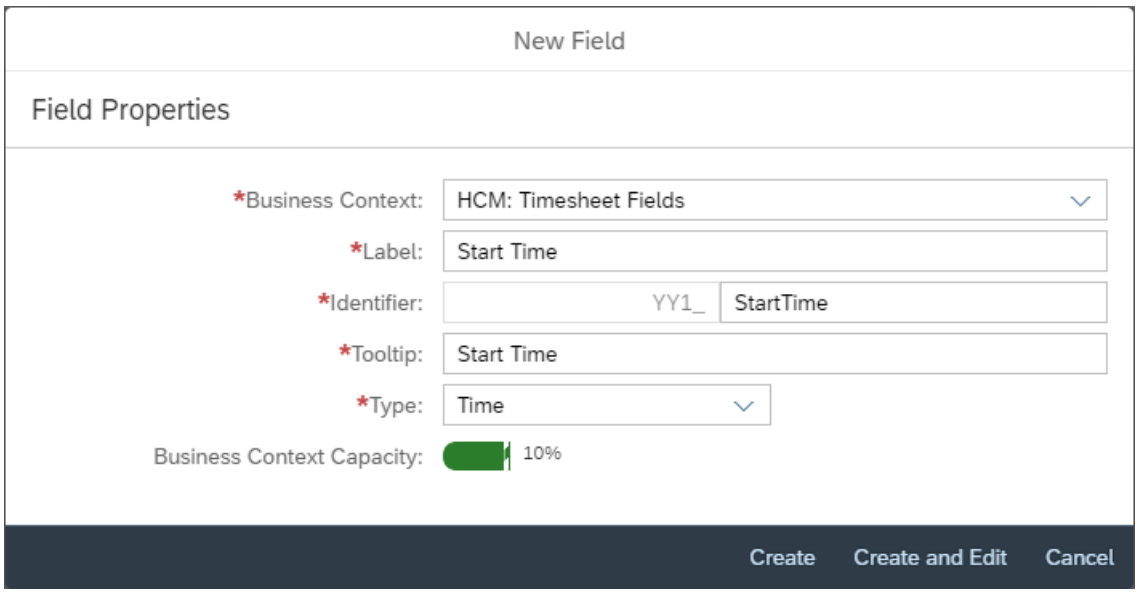
Carry out the following steps to add fields for the start and end time to the standard timesheet in our timesheet extension.

Prerequisite

The `SAP_CORE_BC_EXT` business catalog is assigned to the user.

Procedure

1. Log on to the SAP Fiori launchpad.
2. To launch the *Custom Fields and Logic* app, choose the corresponding SAP Fiori tile in the *Extensibility* catalog.
3. To create a new custom field, choose +.
4. A new window is displayed.



5. To create a new field, under *Business Context*, select *HCM: Timesheet Fields* from the dropdown list. Under *Label*, enter **`Start Time`**. Under *Type*, select *Time* from the dropdown list.

> **Note**
>
> The *Identifier* and *Tooltip* fields are automatically populated according to the value you provided for *Label*.

6. Choose *Create and Edit* to create and edit the custom field.
7. A new window is displayed. Go to the *UI and Reports* tab and select the OData service data for which the field is to be extended. Choose *Enable Usage* .
8. Choose *Save* and *Publish*.
9. Once the extended field has been successfully published, it will be part of the metadata of the OData service and the corresponding database.
10. Repeat these steps to create a field for the end time (In step 5, enter **`End Time`** instead of **`Start Time`**).

4.2 Configuring Single Sign-On

Use

Configuring single sign-on (SSO) between SAP S/4HANA Cloud and SAP Business Technology Platform and enabling principal propagation ensures secure and consistent access to extension solutions.

In this specific case, the SAP S/4HANA Cloud system and the SAP Business Technology Platform subaccount must have mutual trust established and use the same identity provider.

By configuring single sign-on and using the same identity provider, you ensure that your SAP S/4HANA Cloud business user can log on to and access the side-by-side application.

Prerequisites

- You have an SAP Business Technology Platform account.
- You have an SAP S/4HANA Cloud system and an Identity Authentication service tenant to which the SAP S/4HANA Cloud system is already connected. For more information, refer to Identity Authentication.
- You have a user with administration authorization for the tenant's administration console for the Identity Authentication service.
- A separate "subaccount" for apps is used that is protected by the identity provider because the identity provider has been configured for a complete "subaccount".

Procedure

Carry out the implementation steps outlined in Configuring Single Sign-On on Cloud Foundry Environment.

Result

You've established a trust between the Identity Authentication service and SAP Business Technology Platform. Your business user is now able to log on to and access the side-by-side application.

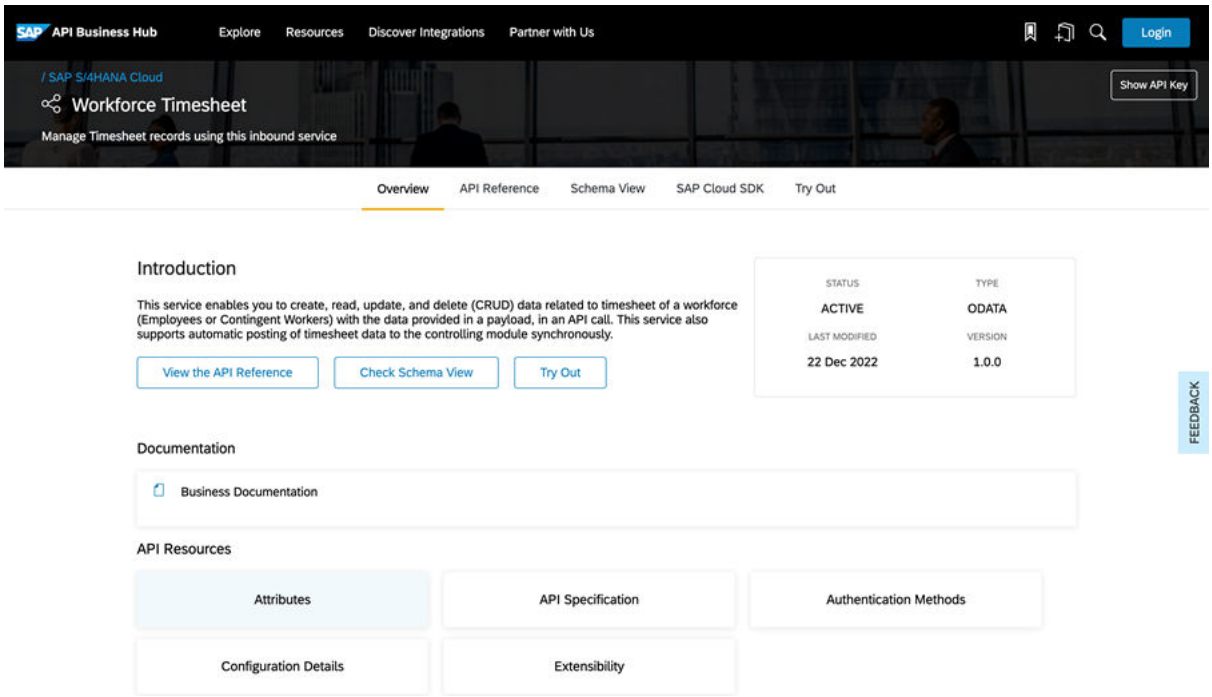
4.3 Communication Arrangement

In this scenario, a side-by-side application reads, creates, updates, and deletes workforce timesheet data in SAP S/4HANA system. For that purpose, we're using standard, resource-based APIs of SAP S/4HANA.

To find an overview of all available APIs, refer to the SAP API Business Hub. Navigate to *APIs* > *SAP S/4HANA Cloud*.

The SAP API Business Hub contains technical documentation and references to business documentation. You can find the technical name of the communication scenario (for example, `SAP_COM_0027`) and the corresponding scope item in the API Hub.

To allow inbound communication to the SAP S/4HANA tenant, we need to create a communication arrangement first. The communication arrangement defines which system (communication system) and which user can call which APIs (communication scenarios).



In this example, you're creating a communication arrangement. You're allowing access to the Manage Workforce Timesheet API (SAP_COM_0027) using a technical user.

Prerequisites

The `SAP_BCR_CORE_COM` business role must have been assigned to your user.

4.3.1 Creating a Communication System and a User

Procedure

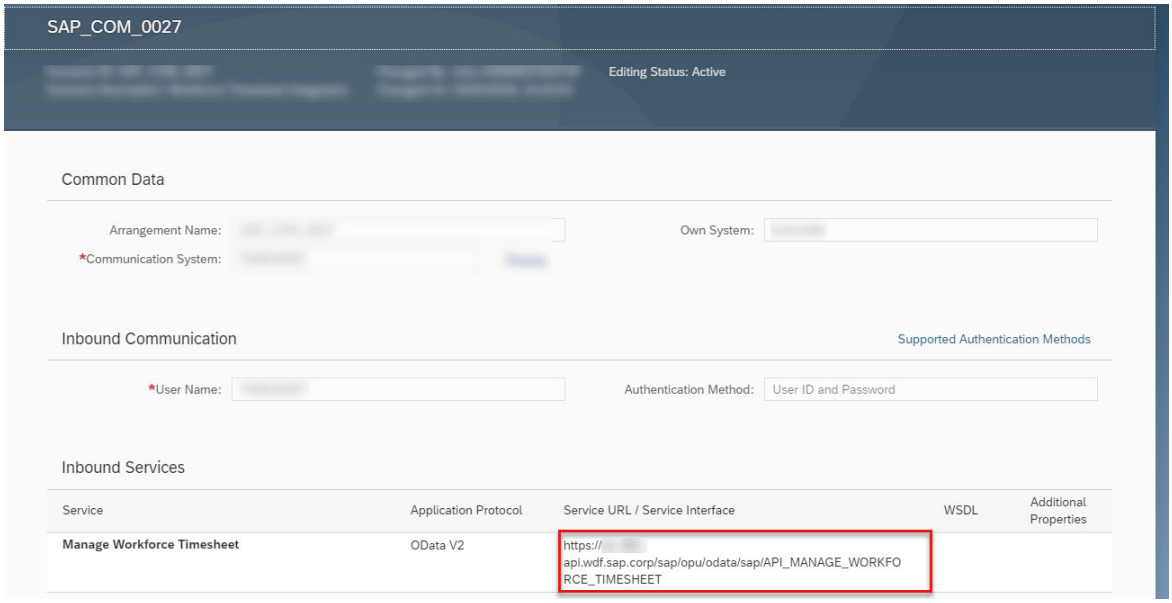
1. Log on to the SAP Fiori launchpad.
2. Go to the *Communication Systems* app.
3. Choose *New*.
4. Enter a system ID (for example, `COM_TIMESHEETAPP`) and a system name.
5. Choose *OK*.
6. On the *Communication System* screen, enter a host name. Since this communication system is only used for inbound calls, enter **`localhost`** as value.
7. Make an entry (such as **`My System`**) in the *Logical System* field.
8. In the *Users for Inbound Communication* section, choose *Add* to create a new communication user.
9. In the dialog box, choose *New User*.
10. Alternatively, you can also create a communication user using the *Maintain Communication Users* app. If you've already created a user, enter the user in the *User Name* field using the value help icon.
11. On the *Create Communication User* screen, enter a user name (for example, **`TIMESHEET_API_USER`**) and a description.
12. Enter a password.
13. Choose *Create*.
14. On the *Communication System* screen, the new user is automatically inserted in the *User Name* field dialog box. The authentication method is *User Name and Password*.
15. Choose *OK*.
16. Save the new communication system.
17. Make sure that the status is *Active*.

4.3.2 Communication Scenario

A communication scenario bundles inbound and outbound communication design-time artifacts. Since it allows communication between systems, each communication arrangement must be based on a communication scenario. For all standard APIs, SAP S/4HANA provides predefined communication scenarios. For our purpose, we're using the Workforce Timesheet Integration (SAP_COM_0027) communication scenario.

4.3.3 Creating Communication Arrangements

1. Go to the SAP Fiori launchpad.
2. Go to the *Communication Arrangements* app.
3. To create a new communication arrangement, choose *New*.
4. To create a communication arrangement for the *Manage Workforce Timesheet* API, select *SAP_COM_0027*.
5. Adapt the *Arrangement Name* if required.
6. Choose *Create*.
7. In the *Common Data* section, enter the communication system that you created in the section Creating a Communication System and a User [page 12] (`COM_TIMESHEETAPP`) using the value help icon.
8. The technical user that you created in the previous step is automatically added to the *Inbound Communication* section.
9. Save your changes.
10. Check that the communication arrangements have been activated (the status *Active* must be visible).
11. **Note down the service URLs for your custom business object. You'll need the URLs later.** You find them in the *Inbound Communication* section of the communication arrangement.



4.4 Timesheet – Build the Sample Application and Deploy to SAP BTP

In this step, you download, adapt, and deploy the sample app to your SAP Business Technology Platform account.

This app uses the SAP S/4HANA Cloud SDK. It helps you to easily build extensions for SAP S/4HANA on the SAP Business Technology Platform.

The SAP Cloud SDK makes connecting to and integrating with any SAP S/4HANA system easy. The SAP Cloud SDK includes further features that facilitate application development, such as abstractions of the

underlying SAP Business Technology Platform implementation, fault-tolerance, cache management, and project templates.

Additionally, the SAP Cloud SDK delivers tools to help you get started quickly and to maintain high quality. For example, project starters and continuous integration tools. These components enable developers to set up the environment for development, quality assurance, and deployment that is essential for the development in cloud environments.

Prerequisites

- You've installed a JDK 8, which is available on the Oracle Java Downloads page. Use the JAVA_HOME environment variable.
- You've downloaded and installed Maven 3.5, which is available on the Apache Maven Project Download page.
- You've downloaded and installed the Git Command Line Interface, which is available on the Git Download page.
- You've downloaded and installed the Node Js Command Line Interface, which is available on the Node JS page.
- You've downloaded and installed the service management plug-in for Cloud Foundry tools, which is available at https://docs.cloudfoundry.org/cf-cli/install-go-cli.html .
- You've downloaded and installed the Cloud MTA Build Tool (MBT), which is available on SAP Build solutions for multitarget applications at https://github.com/SAP/cloud-mta-build-tool .
- (Optional) To use an integrated development environment such as Eclipse, refer to the tutorial about how to configure an Eclipse IDE for Java development on SAP Business Technology Platform at https://developers.sap.com/tutorial-navigator.html.

> **i Note**
>
> Make sure that all binaries are maintained in your environment PATH variable. If you're behind a web proxy, make sure that you configure the proxy settings accordingly (for example, settings.xml for Maven, environment variable HTTPS_PROXY for Git, network settings in Eclipse).

4.4.1 Setting Up Destinations

The destination feature of SAP Business Technology Platform enables you to externalize configurations from your applications. For the sample application, you need one destination to establish a connection to the SAP S/4HANA system that is connected to the application.

4.4.1.1 Creating a Destination to the SAP S/4HANA Cloud System

The application uses the SAP Cloud SDK to connect to the OData APIs of the SAP S/4HANA system. However, the SAP Cloud SDK uses the SAP Business Technology Platform destination service internally to provide a separation code and configuration.

In this step, you create a destination to define the outbound communication of the side-by-side application to the SAP S/4HANA Cloud system. In this app, the actual connection to the SAP S/4HANA Cloud is set up using the communication user. Principal propagation to the SAP S/4HANA Cloud system is possible, but it is out of scope for this guide.

Procedure

1. Sign in to your SAP Business Technology Platform account.
2. In the cockpit, go to *Connectivity* > *Destinations*.
3. Choose *New Destination*.
4. Enter the following data:

Property	Value
Name	**S4HANA_CLOUD**
Type	**HTTP**
Description	**<for example the name of your communication arrangement>**
URL	**<the base URL to your SAP S/4HANA Cloud system, note the "-api", for example https://myXXXXXX-api.s4hana.ondemand.com>**
Proxy type	**Internet**
Authentication	**BasicAuthentication**
User	**<the user that you've created, for example EXTORDERD_API_USER>**
Password	**<the password that you've created>**

> **Note**
>
> The user and password depend on the communication arrangement that has been created in your SAP S/4HANA Cloud system (refer to the section Creating a Communication System and a User [page 12]).

4.4.2 Downloading Consumer Applications

Procedure

1. Go to the sample app repository on the GitHub .
2. Download and extract the ZIP file that you get from the GitHub repository.
   Alternatively, you can clone the repository using this command:

   > **Sample Code**
   >
   ```
   git clone https://github.com/SAP-samples/s4hana-cloud-ext-timesheet.git
   cd s4hana-cloud-ext-timesheet
   ```

   If you want to clone only the single branch, use:

   > **Sample Code**
   >
   ```
   git clone -b timesheet-cf --single-branch git://github.com/SAP-samples/
   s4hana-cloud-ext-timesheet.git
   cd s4hana-cloud-ext-timesheet
   ```

> **Note**
>
> Sample extension scenarios are designed to help you get an overall understanding of various extensibility concepts and patterns. We recommend that you do not use these samples for productive use.

4.4.3 Building the Consumer Application

Procedure

1. Go to the *timesheet-cf* folder and open the *mta.yaml* file using the notepad editor of your choice.
   You can find that it has four modules, namely *approuter*, *server (java backend)*, *webapp deployer* , and *ui*.
   When you build the application, these modules are deployed in your SAP BTP account.

2. Go to the *timesheet-cf* folder using the command **`mbt build`**.
   The folder "../timesheet-cf/mta_archives/**time-sheet_0.0.1.mtar**" is created.

4.4.4 Deploying Consumer Applications

Prerequisites

- The service management plug-in for Cloud Foundry tools is installed on your computer.
- The application uses the following services on SAP Business Technology Platform.
  - Authorization and Trust Management Service
  - Destination Service
  - Application Logging Service
  - HTML5 Application Repository Service

  Make sure that the required quota is assigned to your subaccount.

Procedure

To deploy all applications at once, use the service management plug-in for Cloud Foundry tools.

1. Go to the command console.
2. Switch to the application folder (..\timesheet-cf) of the project structure.
3. Use the Cloud Foundry command **`cf login`** to log in to your Cloud Foundry account:
4. Enter the API endpoint you want to connect to.
   You can see this value in the *API Endpoint* field in your subaccount.
5. Enter your user name (your p-user) and password.
6. Push the **mtar** build applications to the cloud using this command:

   Sample Code

   ```
   cf deploy mta_archives/time-sheet_0.0.1.mtar
   ```

   Once the build is successful, you can access your application in SAP BTP.
7. Alternatively, you can get the application's URL using the command **`cf apps`**.

4.4.5 Adding a Custom Tile to the SAP Fiori Launchpad

In this step, you're adding a custom tile to your SAP Fiori launchpad. You can integrate external URLs, for example a side-by-side extensibility application that is hosted on the SAP Business Technology Platform. With this feature, business users can easily access our side-by-side extensions from within SAP S/4HANA.

Prerequisite

The `SAP_CORE_BC_EXT` business catalog must have been assigned to the user.

Procedure

1. Log on to the SAP Fiori launchpad in the SAP S/4HANA Cloud system.
2. Go to the *Extensibility* tile group and choose *Custom Tiles*.
3. To create a new custom tile, choose *New*.
4. In the *Create Tile* dialog box, enter a title and an ID.
5. Choose *Create*.
6. On the *Custom Tile Details* screen, you can maintain more details, for example subtitle and icon.

   > **i Note**
   >
   > Make sure that you maintain the URL (for example, the URL of the external HTML5 application from the SAP Business Technology Platform) together with the protocol prefix, for example **`https://`**.

7. Save your changes.
8. To determine where the new tile will be displayed, choose *Assign Catalogs*.
9. Choose *Add*.
10. In the *Add Business Catalog* dialog box, select the catalogs of your choice, for example the *Extensibility* business catalog (`SAP_CORE_BC_EXT`), and choose *OK*.

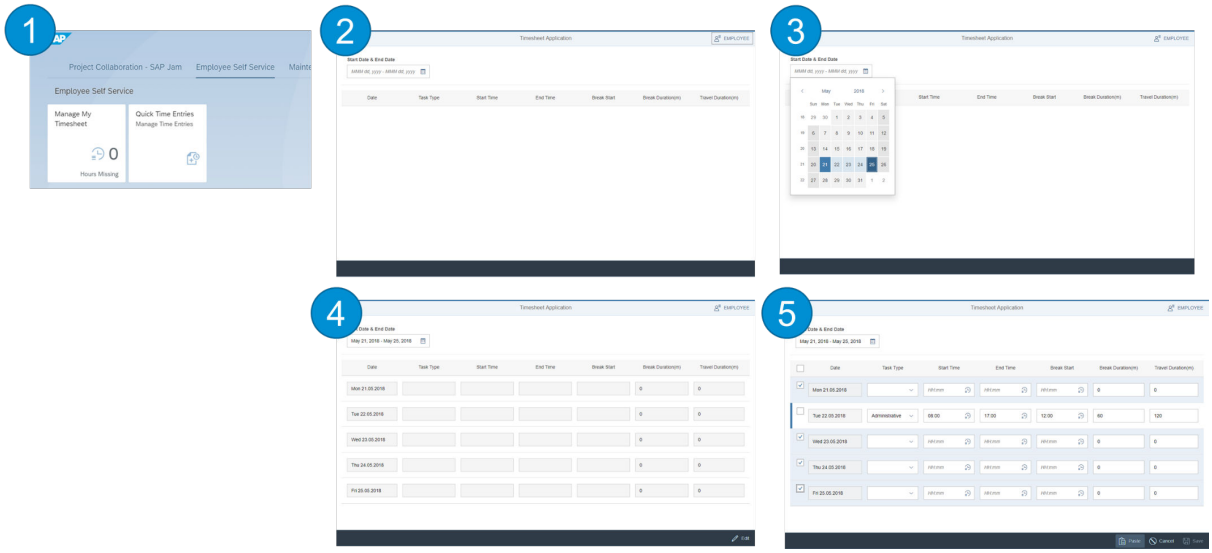
    > **i Note**
    >
    > The target users should have access to the catalog you select.

11. On the *Custom Catalog Extensions* screen in the *Used in Business Catalog* section, you see the catalog that you've added. It has the status *Unpublished*.
12. Select the checkbox of the catalog(s) and choose *Publish*.
13. In the *Confirmation* dialog box, choose *OK*.
14. The status changes to *Publishing*. It might take some time until it has the status *Published*.
15. Go back to the SAP Fiori launchpad. Once the tile has been successfully published, you find it in the group to which you've added it, for example in the *Extensibility* group. If you choose the tile, you're navigated to the page you maintained previously. It opens in another tab.

4.4.6 Use the SAP Business Technology Platform Application

After you've completed the steps in this guide, you can use the newly created side-by-side application. Log on as the SAP S/4HANA Cloud user to whom you've assigned your custom tile. Navigate to your SAP Business Technology Platform app and check out the custom Timesheet application.

You'll experience a completely different user interaction in comparison to the standard application. You can easily enhance this application yourself and adapt it to meet your needs.



4.4.7 Timesheet App Walkthrough

This topic illustrates a demo scenario. It gives you an example of how a specific use case for the *Timesheet* app is displayed.

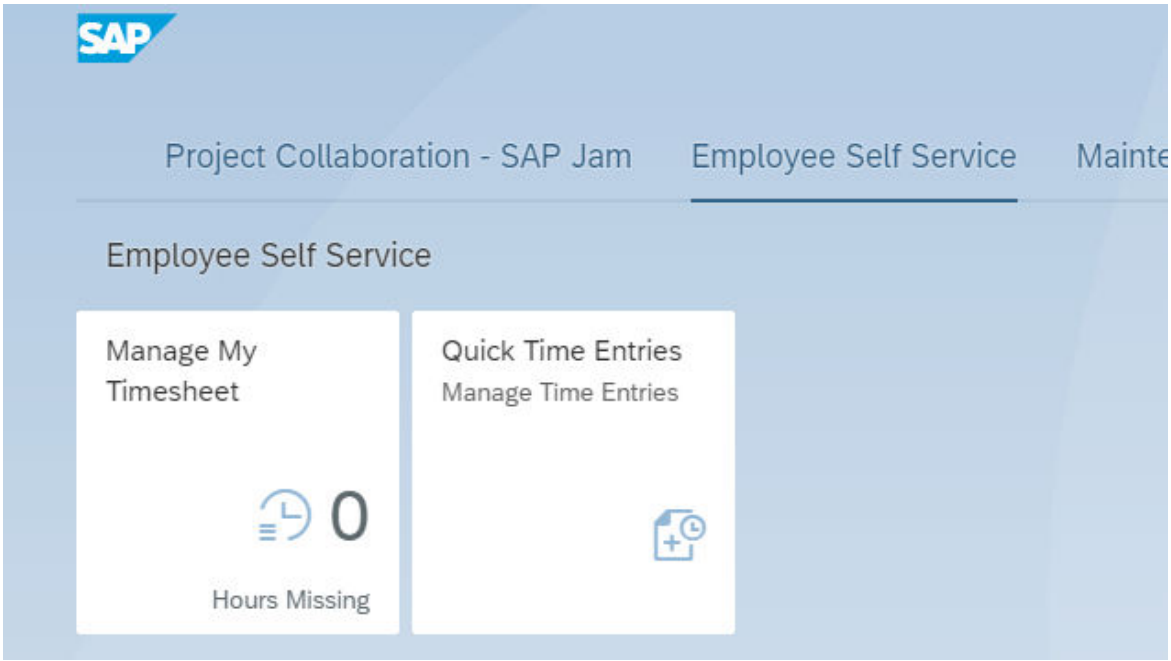
In this case, for an initial start up of the app, the onboarding is explained step by step. Afterward, new time records are added to the SAP S/4HANA system.

This section includes the following steps that tell you how to:

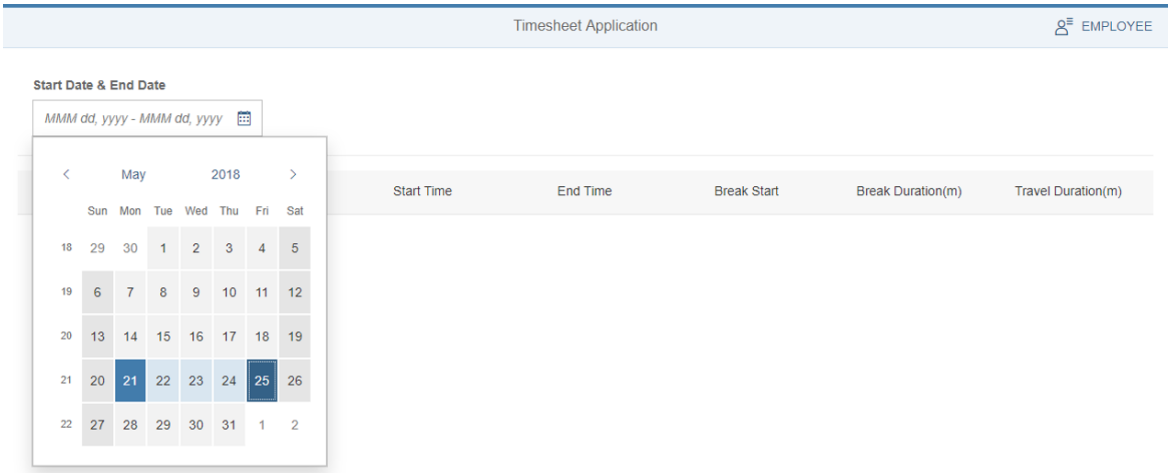
- access the *Timesheet* app
- select the period for which you would like to record an activity recording
- fill out the time period you selected

Procedure

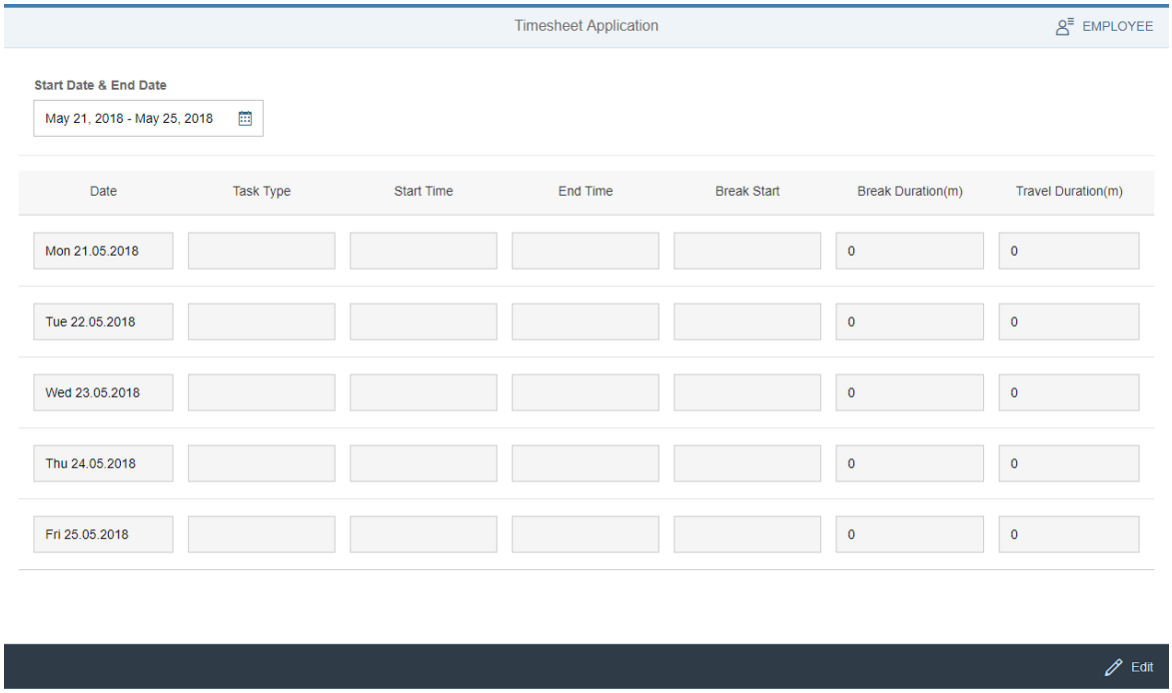
1. Log on as the SAP S/4HANA Cloud user to whom you've assigned your custom tile.
2. To launch the app, choose *Quick Time Entries*.



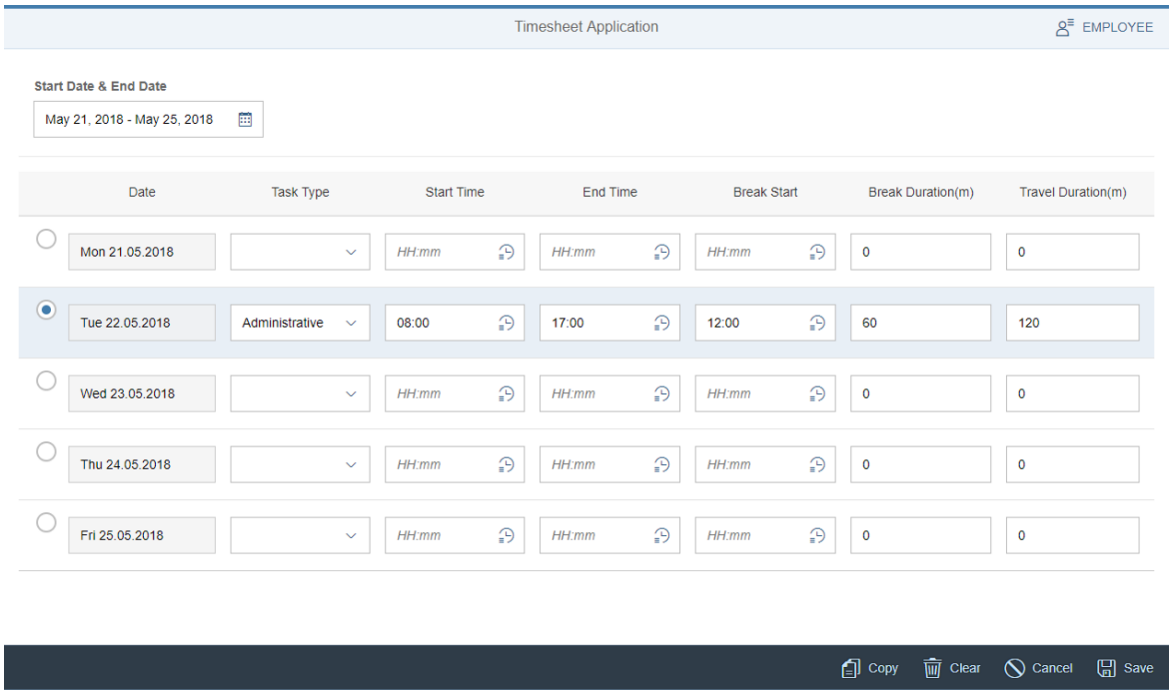
3. Choose the date picker to select the days for which you want to record your time and activities.



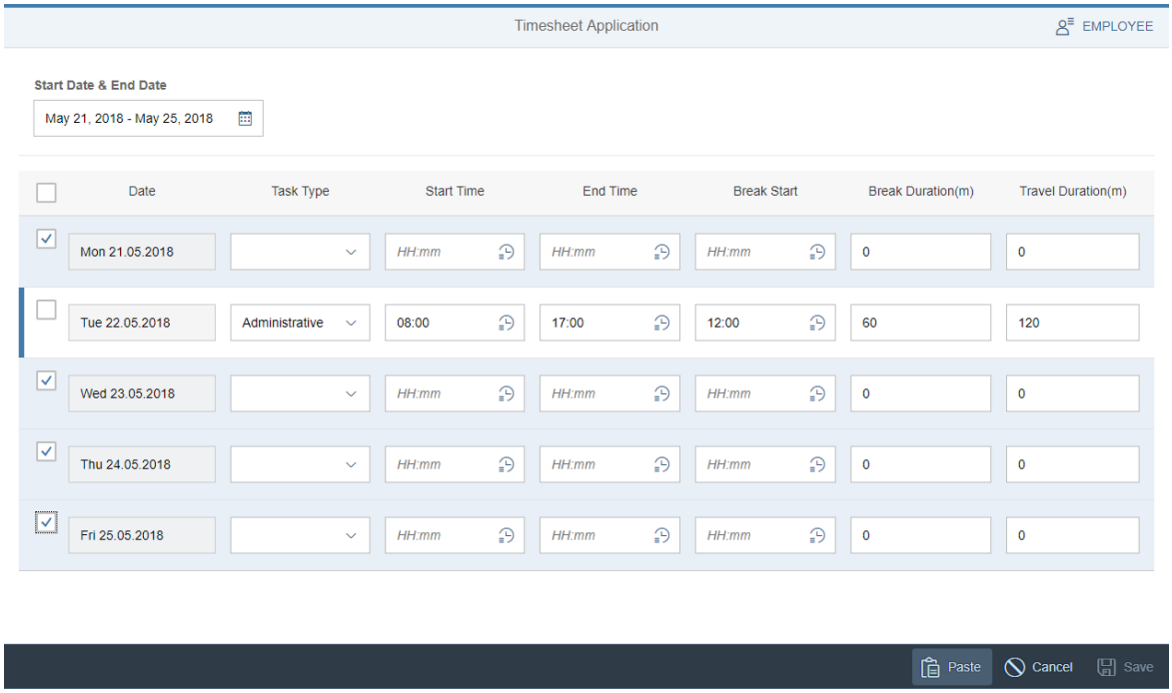
4. Once the data has been read from the back end, you see an empty work week.
5. To fill out one work day, choose *Edit* and enter specific data.



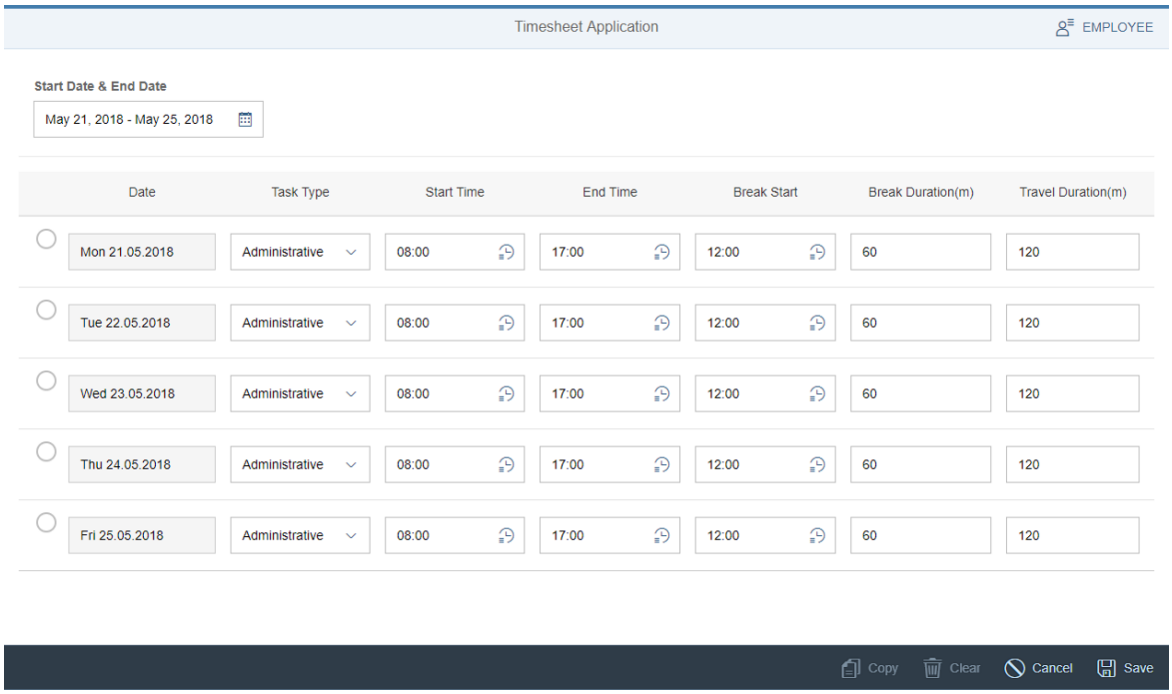
6. After you've entered data for one day, if you want to copy it, select this day and choose *Copy* .



7. The entry you copied is highlighted. Select the entries into which you want to paste the data and choose *Paste*.

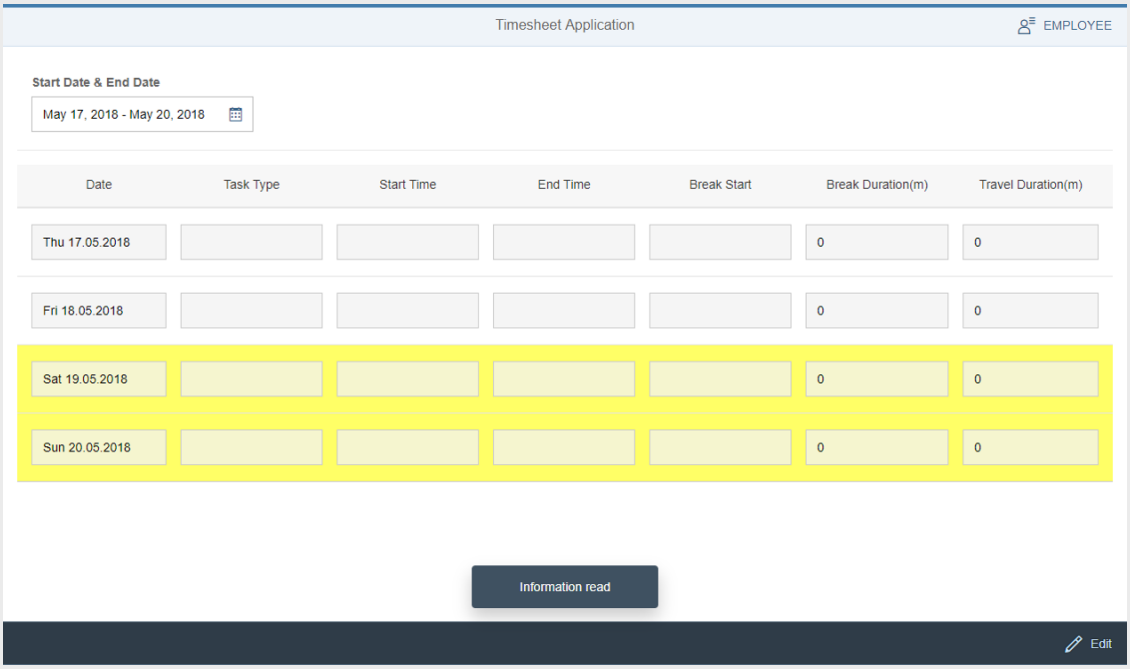


8. Now you can see the results. Choose *Save* to save your records.



i Note

If the period you selected contains weekend days, these days are highlighted.



4.4.8 Appendix

4.4.8.1 Issues

SAP does not offer any official support for the sample code (see the SAP SAMPLE CODE LICENSE AGREEMENT on GitHub). However, if you have any problems, use the *Issues* section on the GitHub to report an incident. We recommend that you browse through the known issues (https://github.com/SAP-samples/s4hana-cloud-ext-timesheet/issues) before reporting a new one.

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