



Implementation Guide | PUBLIC
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User Interfaces (Core Tool with Offers and Subscriptions)

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1 User Interfaces in SAP Convergent Charging

SAP Convergent Charging 5.0 provides you with **several user interfaces** to configure the SAP CC systems with master data, business data, or system level settings. You use these central tools to configure, administer, monitor, and operate all the SAP CC systems available in your SAP System Landscape.

The **main user interfaces** for IT consultants and IT administrators are:

- [Cockpit \[page 157\]](#)
- [Core Tool \[page 348\]](#)

See here the user experience (UX) for SAP CC:

- [Graphical User Interfaces - GUIs \[page 5\]](#)
- [Console User Interfaces \[page 1002\]](#)
- [Command-Line User Interfaces \[page 1004\]](#)
- [Index of User Interfaces \[page 1006\]](#)

2 Graphical User Interfaces - GUIs

SAP Convergent Charging 5.0 provides you with **several user interfaces** to configure the SAP CC systems with master data, business data, or system level settings. You can use these user interfaces to configure, administer, monitor, and operate all the SAP CC systems available in your SAP system landscape.

SAP Convergent Charging 5.0 provides graphical user interfaces to configure your main data in the SAP CC systems or to operate with productive systems.

These user interfaces are desktop Java-based programs (SAP CC Core Tool) or Web applications (SAP CC Cockpit) based on SAP Fiori and SAP UI5.

User Interface (UI)	Summary
Cockpit [page 157]	Cockpit is a web application that enables the SAP CC Application and System Administrators and power users to manage the SAP CC Core Server systems and data quickly and efficiently. Cockpit is a launchpad. It provides user-centric and guided access to the new apps of SAP Convergent Charging. It allows you to configure the system parameters.
Core Tool [page 348]	Core Tool is a graphical user interface that allows you to configure and maintain the master data (pricing catalog for a service provider) and business data (public holidays and currencies). You can configure some master data for the end customers of a service provider, only for test, demo, or training purposes. In an offline charging scenario, you can manage the rerating operations reserved to the application administrators for business administration.
BART Tool [page 6]	BART Tool is a graphical user interface that allows you to operate batch acquisition and batch charging of customer service consumption in an offline charging scenario in postpaid environment.
CAT Tool - IEC Application [page 55]	Connector Administration Tool (CAT Tool) is a graphical user interface that allows you to configure scenario scripts for importing, exporting, or modifying transactional data. You use this scenario file to configure an Import/Export Connector (IEC) application installed in the system landscape.
SL Common GUI [page 995]	SL Common GUI is a web application and a central tool that allows the SAP CC system administrators and IT consultants to install and deploy initially, maintain, and upgrade a multihost and multiinstance SAP Convergent Charging 5.0 system.

Related Links

- [SAP CC 5.0 Operations Guide](#)
- [SAP CC 5.0 Tuning Guide](#)
- [SAP CC 5.0 Installation and Upgrade Guide](#)

2.1 BART Tool

BART Tool is a central tool that enables the SAP CC business administrators to operate and monitor the offline charging operations (CDRs (Call Detail Record or more generally Consumption Detail Record) acquisition, consolidation, deduplication, batch rating/charging) in a postpaid environment scenario.

[What's New? \[page 6\]](#)

[Getting Started \[page 7\]](#)

[Important Concepts \[page 37\]](#)

[Tasks \[page 42\]](#)

[Troubleshooting \[page 54\]](#)

2.1.1 What's New?

What's New in BART Tool

This section highlights the main changes in this *SAP Product Document and User Assistance Deliverable*. They relate both to **new or changed features** in the SAP Convergent Charging 5.0 software and to **documentation enhancements** for enriching your SAP user experience continuously.

What's New in SP 4

Your *Primary Help* migrates to a new content management system. You can benefit from:

- Rich navigation between the other SAP product documents and user assistance deliverables
- PDF deliveries for offline consultation
- Powerful search and indexing tools
- Feedbacks and live comments

What's New in SP 0

This version includes the following changes:

- Links in the [Help Resources \[page 35\]](#) topic have been changed to access the new SAP Help Portal (help.sap.com)

Related Information

[What's New in Support Package 6](#)

2.1.2 Getting Started

Target Audience

- Business Administrator (Offline Charging)

This primary help is intended for IT consultants and IT administrators of SAP Convergent Charging who work with the **BART Tool** user interface and manage the offline charging services.

They should be able to master:

- The environment of the Operating System used (such as Microsoft Windows, Linux, UNIX, HP, Sun Solaris)
- The databases and their administration

This primary help presents all information necessary for using BART Tool in a production system landscape with a BART Server system that is running live.

Getting Started with the User Interface

- [Launching BART Tool and Logging On \[page 43\]](#)
- [Changing the Password in BART Tool \[page 53\]](#)
- [Exploring the Workspace for BART Tool \[page 7\]](#)
- [Logging Off and Disconnecting from BART Server \[page 44\]](#)
- [Getting Help \[page 35\]](#)

2.1.2.1 Exploring the Workspace for BART Tool

When [launching \[page 43\]](#) the **BART Tool** user interface, it displays one of the following windows:

- The [main window \[page 8\]](#) of the user interface application
- The list of previously failed logon authentication attempts
- The window used to change your password

[Main Window in BART Tool \[page 8\]](#)

[Choose Columns Window \[page 10\]](#)

[Supervision Tab and Area \[page 12\]](#)

[Workbench Tab and Area \[page 14\]](#)

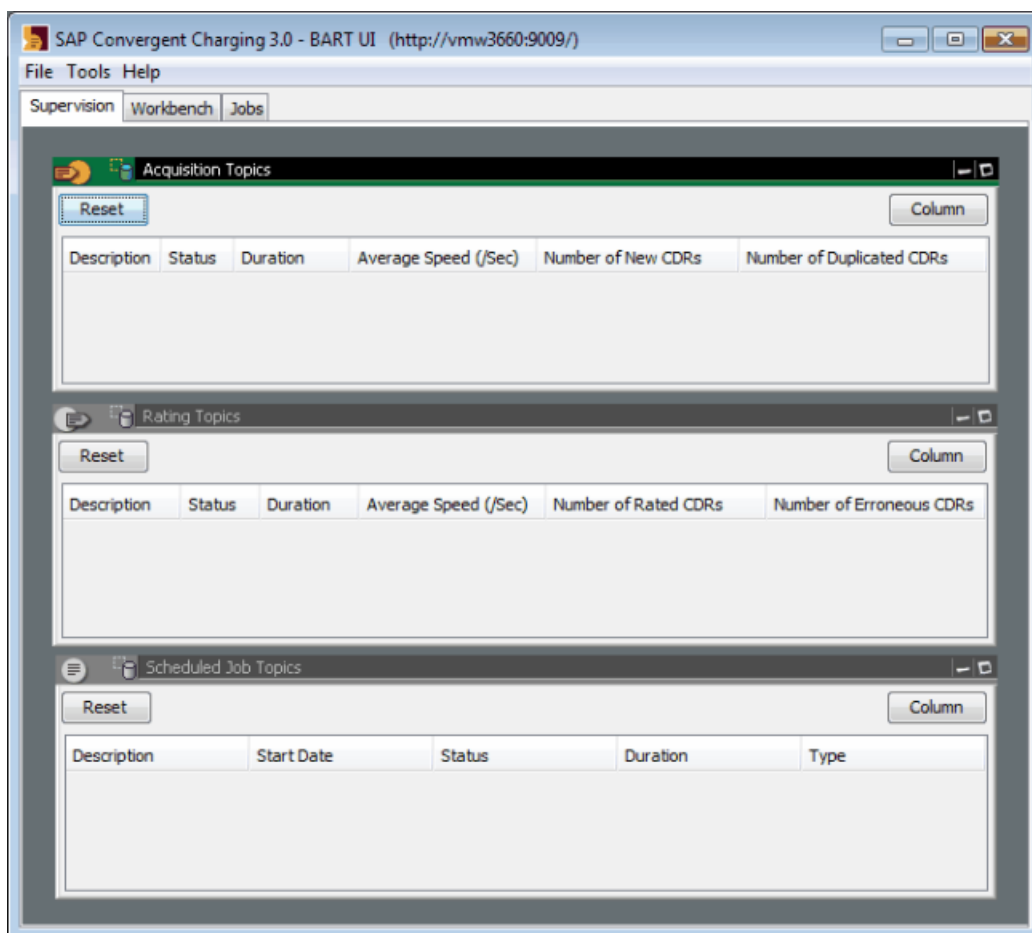
[Jobs Tab and Area \[page 30\]](#)

2.1.2.1.1 Main Window in BART Tool

The main window appears once you have [started and logged on \[page 43\]](#) to the *BART Tool* user interface successfully.

Main Window

If the password management policy does not apply to you, or if it has been disabled, BART Tool displays the following main window:



The main window displays:

- A title bar
- A menu bar

- A tab bar
- A working area containing some secondary windows depending on the selected tab in the bar above

By default, the user interface displays the *Supervision* primary tab that contains three windows.

Menu Bar

The menu bar displays three menus:

- *File*: Provides some basic commands:
 - *New*
 - *Rating Session*: Allows creating a batch rating/charging session.
 - *Job*: Allows creating a creating a job to automate a task.
 - *Exit*: Allows quitting BART Tool by closing the main window and disconnecting from BART Server.
- *Tools*: Provides the following commands for the business administration tasks:
 - *Handle CDRs [page 14]*: Allows working with CDRs stored in BART Server
 - *Handle Sessions [page 41]*: Allows working with rating or acquisition sessions
 - *Acquisition Sessions*: Allows [working with your batch acquisition sessions for CDRs \[page 18\]](#).
 - *Rating Sessions*: Allows [working with your batch rating/charging sessions of CDRs \[page 21\]](#).
 - *Show Batch Rating Groups [page 25]*: Allows viewing batch rating groups
 - *Bulk Operations [page 49]*: Allows triggering bulk operations on CDRs, rating, or acquisition sessions
- *Help*

Tab Bar

The tab bar displays three primary tabs that allows displaying the corresponding spaces and areas:

- [Supervision \[page 12\]](#)
- [Workbench \[page 14\]](#)
- [Jobs \[page 30\]](#)

Window Display Area

Depending on the selected primary tab, this working area displays the windows you use to complete your tasks:

Area	Displayed Window
Supervision	• Acquisition Topics: Allows monitoring some CDR¹ acquisition sessions [page 12]. • Rating Topics: Allows monitoring some batch rating/charging sessions [page 13] of CDRs. See . • Scheduled Job Topics: Allows monitoring some business jobs or technical jobs [page 13].
Workbench	Various windows for your business administration tasks.
Jobs	• All Jobs - see All Jobs Window [page 31]

Related Information

[Tasks \[page 42\]](#)

2.1.2.1.2 Choose Columns Window

You can **filter some information** in the visualization tables or workbench tables. The following list shows all the columns displayed by the [Choose Columns](#) window that you can open when working with the windows such as:

- [Acquisition Topics](#)
- [Rating Topics](#)
- [Scheduled Job Topics](#)
- [Acquisition Sessions](#)
- [Handle Rating Sessions](#)
- [View CDR](#)

The column names are:

- [OID](#): Displays the unique identifier for the session that the CDR relates to.
- [Job ID](#): Displays the job identifier.
- [User ID](#): Displays the user identifier of the CDR. It is a technical information that identifies the [end-customer](#) who used (or "consummed") the [marketable service](#) to monetize by charging for its usage.

❖ Example

For example in *SAP Telecommunications industry*, the user ID information is the *User Service ID aka "USID"*.

¹ Call Detail Record or more generally Consumption Detail Record

- **Service ID:** Displays the service identifier that the CDR refers to. It is a technical information that identifies the marketable service (or a bundle of services) to monetize.
- **Subscription ID:** Displays the identifier of the subscription which the CDR relates to.
- **Acquisition ID:** Displays the unique identifier of the acquisition session during which the CDR was acquired.
- **Rating ID:** Displays the unique identifier of the rating/charging session during which the CDR was rated and charged to a postpaid account.
- **Name:** Displays the CDR name.
- **Description:** Displays the session or job description.
- **Start Date:** Displays the date/time on which the session or job was launched.
- **Consumption Date:** Displays the consumption date/time for the service usage that the CDR relates to.
- **Acquisition Date:** Displays the date/time on which the CDR was acquired (received by the BART Server system).
- **Rating Date:** Displays the date/time on which the CDR was rated and charged.
- **Status:** Displays the session status, which can be In Progress, Stopped, or Ended.
- **Duration (sec.):** Displays the session or job duration.
- **Type:** Displays the job type, which can be Database Cleaning, or Rating Session.
- **Spot Speed (/sec.):** Displays the current acquisition or rating speed.
- **Avg. Speed (/sec.):** Displays the average acquisition or rating speed.
- **Max. Speed (/sec.):** Displays the maximum acquisition or rating speed.
- **Acquisition Mode:** Displays the session mode, which can be Deduplicate, Reject Duplicate, or Acquire.
- **Rating Mode:** Displays the session mode, which can be Selection by subscription and stop on first fail, Selection by subscription and rate all, and so on.
- **No. New CDRs:** Displays the number of CDRs acquired during the session.
- **No. Duplicated CDRs:** Displays the number of CDRs duplicated during the session.
- **Source:** Displays the acquisition source of CDRs.
- **Max. CDR Consumption Date:** Displays the date used as a criterion for filtering CDRs. Only the CDRs whose consumption date is earlier than the Max Consumption date are rated.
- **No. Rated CDRs:** Displays the number of CDRs rated and charged during the session.
- **No. Erroneous CDRs:** Displays the number of erroneous CDRs occurred during the session.
- **Batch Rating Grp ID:** Displays batch rating group.
- **Error Code:** Displays the code of the rating error ([Rating Error Codes \[page 40\]](#)) for the CDR.
- **Error Description:** Displays the description of the error code.
- **Magic Number:** Displays the property value used to check if the CDR is unique in the SAP CC BART Database system.

Related Information

[Handle Acquisition Sessions Window \[page 18\]](#)

[Handle CDRs Window \[page 14\]](#)

[Handle Rating Sessions Window \[page 21\]](#)

2.1.2.1.3 Supervision Tab and Area

In **BART Tool**, the *Supervision* primary tab displays the *sessions* and *jobs* in progress and gives information on the continuous changes that occur during *sessions* [page 41] and *jobs* [page 30] launched from the SAP CC BART Server system. In the BART Tool user interface, you can monitor these *business operations* performed by the BART Server system.

Clicking the *Supervision* primary tab displays the three following windows:

- *Acquisition Topics*: Allows monitoring some CDR² *acquisition sessions* [page 12].
- *Rating Topics*: Allows monitoring some batch *rating/charging sessions* [page 13] of CDRs. See .
- *Scheduled Job Topics*: Allows monitoring some *business jobs* or *technical jobs* [page 13].

Related Information

[Tasks](#) [page 42]

2.1.2.1.3.1 Acquisition Topics Window

In the *Supervision* primary tab, the *Acquisition Topics* window displays all the *CDRs acquisition sessions* launched in the BART Server system and all changes relating to these sessions. You monitor and administer your sessions.

When a batch acquisition session for CDRs is launched, a row displays the session in the visualization and operation table of the *Acquisition Topics* window. The table is updated each time a change occurs during the acquisition session.

→ Tip

To manage a specific batch acquisition session for CDRs [page 18], double-click a row to open the *Handle Acquisition Sessions* window in the *Workbench* primary tab.

You can stop this session.

Use of Buttons

The *Acquisition Topics* window contains the following buttons:

- *Clear*: Removes all the batch acquisition sessions displayed in the table. Note that if an acquisition session is always in progress, it is displayed again.
- *Column*: Opens the *Choose Columns* dialog box, which allows you to filter the information related to the acquisition sessions displayed in the table. You can delete from or add to the table one or more information columns. All the checkboxes are described in the section *Choose Columns Window* [page 10].

² Call Detail Record or more generally Consumption Detail Record

2.1.2.1.3.2 Rating Topics Window

In the *Supervision* primary tab, the *Rating Topics* window displays all the [batch rating/charging sessions \[page 41\]](#) launched in the BART Server system and all changes relating to these sessions. You monitor and administer your sessions.

When a batch rating/charging session for CDRs is launched, a row displays the session in the visualization and operation table of the *Rating Topics* window. The table is updated each time a change occurs during the batch rating/charging session.

→ Tip

To manage a specific batch rating/charging session for CDRs [\[page 21\]](#), double-click the corresponding row to open the *Handle Rating Sessions* window in the *Workbench* primary tab.

You can stop this session.

Use of Buttons

The *Rating Topics* window contains the following buttons:

- **Clear:** Removes all the batch rating/charging sessions displayed in the table. Note that if a batch rating/charging session is always in progress, it is displayed again.
- **Column:** Opens the *Choose Columns* dialog box, which allows you to filter the information related to the rating sessions displayed in the table. You can delete from or add to the table one or more information columns. All the checkboxes are described in the section [Choose Columns Window \[page 10\]](#).

2.1.2.1.3.3 Scheduled Job Topics Window

In the *Supervision* primary tab, the *Scheduled Job Topics* window displays all the rating/charging, database cleaning, and custom jobs launched in the BART Server system and all changes relating to these jobs.

When a rating/charging or a database cleaning job is launched, a row displays the job in the table of the *Acquisition Topics* window. The table is updated each time a change occurs during the rating or cleaning job

→ Tip

To work with a displayed job, double-click the corresponding row to open the *All Jobs* window in the *Jobs* primary tab. You can change or stop the job. See [Jobs Tab and Area \[page 30\]](#).

Use of Buttons

The *Scheduled Job Topics* window contains the following buttons:

- **Clear:** Removes all the jobs displayed in the table. Note that if a job is always in progress, it is displayed again.
- **Column:** Opens the *Choose Columns* dialog box, which allows you to filter the information related to the jobs displayed in the table. You can delete from or add to the table one or more information columns. All the checkboxes are described in the section [Choose Columns Window \[page 10\]](#).

2.1.2.1.4 Workbench Tab and Area

In **BART Tool**, the *Workbench* primary tab allows you to work with [CDRs \[page 39\]](#)³, [operating sessions \[page 41\]](#), and [bulk operations \[page 49\]](#). You can also [view \[page 25\] batch rating groups](#).

In the main window, you use the *Tools* menu on the menu bar to access the different commands and their submenus to trigger your business administration operations manually.

The menu contains the following commands:

- *Handle CDRs*: Allows [working with acquired CDRs \[page 14\]](#) stored in BART Database.
- *Handle Sessions*:
 - *Acquisition Sessions*: Allows [working with your batch acquisition sessions for CDRs \[page 18\]](#).
 - *Rating Sessions*: Allows [working with your batch rating/charging sessions of CDRs \[page 21\]](#).
- *Show Batch Rating Groups*: Allows [viewing batch rating groups \[page 25\]](#) that are customized in your offline charging scenario. You use these groups to plan your charging operations.
- *Bulk Operations*: Allows [triggering some useful bulk operations on CDRs \[page 25\]](#) (consolidation, modification/deduplication, and deletion). You can also clean your acquisition sessions and rating/charging sessions.

See also:

- [CDRs \[page 39\]](#)
- [Batch Sessions \[page 41\]](#)
- [Working with Bulk Operations \[page 49\]](#)

Related Information

[Tasks \[page 42\]](#)

2.1.2.1.4.1 Handle CDRs Window

You can list and search for CDRs⁴ that you want to view, inspect, or operate with. Your business administration operations are:

- View and inspect some CDRs
- Corrections and modifications
- Single deletion
- Single deduplication
- Batch rate and charge for a single CDR

From the menu bar in the main window, select  *Tools*  *Handle CDRs* . The *Handle CDRs* window opens, which consists of three areas:

³ Call Detail Record or more generally Consumption Detail Record

⁴ Call Detail Record or more generally Consumption Detail Record

- The top part of the window is the [Filter](#) area, which allows you to find CDRs by using filter criteria. The information on the [General](#) and [Advanced](#) tabs is combined during the search operation.
- The middle area of the window is the [Results](#) area, which displays the search results allowing you to perform operations.
- The bottom part of the window is the [Details](#) area, which displays the details of CDRs that you select in the [Results](#) area.

Filter Area

General Tab

The [General](#) tab allows you to search for CDRs depending on the following criteria:

- [Rating ID](#): Type the unique identifier of the CDR.
- [Acquisition ID](#): Type the identifier assigned to the CDR during the batch acquisition session.
- [Acquisition Date Between](#): Select two dates/times to define a period of time and search the CDRs acquired during this period. Click the calendars related to the two fields to select the dates/times.
- [Rating Date Between](#): Select two dates/times to define a period of time and search the CDRs rated during this period. Click the calendars related to the two fields to select the dates/times.
- [Consumption Date Between](#): Select two dates/times to define a period of time and search if the consumption date of CDRs is included in this period. Click the calendars related to the two fields to select the dates/times.
- [Status](#): Provides the list of statuses. Select [No matter](#) if you do not want to use the [CDR status](#) [page 39] as a criterion, or select one of the following statuses:
 - NEW
 - ERROR
 - RATED
 - DUPLICATED
 - IGNORED
 - TO_BE_RERATED
 - NO_PROVISIONING
 - ONLINE_SUBSCRIPTION
 - --ANY STATUS--
- [Result Fetch Size](#): Type the number of CDRs you want to be displayed in the result area when the result list is large.

Advanced Tab

The [Advanced](#) tab allows you to create a table with one or more search criteria to search and select CDRs depending on various criteria: [OID](#), [Name](#), [User ID](#)(*), and so on.

- To add a row to the table, click the [Add](#) button.
- To delete a row from the table, select the related checkbox, and then click the [Remove](#) button.

i Note

(*) The whole list is the following:

- [OID](#)

- *Name*
- *User ID*
- *Service ID*
- *Subscription ID*
- *Consumption Date*
- *Status*
- *Acquisition Date*
- *Acquisition ID*
- *Rating Date*
- *Rating ID*
- *Error Code*
- *Error Description*
- *Source*
- *Magic Number*
- *Batch Rating Grp ID*

Results Area

The [Results](#) area consists of search buttons, an area for displaying the search results and buttons for working on CDRs.

You use this area to administer the selected CDRs, CDR by CDR. Remember that BART Tool provides you with some [bulk operation commands \[page 25\]](#) to facilitate this business administration.

To view and inspect a CDR (see [View CDR Window \[page 17\]](#)), double-click the related row.

Use of Search Buttons

Use the following buttons to search for CDRs:

- [Search](#): Starts a new search whether you use search criteria or not.
- [Clear results](#): Deletes the result list.
- [<<](#): Moves to the previous page. This button is available when the result list is large.
- [>>](#): Moves to the next page. This button is available when the result list is large.
- [Save Search](#): Saves the result list in a file.
- [Open Search](#): Opens a result list saved in a file. The new result list is added to the existing one in the result area.
- [Columns](#): Opens the [Choose Columns](#) dialog box, which allows you to filter the information related to the CDRs displayed in the table (see [Choose Columns Window \[page 10\]](#)). You can delete from or add to the table one or more information columns.

Use of Buttons for Working on CDRs

Select a CDR in the result list, and then click one the following buttons:

- [Modify](#): Opens the [Modify CDR](#) window to change or correct a single CDR without deduplicating it. See [Modify CDR Window \[page 18\]](#).
- [Delete](#): Opens a confirmation dialog box. Click [Yes](#) to delete the selected CDR from the BART Database (and from the displayed result list).

- **Rate**: Opens a confirmation dialog box. Click **Yes** to trigger the batch rating and charging for the selected CDR (see [Handle Rating Sessions Window \[page 21\]](#)). After processing by the connected systems, the result table is not refreshed in the user interface. Note that the button **Rate** is available only for CDRs whose status (see [CDRs \[page 39\]](#)) is **NEW** or **ERROR**.
- **Deduplicate**: Opens a confirmation dialog box. Click **Yes** to trigger the deduplication for the single selected CDR.

i Note

Use the arrows



to hide or show the **Results** area.

Details Area

This area displays the details of the CDR selected in the result list.

2.1.2.1.4.1.1 View CDR Window

After finding CDRs (see [Handle CDRs Window \[page 14\]](#)), you double-click a CDR to open the **View CDR** window that displays information on the acquisition and rating sessions relating to the selected CDR.

All the checkboxes are described in the section [Choose Columns Window \[page 10\]](#). You cannot modify any of these fields. However, the following fields allow you to open dialog boxes:

- **Acquisition ID**: Displays the unique identifier of the acquisition session during which the CDR was acquired.
An external system transmitted the CDR to the BART Server system. Clicking  opens the **Acquisition Session Properties** window (see [Acquisition Session Properties Window \[page 20\]](#)).
- **Rating ID**: Displays the unique ID of the rating session during which the CDR was rated. Clicking  opens the **Rating Session Properties** window (see [Rating Session Properties Window \[page 23\]](#)).
- **Error Code**: Displays the code of the rating error (see [Rating Error Codes \[page 40\]](#)) of the CDR. Clicking  opens a description message dialog box displaying information on the error type.
- **Batch Rating Grp ID**: Displays the group to which the CDR belongs. The consolidation process determines the correct group. After the CDR acquisition and consolidation, you use such group to rate and charge a consistent set of CDRs. Clicking  opens the **Batch Rating Group Properties** dialog box displaying information on the batch rating group: **OID**, **Name**, and **Description**.

Related Information

[Handle CDRs Window \[page 14\]](#)

2.1.2.1.4.1.2 Modify CDR Window

After finding some CDRs (see [Handle CDRs Window \[page 14\]](#)), you click *Modify* to open the *Modify CDR* window that allows you to change, deduplicate, or correct a CDR.

All the checkboxes are described in the section [Choose Columns Window \[page 10\]](#).

Refer to the section [Modify CDR Bulk Window \[page 27\]](#) for more information and user assistance.

2.1.2.1.4.2 Handle Acquisition Sessions Window

From the menu bar in the main window, select **Tools > Handle Sessions > Acquisition Sessions**. The *Handle Acquisition Sessions* window opens, which consists of two areas:

- The top part of the window is the *Filter* area, which allows you to find acquisition sessions by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.
- The bottom area of the window is the *Results* area, which displays the search results allowing you to perform operations.

Filter Area

General Tab

The *General* tab allows you to search for some acquisition sessions depending on the following criteria:

- *Start date between*: Select two dates/times to define a period of time and search if the start date/time of acquisition sessions is included in this period. Click the calendars  related to the two fields to select the expected dates/times.
- *Acquisition Mode*: Provides the list of acquisition modes. Select *No matter* if you do not want to use the acquisition mode as a criterion, or select one of the following acquisition modes:
 - *ACQUIRE*
 - *ACQUIRE AND DEDUPLICATE*
 - *ACQUIRE AND REJECT DUPLICATES*
 - *--ANY--*
- *Status*: Provides the list of statuses. Select *No matter* if you do not want to use the session status as a criterion, or select one of the following session statuses:
 - *IN PROGRESS*
 - *ENDED*
 - *ENDED WITH ERROR*
 - *CLEANED*

Advanced Tab

The *Advanced* tab allows you to create a table to search for some acquisition sessions depending on various criteria: *OID*, *Start Date*, *Duration* (*), and so on.

- To add a row to the table, click the [Add](#) button.
- To delete a row from the table, select the related checkbox, and then click the [Remove](#) button.

i Note

(*) The whole list is the following:

- [OID](#)
- [Start Date](#)
- [Duration](#)
- [No. Acquired CDRs](#)
- [No. Duplicated CDRs](#)
- [No. Consolidated CDRs](#)
- [Source](#)
- [Description](#)
- [Acquisition Mode](#)
- [Status](#)

Results Area

The [Results](#) area consists of search buttons, an area for displaying the search results and buttons for working on acquisition sessions and collected data.

Double-click a row to [view \[page 20\]](#) the properties of a batch acquisition session for CDRs⁵.

Use of Search Buttons

Use the following buttons to search for acquisition sessions:

- [Search](#): Starts a new search whether you use search criteria or not.
- [Clear results](#): Deletes the result list.
- [Refresh](#): Updates the result area.
- [Columns](#): Opens [\[page 10\]](#) the [Choose Columns](#) dialog box, which allows you to filter the information related to the acquisition sessions displayed in the table. You can delete from or add to the table one or more information columns.

Use of Buttons for Operating on CDR Acquisition Sessions and Acquired CDRs

Select an acquisition session in the result list, and then click one the following buttons:

- [Delete](#): Opens a confirmation dialog box. Click [Yes](#) to delete the selected acquisition session from the result list.
- [Stop](#): Click to **stop an open acquisition session**.
- [Report](#): Opens the [Report for Acquisition Session](#) window to display the acquisition report relating to the selected acquisition session. Click [Cancel](#) to close the window, or click [Save In File](#) to save the [report \[page 20\]](#) to a file on your computer.
- [Handle CDRs](#): Opens the window [\[page 14\]](#) to administer the CDRs just acquired (see [Handle CDRs Window \[page 14\]](#)).

⁵ Call Detail Record or more generally Consumption Detail Record

Related Information

[Handle Acquisition Sessions Window \[page 18\]](#)

[Handle CDRs Window \[page 14\]](#)

[Handle Rating Sessions Window \[page 21\]](#)

2.1.2.1.4.2.1 Acquisition Session Properties Window

After finding some *CDR acquisition sessions* (see [Handle Acquisition Sessions Window \[page 18\]](#)), you double-click a row to open the *Acquisition Session Properties* window that displays some useful information on the selected acquisition session.

In the *Acquisition Session Properties* window, all the fields are described in the section [Choose Columns Window \[page 10\]](#). You cannot modify any of these fields.

View and inspect these properties.

Related Information

[Handle Acquisition Sessions Window \[page 18\]](#)

2.1.2.1.4.2.2 Report for Acquisition Session Window

The *Report for Acquisition Session* window displays a report that you can save to a file.

Use of Buttons

- *Save In File*: Saves the report to a file on your computer.
- *Cancel*: Closes the window and goes back to the *Handle Acquisition Session* window.

Related Information

[Handle Acquisition Sessions Window \[page 18\]](#)

2.1.2.1.4.3 Handle Rating Sessions Window

From the menu bar in the main window, select **Tools > Handle Sessions > Rating Sessions**. The *Handle Rating Sessions* window opens, which consists of two areas:

- The top part of the window is the *Filter* area, which allows you to find rating/charging sessions by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.
- The bottom area of the window is the *Results* area, which displays the search results allowing you to perform operations.

Filter Area

General Tab

The *General* tab allows you to search for some batch rating/charging sessions depending on the following criteria:

- *Start Date Between*: Select two dates/times to define a period of time and search if the start date/time of rating/charging sessions is included in this period. Click the calendars  related to the two fields to select the dates/times.
- *No. Rated CDRs*: Type the number of *CDRs* [page 39] rated (dynamically priced) and charged during the session.
- *No. Erroneous CDRs*: Type the number of errors occurred during the session.
- *Rating Mode*: Provides the list of batch rating/charging modes. Select *No matter* if you do not want to use this processing mode as a criterion, or select one of the following *recommended modes* [page 41]:
 - *Selection by day and stop on first fail*
 - *Selection by day and rate all*
 - *--ANY STATUS--*
 - Other *values* [page 41] are available for compatibility purposes
- *Status*: Provides the list of status. Select *No matter* if you do not want to use the session status as a criterion, or select one of the following session status:
 - *IN PROGRESS*
 - *ENDED*
 - *STOPPED*
 - *CLEANED*
 - *SELECTING SUBSCRIPTIONS*
 - *RATING CDRs*
 - *--ANY STATUS--*

Advanced Tab

The *Advanced* tab allows you to create a table for searching rating sessions depending on various criteria: *OID*, *Start Date*, *Duration* (*), and so on.

- To add a row to the table, click the *Add* button.
- To delete a row from the table, select the related checkbox, and then click the *Remove* button.

i Note

(*) The whole list is the following:

- *OID*
- *Start Date*
- *Duration*
- *Max. CDR Consumption Date*
- *Rating Mode*
- *No. Rated CDRs*
- *No. Erroneous CDRs*
- *Description*
- *Status*

Results Area

The [Results](#) area consists of search buttons, an area for displaying the search results, and buttons for working on batch rating/charging sessions.

Double-click a row to view the properties of a batch rating/charging session for CDRs (see [Rating Session Properties Window \[page 23\]](#)).

Use of Search Buttons

Use the following buttons to search for batch rating/charging sessions:

- [Search](#): Starts a new search whether you use search criteria or not.
- [Clear results](#): Deletes the result list.
- [Refresh](#): Updates the result area.
- [Columns](#): Opens the [Choose Columns](#) dialog box (see [Choose Columns Window \[page 10\]](#)), which allows you to filter the information related to the rating sessions displayed in the table. You can delete from or add to the table one or more information columns.

Use of Buttons for Working on Batch Rating/Charging Sessions

Select a session in the result list, and then click one the following buttons:

- [Delete](#): Opens a confirmation dialog box. Click [Yes](#) to delete the selected batch rating/charging session from the result list.
- [Stop](#): Opens a confirmation dialog box. Click [Yes](#) to stop the selected rating/charging session which is running. The [Results](#) list is not refreshed. The button [Stop](#) is available only for the rating sessions displaying the status [In Progress](#).
- [Refresh](#): Updates the result area.
- [Report](#): Opens the [Report for Rating Session](#) window to display the rating/charging report relating to the selected batch rating/charging session for CDRs. Click [Cancel](#) to close the window, or click [Save In File](#) to save the report to a file on your computer. See [Report for Rating Session Window \[page 23\]](#).
- [Handle CDRs](#): Opens the window to work with CDRs just acquired. See [Handle CDRs Window \[page 14\]](#).
- [Create](#): Opens the window to **create and start** a batch rating/charging session for CDRs. See [Creating and Starting a Rating/Charging Session \[page 47\]](#).

See Here

- [Rating Session Properties Window \[page 23\]](#)
- [Report for Rating Session Window \[page 23\]](#)

See Also

- [Handle Acquisition Sessions Window \[page 18\]](#)
- [Handle CDRs Window \[page 14\]](#)

Related Information

[Administering Rating/Charging Sessions for CDRs \[page 46\]](#)

2.1.2.1.4.3.1 Rating Session Properties Window

After finding some rating sessions (see [Handle Rating Sessions Window \[page 21\]](#)), you double-click a row to open the *Rating Session Properties* window that displays some useful information on the selected batch rating/charging session for CDRs ([Batch Sessions \[page 41\]](#)).

In the *Rating Session Properties* window, all the fields are described in the section [Choose Columns Window \[page 10\]](#). You cannot modify any of these fields. You can only click  in the *Batch Rating Grp ID* field to view the group properties. In BART Tool, you can get the list of batch rating groups that are available in your environment (see [Show Batch Rating Groups Window \[page 25\]](#)).

View and inspect these properties.

Related Information

[Handle Rating Sessions Window \[page 21\]](#)

2.1.2.1.4.3.2 Report for Rating Session Window

The *Report for Rating Session* window displays a report that you can save to a file and archive.

Use of Buttons

- *Save In File*: Saves the report to a file on your computer.
- *Cancel*: Closes the window and goes back to the *Handle Rating Session* window.

Related Information

[Handle Rating Sessions Window \[page 21\]](#)

2.1.2.1.4.4 Create Rating Session Window

After [creating a rating/charging session for CDRs \[page 47\]](#), you fill in the *Create Rating Session* window (dialog box) to set up and launch a batch rating/charging session for CDRs.

Create Rating Session window

Fill in or modify the following fields (some fields are not available):

- *OID*: Displays the session unique identifier.
- *Start Date*: Displays the date and time on which the session or job was launched.
- *Duration*: Displays the session duration.
- *Rating Mode*: Select one of the [recommended batch charging modes \[page 41\]](#):
 - *Selection by day and stop on first fail*
 - *Selection by day and rate all*
 - Other [values \[page 41\]](#) are available for compatibility purposes
- *Max. CDR Consumption Date*: Click the calendar



, and then select a date/time for rating the CDRs whose consumption date/time is earlier than the selected date/time.

- *No. Rated CDRs*: Displays the number of CDRs rated during the session.
- *No. Erroneous CDRs*: Displays the number of erroneous CDRs occurred during the session.
- *Description*: Type a description if necessary.
- *Status*: Displays the session status, which can be *In progress*, *Stopped*, or *Ended*.
- *Batch Rating Grp ID*: Click



to select a group. When the *Batch Rating Group Chooser* dialog box is open, select a group, and then click the *Set* button. If you want to view the list of groups, click



.

i Note

A parent contract and its linked contracts have the same batch rating group to ensure the consistency of the charging operations. When CDRs relate to a linked contract, the system takes into account the settings of the parent contract.

Use of Buttons

Use the following buttons to:

- [Create and Launch](#): Click to launch the batch rating/charging session.
- [Cancel](#): Click this button to cancel all your changes and close the window.

2.1.2.1.4.5 Show Batch Rating Groups Window

The [Show Batch Rating Groups](#) window allows you to view all the [batch rating groups](#) defined in SAP Convergent Charging. Each row in the table represents a batch rating group. The batch rating groups are ranked in ascending order.

You use these groups to plan your offline charging operations.

→ Tip

Batch Rating Groups are part of the business data that is stored in the SAP CC Core Server system. See [Admin+ \[page 1002\]](#) and the commands [grouplist](#) and [groupladd](#).

2.1.2.1.4.6 Bulk Operations Menu and Commands

From the menu bar in the main window, select **Tools > Bulk Operations**. This submenu contains the following operation commands:

- [Delete Acquisition Sessions Bulk](#) - see [Delete Acquisition Sessions Bulk Window \[page 26\]](#)
- [Consolidate CDR Bulk](#) - see [Consolidate CDR Bulk Window \[page 26\]](#)
- [Modify CDR Bulk](#) - see [Modify CDR Bulk Window \[page 27\]](#)
- [Delete CDR Bulk](#) - see [Delete CDR Bulk Window \[page 29\]](#)
- [Delete Rating Session Bulk](#) - see [Delete Rating Session Bulk Window \[page 30\]](#)

Clicking a command opens a specialized window in the [Workbench](#) primary tab in the BART Tool user interface.

Related Information

[Working with Bulk Operations \[page 49\]](#)

2.1.2.1.4.6.1 Delete Acquisition Sessions Bulk Window

With this window, you bulk delete a lot of batch acquisition sessions to clean your environment.

From the menu bar in the main window, select **Tools > Bulk Operations > Delete Acquisition Session**. The *Delete Acquisition Session Bulk* window opens.

The top part of the window is the *Filter* area, which allows you to find and select some CDR acquisition sessions by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.

Filter Area

The *Filter* area is the same as the one used for [Handle Acquisition Sessions Window \[page 18\]](#).

Use this area to search for and select multiple sessions to delete.

Use of Buttons

Use the following buttons to:

- *Delete*: When clicking this button, a confirmation dialog box opens. Confirm the deletion by clicking *Yes*. A dialog box opens to inform you that the acquisition sessions have successfully been deleted. Click *OK*.
- *Cancel*: Click this button to cancel all your changes and close the window.

Related Information

[Handle Acquisition Sessions Window \[page 18\]](#)

2.1.2.1.4.6.2 Consolidate CDR Bulk Window

With this windows, you bulk consolidate a lot of acquired CDRs by retrieving crucial rating information from SAP CC Core Server and by updating each CDR with the mandatory identifiers (such as subscription or provider contract ID, batch rating group ID, active charge in contract, and the data partition ID).

From the menu bar in the main window, select **Tools > Bulk Operations > Consolidate CDR**. The *Consolidate CDR Bulk* window opens.

The top part of the window is the *Filter* area, which allows you to find and select some CDRs [\[page 39\]](#) by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.

Filter Area

The *Filter* area is the same as the one used for handling CDRs (see [Handle CDRs Window \[page 14\]](#)).

Use this area to search for and select multiple CDRs.

Use of Buttons

Use the following buttons to:

- *Consolidate*: When clicking this button, a confirmation dialog box opens. Confirm the consolidation by clicking *Yes*. A dialog box opens to inform you that the selected CDRs have successfully been consolidated. Click *OK*.
- *Cancel*: Click this button to cancel all your changes and close the window.

2.1.2.1.4.6.3 Modify CDR Bulk Window

With this window, you bulk modify and bulk deduplicate a lot of CDRs.

From the menu bar in the main window, select **Tools > Bulk Operations > Modify CDR**. The *Modify CDR Bulk* window opens, which consists of two areas:

- The top part of the window is the *Filter* area, which allows you to find and select some CDRs by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.
- The bottom area of the window is the *Modification* area, which allows you to create a list of modifications to apply to the found CDRs.

Filter Area

General Tab

The *General* tab is the same as the one used for handling CDRs (see [Handle CDRs Window \[page 14\]](#)).

Use this area to search for and select multiple CDRs.

Advanced Tab

The *Advanced* tab allows you to create a table to search for and select multiple CDRs depending on various criteria: *OID*, *Name*, *User ID* (*), and so on.

- To add a row to the table, click the *Add* button.
- To delete a row from the table, select the related checkbox, and then click the *Remove* button.

i Note

(*) The whole list is the following:

- *OID*
- *Name*
- *User ID*
- *Service ID*
- *Subscription ID*
- *Consumption Date*
- *Status*
- *Acquisition Date*
- *Acquisition ID*
- *Rating Date*
- *Rating ID*
- *Error Code*
- *Error Description*
- *Source*
- *Magic Number*

Modification Area

The *Modification* area allows you to create a table including **one or more modifications** to apply to CDRs.

- To add a row to the table, click the *Add* button. Each row consists of three columns: two lists and one field.
- To delete a row from the table, select the related checkbox, and click the *Remove* button.

After you add a new row to the table, select in the first list (*) the criterion to be modified, and then select in the second list the operation type (*update*, *create*, or *delete*). In the field, type the value to be modified.

(*) The list of criteria is the following:

- *Name*
- *User ID*
- *Service ID*
- *Consumption Date*
- *Status*
- *Source*
- *Details (String)*
- *Details (Integer)*
- *Details (Date)*

i Note

You can create a new detail and update or delete any details but you can only update the others criteria (*Name*, *User ID*, *Service ID*, and so on).

To create a new detail:

1. Select the type of the detail (*String*, *Integer* or *Date*) in the first list.
2. Type the name of the new detail directly in the list.
3. Select *create* in the second list.

4. Type the value of the detail in the field.

Modification Mode: Provides the list of operation types. Select one of the following operation types:

- **Modify:** Modifies the CDRs matching the search criteria
- **Modify and deduplicate:** Modifies and deduplicates the CDRs matching the search criteria

Use of Buttons

Use the following buttons to:

- **Modify:** When clicking this button, a confirmation dialog box opens. Confirm the modifications by clicking **Yes**. A dialog box opens to inform you that the selected CDRs have successfully been modified (and deduplicated). Click **OK**.
- **Cancel:** Click this button to cancel all your changes and close the window.

2.1.2.1.4.6.4 Delete CDR Bulk Window

With this window, you bulk delete a lot of CDRs.

From the menu bar in the main window, select **Tools > Bulk Operations > Delete CDR**. The **Delete CDR Bulk** window opens.

The top part of the window is the **Filter** area, which allows you to find CDRs by using filter criteria. The information on the **General** and **Advanced** tabs is combined during the search operation.

Filter Area

The **Filter** area is the same as the one used for handling CDRs (see [Handle CDRs Window \[page 14\]](#)).

Use this area to search for and select multiple CDRs to delete from the BART Database system.

Use of Buttons

Use the following buttons to:

- **Delete:** When clicking this button, a confirmation dialog box opens. Confirm the deletion by clicking **Yes**. A dialog box opens to inform you that the previously selected CDRs have successfully been deleted. Click **OK**.
- **Cancel:** Click this button to cancel all your changes and close the window.

2.1.2.1.4.6.5 Delete Rating Session Bulk Window

With this window, you bulk delete a lot of batch rating/charging sessions to clean your environment.

From the menu bar in the main window, select **Tools** > **Bulk Operations** > **Delete Rating Session**. The *Delete Rating Session Bulk* window opens.

The top part of the window is the *Filter* area, which allows you to find and select some batch rating and charging sessions by using filter criteria. The information on the *General* and *Advanced* tabs is combined during the search operation.

Filter Area

The *Filter* area is the same as the one used for handling batch rating/charging sessions (see [Handle Rating Sessions Window \[page 21\]](#)).

Use this area to search for and select multiple sessions to delete.

Use of Buttons

Use the following buttons to:

- **Delete**: When clicking this button, a confirmation dialog box opens.
 - Confirm the deletion by clicking **Yes**.
 - A dialog box opens to inform you that the batch rating and charging sessions have successfully been deleted.
 - Click **OK**.
- **Cancel**: Click this button to cancel all your changes and close the window.

→ Tip

Create a job to automate your tasks. See [Creating a Job \[page 50\]](#).

2.1.2.1.5 Jobs Tab and Area

In *BART Tool*, the *Jobs* primary tab contains the *All Jobs* window that displays all the jobs (see [All Jobs Window \[page 31\]](#)) launched from BART Server and allows you to administer some jobs. You can create and change, start and stop, or delete the following types of jobs:

- **Rating session job**
- **Database cleaning job**

There is no job for the CDR acquisition sessions because these sessions are not triggered by you with this user interface. An external system that is part of the mediation chain, triggers the transfer to the BART Server system.

→ Tip

When the BART Tool user interface starts, some jobs are already initialized by the connected BART Server system. As you launch BART Tool when BART Server is running, click the button [Refresh](#) to update the table displaying the jobs.

Before Starting

You must create a job (see [Creating a Job \[page 50\]](#)) before creating and setting up a rating session or the BART Database cleaning.

Related Information

[Tasks \[page 42\]](#)

2.1.2.1.5.1 All Jobs Window

In the [All Jobs](#) window, you can start or stop a job, create, change, or delete a job. The [All Jobs](#) window consists of a table and buttons.

Visualization and Operation Table

Each row in the table represents a job. The table contains the following columns:

- [Description](#): Displays the job description.
- [Type](#): Displays the job type (*).
- [Recurrence or Polling Period](#): Displays the scheduled frequency of the job.
- [Active](#): Allows you to **start or stop the job**. Select the checkbox to start the job, or clear the checkbox to stop the job.
- [State](#): Displays the state of the job, which is `Running`, `Not running`, or `Unknown` if the communication with the BART Server system failed.

i Note

(*) The default types are [Rating Session](#) (business operations) and [Database Cleaning](#) (technical operations). However, other types can be added to the list through the configuration file of the BART Tool

user interface but ask your SAP CC administrator before modifying the list. Maybe the project team has customized this list in your environment during the *Implementation Phase*.

Use of Buttons

Use the following buttons to:

- **Create:** Click to create a new job. The *New Job – Choose Type* dialog box opens allowing you to create and set up a rating session job (see [Rating Session Job Window \[page 32\]](#)) or a database cleaning job (see [Cleaning Database Job Window \[page 34\]](#)). Select the job to create, and then click *Continue*.
- **Delete:** Deletes a job from the table. To delete a job, select a job in the table, and then click the button *Delete*. A confirmation dialog box opens. Click *Yes* to delete the job. If the job is running, it is stopped before being deleted.
- **Modify:** Changes an existing job. To change a job, select a job in the table, click the button *Modify*, and then set up the rating session job (see [Rating Session Job Window \[page 32\]](#)) or the database cleaning job (see [Cleaning Database Job Window \[page 34\]](#)).
- **Refresh:** Manually updates the table and the information.

2.1.2.1.5.1.1 Rating Session Job Window

The *Rating Session Job* window allows you to create or change a *rating/charging session job* to automate your business administration. Each job is scheduled in the system according to your needs. You define a triggering policy based on an intelligent recurrence or a polling period (in seconds).

i Note

During the execution of a rating session job, only the CDRs whose *Consumption Date/Time* is earlier than the *Max Consumption Date/Time* are rated and charged by SAP Convergent Charging.

The *Rating Session Job* window consists of two tabs:

- *General*
- *Specific*

General Tab

You can select one of the two scheduling policies:

- **Recurrence:** This policy is based on the UNIX cron grammar (see [Using the UNIX Cron Grammar \[page 51\]](#)).
- **Polling Period:** Allows you to define a *recurring period of time*. For example, if you select 3,600 seconds as the recurring period, the scheduler will trigger the job every hour.

If you select the *Recurrence* option, the *General* tab displays the following:

- **Description:** Describes the job if necessary.
- **Seconds:** Type a number between 0 and 59.
- **Minutes:** Type a number between 0 and 59.
- **Hours:** Type a number between 0 and 23 (hour of the day).
- **Days:** Type a number between 1 and 31 (day of the month). If necessary, select the option *Include the last day of month*.
- **Include last day of the month:** Select this option if you want to include the last day of the month.
- **Days of Week:** Provides the list of days. Select a day on which you want to execute the job.
- **Months:** Provides the list of months. Select a month in which you want to execute the job.

If you select the *Polling Period* option, the *General* tab displays the following:

- **Description:** Describes the job if necessary.
- **Seconds:** Type the number of seconds. The job is carried out every time the period expires.

Specific Tab

Select the *batch rating group* for the CDRs to be rated, the rating mode, and the delay for the job:

- **Batch Rating Grp ID:** Click  to select a group already defined in SAP Convergent Charging. When the *Select Batch Rating Group* dialog box is open, select a group, and then click the *Set* button. If you want to view the list of groups, click .
- **Delay:** Type the number of seconds to delay the rating job. The delay is subtracted from the current system time, and the result represents the *Max Consumption Date and Time* (*).

For example, the current time is 2018-09-03 11:55:26, and you type **900** (seconds) as the delay. After calculation, the Max Consumption Date/Time will be 2018-09-03 11:40:26.

- **Mode:** Provides the list of *batch rating and charging modes* [page 41]. Select one of the following recommended modes:
 - *Selection by day and stop on first fail*
 - *Selection by day and rate all*
 - Other values are available for compatibility purposes. See *About Rating Modes* [page 41] and the *Application Help*.

i Note

(*) Refer to the note earlier in this topic.

Related Information

[Using the UNIX Cron Grammar \[page 51\]](#)

2.1.2.1.5.1.2 Cleaning Database Job Window

The *Cleaning Database Job* window allows you to create or modify a *database cleaning job* to automate your administration operations. Each job is scheduled in the system according to your needs. You define a triggering policy based on an intelligent recurrence or a polling period (in seconds).

i Note

During the execution of a database cleaning job, only the following items are cleaned:

- **CDRs** (see *CDRs* [page 39]) whose *Consumption Date/Time* is earlier than the *Max Consumption Date/Time* AND whose *status* [page 39] is:
 - *RATED*
 - *IGNORED*
 - Or *DUPLICATED*
- **Acquisition sessions** and **rating/charging sessions** whose *Start Date/Time* is earlier than the *Max Consumption Date/Time*

The *Cleaning Database Job* window consists of two tabs:

- *General*
- *Specific*

General Tab

This tab is described in the section *Rating Session Job Window* [page 32]. You set up the triggering policy by defining a recurrence or a polling period.

Specific Tab

You can delay the database cleaning job:

- *Delay*: Type the **number of seconds** to delay the database cleaning job. The delay is subtracted from the current system time, and the result represents the *Max Consumption Date and Time* (*).
For example, the current time is 2018-09-03 11:55:26, and you type **900** (seconds) as the delay. After calculation, the Max Consumption Date/Time will be 2018-09-03 11:40:26.

i Note

(*) Refer to the note earlier in this topic.

Related Information

[Using the UNIX Cron Grammar](#) [page 51]

2.1.2.2 Getting Help

- [Help Resources \[page 35\]](#)
- [Typographical Conventions \[page 37\]](#)

2.1.2.2.1 Help Resources

To help you get the most out of SAP Convergent Charging 5.0, SAP SE provides you with an extensive list of resources you can use for support and guidance.

Integrated SAP Solution Scenarios

SAP Convergent Charging 5.0 is integrated with different software components of the SAP Business Suite: SAP CRM, SAP ERP/FI-CA, and SAP Convergent Invoicing in SAP ERP.

The primary help provides you with specific information and recommendations for configuring data in SAP Convergent Charging 5.0 for the integrated [SAP Solution](#) scenarios.

Consult the SAP Help Portal

On the [SAP Help Portal](#), you find extensive documentation from the SAP Library on SAP products and solutions, along with additional information about the documentation, information design at SAP, educations services, and links to the SAP Community Network (SCN).

i Note

SAP Convergent Charging 5.0 is part of SAP Billing and Revenue Innovation Management. When your SAP CC system is connected to the SAP CRM system or to SAP Convergent Invoicing in the SAP ERP system, the following SAP libraries are relevant on SAP Help Portal at:

- SAP Help Portal > SAP EHP 4 for SAP CRM 7.0 > Application Help > SAP Library > SAP CRM for Industries > Telecommunications > Functions for Provider Sales and Order Management
- Products > Cross Catalog Mapping
- Business Agreement
- Provider Order and Provider Contract
- Sharing Contract
- SAP Help Portal > SAP EHP 8 for SAP ERP 6.0 > Application Help > SAP Library > Industries in SAP ERP > SAP Telecommunications > Contract Accounts Receivable and Payable > SAP Convergent Invoicing
- Master Data
- Rating
- Billing
- Discounts and Charges on Billable Items
- Partner Settlement
- Invoicing

Access the Reference Guides of SAP Convergent Charging

These guides are available in PDF format and provided on the DVD-ROM with the release of this product. They contain comprehensive information about each functional aspect of SAP Convergent Charging 5.0. The guides are also available on SAP Help Portal for online consultation or download.

Master Guide, Upgrade Guide, Operations Guide: to find a key word once a guide is open, press CTRL + F (Windows users), type the word in the *Find* field, and then click *Find Next*.

Access the Configuration Guide of SAP Convergent Charging

If you need more information about configuring and maintaining the master data for a service provider, we recommend that you consult the SAP Convergent Charging 5.0 [Tuning Guide](#) on SAP Help Portal.

Access the Primary Help for Subscription-Based Business

In case of a system landscape with customer master data including subscriptions, you can set up the SAP CC [Core Tool](#) user interface to work with all kinds of data related to the charging process based either on subscriptions or provider contracts.

Consult the primary help for Core Tool and Logic Component Reference on the SAP site:

- [Primary Help of Core Tool \[page 356\]](#)
- [Logic Component Reference \[page 831\]](#)

Access the Primary Help for a New Platform

In case of a newly installed landscape, SAP CC [Core Tool](#) is set up by default to work with new data models used for the charging process on provider contracts.

Consult the primary help for Core Tool and Logic Component Reference on the SAP site:

- [Primary Help of Core Tool \[page 356\]](#)
- [Logic Component Reference \[page 831\]](#)

Access the Application Help Documentation

The Web Services Documentation, the SAP CC Java/XML API References, and the SAP CC Error Code Reference documents are provided in the Software Development Kit (SDK) of SAP Convergent Charging 5.0. A version is available on SAP Help Portal in the following sections for online consultation:

- [Web Services Documentation](#)
- [Error Code Reference](#)
- [Core APIs](#)

i Note

You can also download these product documents on [SAP Help Portal](#).

Access the SAP Notes

SAP Notes and SAP Knowledge Base Articles (KBA) help you find answers to questions that arise from your daily work with SAP Convergent Charging 5.0:

- [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#)

2.1.2.2.2 Typographical Conventions

The following typographical conventions are used in the primary help of SAP:

- Text or a button that appears on the graphical user interface is written like *this*.
- System commands, names of folders and files, and codes used in APIs are written in `code` font.
- Menu choices are shown in this format: ► *menu name* ► *submenu name* ► *menu item name* ►.
- Text to be typed into a field is shown as follows: **userinput**

2.1.3 Important Concepts

Related Information

[Offline Charging and BART Server \[page 37\]](#)

[CDRs \[page 39\]](#)

2.1.3.1 Offline Charging and BART Server

Welcome to BART Tool

SAP Convergent Charging 5.0 provides two software components dedicated to the offline charging of consumption information data related to the past usage of marketable services by end customers:

- *SAP CC BART Tool* is the user interface that allows you to **administer the batch data acquisition and batch charging operations** with the production systems of SAP Convergent Charging. To facilitate this business administration, BART Tool includes business monitoring and supervision functions to ensure revenue insurance ([Tasks \[page 42\]](#)).
- *SAP CC BART Server* is a system that is part of the *mediation chain* between the network element (device, system) generating Consumption Detail Records (CDRs) or similar usage event records and the core component *SAP CC Core Server*. BART Server is the specialized system that acquires, deduplicates, and stores CDRs (in medium volume). Core Server is the principal system that processes the rating (dynamic pricing) and charging functions in SAP Convergent Charging.

About Offline Charging and BART Server

The [SAP CC BART Tool user interface](#) connects to the SAP CC BART Server system in your SAP Convergent Charging system landscape. Discover the business services and processes of the BART Server system.

BART Server acquires and consolidates medium volume of consumption detail records (CDRs) that you can rate and charge through a session. The whole offline service consists of the following steps:

- CDR Acquisition and Consolidation
- Batch Rating and Charging

For more information on these processes, refer to the SAP Convergent Charging 5.0 [Application Help](#)

CDR Acquisition and Consolidation

During the acquisition process, the BART Server system acquires new CDRs and detects duplicated CDRs depending on the selected acquisition mode. The mediation system converts usage events to CDRs and sends the CDRs to the BART Server system. A connector application can convert and transmit the CDRs.

[Consolidation](#) is part of the acquisition process, for which the BART Server system retrieves rating information from the Core Server system and updates each CDR with the [Subscription ID](#), the [Batch Rating Group ID](#), the [Charge ID](#), and the [Partition ID](#). But note that you can also consolidate CDRs by using a dedicated API.

There are three modes:

- Acquire
- Acquire and deduplicate
- Acquire and reject duplicates

Batch Rating and Charging

During the batch rating and charging processes, the intermediate BART Server system selects CDRs from a common Batch Rating Group and triggers charging operations for the target Core Server system. It converts the CDRs into chargeable items which are the transactional data accepted by the target Core Server system. When the rating fails, erroneous CDRs are duly identified with an error code and an error description ([Rating Error Codes \[page 40\]](#)) to facilitate the troubleshooting.

Batch Rerating

BART Server provides functions to rerate CDRs by enabling the correction of the erroneous CDRs and by resubmitting the corrected CDRs to SAP CC Core Server. You can trigger the rerating operations in SAP CC [Core Tool](#).

i Note

SAP CC BART Server or SAP ERP/FI-CA is mandatory for using the rerating feature of SAP Convergent Charging 5.0. For more information on the rerating feature, refer to the [Application Help](#). Consult the [Primary Help of Core Tool \[page 356\]](#) for more information on how to operate rerating.

BART useful functions

BART Server provides the following functions to:

- Detect duplicated CDRs.
- Detect CDRs that cannot be rated, inform why a CDR is rejected by SAP CC Core Server, and provide functions for modifying acquired CDRs in bulk.
- Activate recurring signals and alarms when unexpected changes occur through the rating chain.

2.1.3.2 CDRs

Consumption Detail Record (CDR)

In SAP Convergent Charging a *CDR* is a data record that includes **consumption details about the usage for a marketable service by an end customer**.

It contains:

- Service usage data/time or duration
- Multiple identifiers (service, end customer)

Batches of CDRs are transmitted from a mediation system in your system landscape to the SAP CC BART Server system for being rated (dynamically priced) and charged to the determined postpaid accounts.

❖ Example

In *SAP Telecommunications industry*, a CDR about phone calls can include details such as type, time, duration, originator, and destination. CDR stands for *Call Detail Record*.

In SAP Convergent Charging each acquired CDR has an operational and business [status \[page 39\]](#).

For more information and user assistance, consult the *Application Help*. See [Help Resources \[page 35\]](#).

Related Information

[Administering the Acquisition Sessions and CDRs \[page 45\]](#)

[Acquisition Topics Window \[page 12\]](#)

[Handle CDRs Window \[page 14\]](#)

[Show Batch Rating Groups Window \[page 25\]](#)

2.1.3.2.1 CDR Status

Each [Consumption Detail Record \(CDR\) \[page 39\]](#) stored in SAP Convergent Charging database is assigned one of the following **statuses**:

- **NEW:** The CDR is newly acquired.
- **DUPLICATED:** The CDR is a duplicate of another CDR.
- **NO PROVISIONING:** The CDR must be reconsolidated (*) before being rated and charged. The CDR has already been consolidated but the consolidation failed because the CDR does not contain a subscription ID.
- **ONLINE SUBSCRIPTION:** The CDR has been consolidated but is not valid because the determined subscription ID refers to an [online subscription](#) (**) that is not possible in an offline charging scenario.
- **RATED:** The CDR is successfully rated and charged in [batch](#) processing mode.
- **IGNORED:** The CDR is ignored during a rating and charging session.
- **ERROR:** The CDR has been rejected during the rating/charging session. A [predefined error code](#) [page 40] defines the source of the issue.
- **TO BE RERATED:** The CDR is selected to be rerated for the next rerating session.

Note

(*) Use the menu  [Tools](#) > [Bulk Operations](#) > [Consolidate CDR](#) .

(**) An online subscription is a type of subscription processed only in real time. Because the BART Server system processes CDRs only in batch mode, it cannot process a CDR relating to an online subscription.

2.1.3.2.2 Rating Error Codes

The BART Server system manages the acquired CDRs. When a business administrator triggers a batch rating/charging operation, this system converts the collected CDRs to [chargeable items](#) and sends these transactional data items to the target and connected Core Server system to batch rate and charge the incoming chargeable items (CITs). Then BART Server updates the stored CDRs depending on the results of these batch operations.

Errors can relate to:

- Business errors (bad configuration in the master data and pricing logic: customer master data or pricing catalog of the service provider)
- Technical errors (system communication failures, database failures)

Some possible error codes are:

- **2 - BAD_CONFIGURATION:** Constant error when the price plan to which refers this CDR is badly configured in a charge activated in the identified provider contract (or subscription). A pricing specialist must investigate and verify the master data in the target Core Server system.
- **3 - WRONG_PROPERTY_TYPE:** One or several CDR properties have a wrong type regarding to the configuration of the chargeable item classes in the pricing catalog referenced by the identified provider contract (or subscription) assigned for this service usage. Verify the master data in the SAP CC Core Server system.
- **4 - PROPERTY_NOT_FOUND:** One or several CDR properties are missing in the CDR regarding to the configuration of the chargeable item classes in the pricing catalog referenced by the identified provider contract (or subscription) assigned for this service usage. Verify the master data in the target Core Server system.
- **37 - SERVER_TIMEOUT:** A [system timeout](#) has occurred on the Core Server system side.

Consult the error reference in [1775256](#)  for more information.

2.1.3.3 Batch Sessions

As a business administrator, you manage two types of sessions with BART Tool:

- **Acquisition sessions** during which all CDRs are acquired from the same downstream source and saved to the SAP CC BART Database. You can view, stop, or delete a batch acquisition session ([Administering the Acquisition Sessions and CDRs \[page 45\]](#)).
- **Batch rating and charging sessions** during which the acquired and consolidated CDRs are batch charged by the SAP CC systems. You can create, view, stop, or delete a running session ([Administering Rating/Charging Sessions for CDRs \[page 46\]](#)).

You can operate ([Workbench Tab and Area \[page 14\]](#)) and monitor ([Supervision Tab and Area \[page 12\]](#)) these sessions:

- [Handle Acquisition Sessions Window \[page 18\]](#)
- [Handle Rating Sessions Window \[page 21\]](#)

2.1.3.3.1 About Rating Modes

The following recommended modes are available to batch rate and charge CDRs assigned to provider contracts or subscriptions:

- **Selection by day and stop on first fail:** This mode is used to process all the CDRs converted into *chargeable items*, whatever the subscription or the provider contract they are associated to. The CDRs are grouped according to the consumption date and time. This mode requires fewer resources than the other modes. If an error occurs in a subscription (or a provider contract), the charging operation stops processing the subscription (or the provider contract) and continues with the other subscriptions (and contracts).
- **Selection by day and rate all:** All the CDRs are rated and charged even if an error occurs. The BART Server system then sends all the chargeable items to the target Core Server system.

When setting up a batch rating and charging session (see [Create Rating Session Window \[page 24\]](#)), other modes are available for compatibility purposes:

- **Selection by subscription and stop on first fail**
- **Selection by subscription and rate all**
- **Selection by subscription and simulate**
- **Windowed selection and stop on first fail**
- **Windowed selection and rate all**
- **Windowed selection and simulate**

Refer to the *Application Help* (see [Help Resources \[page 35\]](#)) for more information about when to use these particular modes.

i Note

For more information about the operation conditions and performances, see the *Application Help* documentation.

Related Information

[Rating Session Job Window \[page 32\]](#)

2.1.4 Tasks

In an offline charging scenario, you use the *BART Tool* user interface regularly or exceptionally to administer the batch acquisition and batch charging operations for a specific marketable end-customer service or a bundle of services.

You complete the following basic tasks:

- [Launching BART Tool and Logging On \[page 43\]](#)
- [Logging Off and Disconnecting from BART Server \[page 44\]](#)
- [Changing the Password in BART Tool \[page 53\]](#)

Business Administration

To monetize the usage for the marketable end-customer service, you manage the following administrative operations successfully:

- [Manage the batch acquisition for \(CDRs\) into the database \[page 45\]](#) (operation monitoring, troubleshooting)
- [Manage the batch rating/charging for the consolidated CDRs \[page 46\]](#) (operation starting and monitoring, troubleshooting)
- [Manage the troubleshooting when some operations fail due to business or technical issues \[page 54\]](#)
- [Manage the regular cleanup of the database \[page 48\]](#)

→ Tip

In SAP Convergent Charging, the BART Tool user interface and the BART Server system support the job concept. With this feature, you can [configure some useful scheduled jobs \[page 50\]](#) to automate the batch rating/charging operations for example.

Use Your Workspace

Workbench

In the *Workbench* primary tab, you can manage consumption detail records (CDRs), all the sessions, and all the bulk operations. Refer to [Workbench Tab and Area \[page 14\]](#).

See also:

- [Administering the Acquisition Sessions and CDRs \[page 45\]](#)

- [Administering Rating/Charging Sessions for CDRs \[page 46\]](#)

Supervision

In the [Supervision](#) primary tab, you can monitor and manage the sessions and jobs in progress and get information on the continuous changes that occur during sessions and jobs launched in the BART Server system. Refer to [Supervision Tab and Area \[page 12\]](#).

Jobs

In the [Jobs](#) primary tab, you can view all the jobs launched in the BART Server system, and you are allowed to administer jobs that you can create, delete, or modify. Refer to [Jobs Tab and Area \[page 30\]](#).

See also:

- [Working with Jobs \[page 50\]](#)

Related Information

[Exploring the Workspace for BART Tool \[page 7\]](#)

2.1.4.1 Launching BART Tool and Logging On

Once the required files have been installed on your workstation (computer) by your [SAP CC administrator](#), you can launch the [BART Tool](#) user interface.

Prerequisites

- Before you begin, make sure that you have the user name (or ID) and password given by your [user administrator](#) for SAP Convergent Charging.
- Verify that you have the [host address](#) of the running SAP CC BART Server system to connect to.

Note

- You must start the SAP CC BART Server system before starting your BART Tool user interface. A warning message is displayed if the user interface cannot communicate with this system. For more information on BART Server, refer to [Help Resources \[page 35\]](#).
- If the [Connection](#) dialog box is not displayed after step 2 in the following procedure, refer to your administrator.

Procedure

This procedure is valid for a Windows environment.

1. Using [Windows Explorer](#), open the `SAP Convergent Charging` folder.
2. Open the `Bin` folder and double-click the `bart_tool.bat` file.
The [Connection](#) dialog box appears.
3. In the [Connection](#) dialog box, type your user name or ID in the [Login](#) field. The user name or ID must correspond to an *individual* SAP CC user.
4. Type your password in the [Password](#) field.
5. If necessary, modify the [Server URL](#) field by specifying **an IPv4 or IPv6 server address** for the SAP CC BART Server system to connect to.
6. Click [OK](#).
7. The user interface displays its [main window \[page 8\]](#) that contains a *workplace* for your [tasks \[page 42\]](#) and activities.

i Note

In case of logon issues, one of the following secondary windows is displayed:

- The list of previously failed logon authentication attempts so you can verify the issues.
[Troubleshoot your problems and find an appropriate solution. \[page 43\]](#).
- The window used to [change your password in BART Tool directly \[page 53\]](#) because of the security policy based and corresponding password management settings for SAP Convergent Charging.

Related Information

[Issues When Launching and Logging On to BART Tool \[page 55\]](#)

[Logging Off and Disconnecting from BART Server \[page 44\]](#)

2.1.4.2 Logging Off and Disconnecting from BART Server

To quit the [BART Tool user interface](#) and disconnect from the BART Server system:

- From the menu bar in the main window, select **File > Exit** to close the main window and disconnect from the BART Server system.

Related Information

[Launching BART Tool and Logging On \[page 43\]](#)

2.1.4.3 Administering the Acquisition Sessions and CDRs

Prerequisites

- The SAP CC systems (BART Server, Core Server) are up and running and connected together.
- A mediation system uploads collections of CDRs to your BART Server system and its back-end database system (BART Database).

Context

During the *Production Operation Phase*, you administer the offline charging operations to monetize the usage for your value-added services.

Tasks

You use the *BART Tool* user interface to monitor and operate the batch acquisition for [CDRs \[page 39\]](#).

Business Administration Operations

As a business administrator, you complete the following tasks:

- View, audit, and report CDR acquisition sessions triggered by an external system (see [Handle Acquisition Sessions Window \[page 18\]](#))
 - **Monitor** the correct processing of the sessions (see [Acquisition Topics Window \[page 12\]](#)) and detect all the possible issues
 - **Stop a running acquisition session** triggered by an external system.
 - Delete CDR acquisition sessions to clean up your environment:
 - Single (see [Handle Acquisition Sessions Window \[page 18\]](#))
 - In bulk (see [Delete Acquisition Sessions Bulk Window \[page 26\]](#))
 - **Manage the collected CDRs** before triggering the batch rating and charging operations:
 - List and search for some specific CDRs (see [Handle CDRs Window \[page 14\]](#))
 - View and inspect all the acquired CDRs (see [View CDR Window \[page 17\]](#))
 - (Re-)Consolidate acquired CDRs (see [Consolidate CDR Bulk Window \[page 26\]](#))
 - Troubleshoot and correct erroneous CDRs
 - Deduplicate ([single CDR \[page 18\]](#), [in bulk \[page 27\]](#))
 - Modify ([single CDR \[page 18\]](#), [in bulk \[page 27\]](#))
 - Delete (deletion of few CDRs, or bulk deletion)
-

Next Tasks

[Administering Rating/Charging Sessions for CDRs \[page 46\]](#)

Related Information

[Exploring the Workspace for BART Tool \[page 7\]](#)

2.1.4.3.1 Viewing the Properties of an Acquisition Session

Use the *Acquisition Session Properties* window (see [Acquisition Session Properties Window \[page 20\]](#)).

2.1.4.4 Administering Rating/Charging Sessions for CDRs

Prerequisites

- You managed the acquired CDRs before triggering the batch rating and charging operations (see [Handle CDRs Window \[page 14\]](#)).
- The SAP CC systems (BART Server, Core Server) are up and running and connected together.

Context

During the *Production Operation Phase*, you administer the offline charging operations to monetize the usage for your value-added services.

Tasks

You use the *BART Tool* user interface to trigger and monitor the batch rating and charging for the [acquired and consolidated CDRs \[page 39\]](#).

Business Administration Operations

As a business administrator, you complete the following tasks:

- **Create and start** a batch rating and charging session for CDRs (see [Creating and Starting a Rating/Charging Session \[page 47\]](#))
 - **View, audit, and report** a batch rating/charging session (see [Handle Rating Sessions Window \[page 21\]](#))
 - **Monitor** the correct processing for the sessions (see [Rating Topics Window \[page 13\]](#)) and detect some issues
 - **Stop** a session
 - **Delete** batch rating/charging sessions to clean up your environment:
 - Single (see [Handle Rating Sessions Window \[page 21\]](#))
 - In bulk (see [Delete Rating Session Bulk Window \[page 30\]](#))
 - **Troubleshoot** the erroneous CDRs that cannot be neither rated nor charged. You may have to verify the availability of the target Core Server system, some configuration for the service pricing in master data (pricing catalog) or customer master data (provider contracts, data tables), or some other business/technical settings.
 - **Clean up** the database by using a specialized job (see [Cleaning Database Job Window \[page 34\]](#))
-

Related Information

[Exploring the Workspace for BART Tool \[page 7\]](#)

2.1.4.4.1 Creating and Starting a Rating/Charging Session

You can create a batch rating/charging session for CDRs from:

- The *File* menu
- The *Tools* menu

To create a rating session from the File menu

1. From the menu bar in the main window, select **File > New > Rating Sessions**. The *Create Rating Session* dialog box opens.
2. In this window, set up the rating session (see [Create Rating Session Window \[page 24\]](#)).
3. Click the *Create and Launch* button.

To create a rating session from the Tools menu

1. From the menu bar in the main window, select **Tools > Handle Sessions > Rating Sessions**. The *Handle Rating Sessions* window opens.

2. In the *Handle Rating Sessions* window, click the *Create* button. The *Create Rating Session* dialog box opens.
3. In this window, set up the rating session (see [Create Rating Session Window \[page 24\]](#)).
4. Click the *Create and Launch* button.

Related Information

[Create Rating Session Window \[page 24\]](#)

2.1.4.4.2 Viewing the Properties of a Rating Session

Use the *Rating Session Properties* window (see [Rating Session Properties Window \[page 23\]](#)).

2.1.4.4.3 Organizing and Planning Rating Sessions

In your offline charging scenario, you use the concept of batch rating groups to organize and plan your charging operations.

You can also [define some jobs \[page 50\]](#).

2.1.4.4.3.1 Viewing Batch Rating Groups

Use the *Show Batch Rating Groups* window (see [Show Batch Rating Groups Window \[page 25\]](#)).

2.1.4.5 Cleaning Up the BART Database

To clean some CDRs and session information records from the BART database system, you complete the following tasks:

- Administer some scheduled jobs (see [Working with Jobs \[page 50\]](#))
- Manually use some bulk operations (see [Working with Bulk Operations \[page 49\]](#)):
 - [Delete Acquisition Sessions Bulk Window \[page 26\]](#)
 - [Delete CDR Bulk Window \[page 29\]](#)
 - [Delete Rating Session Bulk Window \[page 30\]](#)
- Delete a single CDR or some session information

Related Information

[Exploring the Workspace for BART Tool \[page 7\]](#)

2.1.4.6 Working with Bulk Operations

To facilitate your daily work as a business administrator, you complete your [tasks \[page 42\]](#) by initiating some bulk operations.

Tasks

As a *business administrator*, you can perform the following bulk operations on CDRs, CDR acquisition sessions, and CDR rating/charging sessions:

- CDR Acquisition:
 - Delete acquisition sessions in bulk (see [Delete Acquisition Sessions Bulk Window \[page 26\]](#)) to clean up your environment
- CDR Consolidation:
 - Consolidate CDRs (see [Consolidate CDR Bulk Window \[page 26\]](#))
- CDR Correction:
 - Modify CDRs in bulk (see [Modify CDR Bulk Window \[page 27\]](#))
 - Modify and deduplicate CDRs in bulk (see [Modify CDR Bulk Window \[page 27\]](#))
 - Delete CDRs in bulk (see [Delete CDR Bulk Window \[page 29\]](#))
- CDR Batch Rating/Charging:
 - Delete rating sessions in bulk (see [Delete Rating Session Bulk Window \[page 30\]](#)) to clean up your environment

Related Information

[Bulk Operations Menu and Commands \[page 25\]](#)

2.1.4.7 Working with Jobs

Configuration

Use the *Jobs* primary tab to configure some new jobs:

- [Creating a Job \[page 50\]](#)
 - [Rating Session Job Window \[page 32\]](#)
 - [Cleaning Database Job Window \[page 34\]](#)
- [Using the UNIX Cron Grammar \[page 51\]](#)

See also: [Jobs Tab and Area \[page 30\]](#)

Execution

Use the *Jobs* primary tab to start or stop a configured job.

See: [Jobs Tab and Area \[page 30\]](#)

Monitoring

Use the *Supervision* primary tab to monitor and administer your defined jobs.

See: [Supervision Tab and Area \[page 12\]](#) and [Scheduled Job Topics Window \[page 13\]](#)

2.1.4.7.1 Creating a Job

To automate some tasks, you can create and define a job from:

- The *File* menu
- The *All Jobs* window on the *Jobs* primary tab (see [All Jobs Window \[page 31\]](#))

Procedures

To create a job from the File menu

1. From the menu bar in the main window, select  *File*  *New*  *Job* . The *New Job – Choose Type* dialog box opens.

2. In the drop-down menu of the dialog box, select *Rating Session* or *Database Cleaning*.
3. Click *Continue*. The *Rating Session Job* window or the *Cleaning Database Job* window opens.
4. Set up the rating session job (see *Rating Session Job Window* [page 32]) or the cleaning database job (see *Cleaning Database Job Window* [page 34]).

To create a job from the All Jobs window on the Jobs primary tab

Refer to the section *All Jobs Window* [page 31].

2.1.4.7.2 Using the UNIX Cron Grammar

The scheduling policy for jobs is based on the UNIX cron grammar. The table below shows you the format in use to type scheduling parameters:

Format	Meaning
*	In the UNIX cron grammar, "all possible values" is represented by an asterisk. On the <i>General</i> tab of the <i>Rating Session Job</i> and <i>Cleaning Database Job</i> windows, "all possible values" is represented by: • An empty field in the <i>Seconds</i>, <i>Minutes</i>, <i>Hours</i>, or <i>Days</i> fields • All the checkboxes cleared in the <i>Days of weeks</i>, or <i>Months</i> areas
n	A single integer is used to match that exact value
m-n	Two integers separated by a dash are used to match any value within the range
m,n	A list including integers that are separated by commas and used to match a value

Time units are expressed in second, minute, hour, or day.

Note

- An empty field means "every". For example, if the *Seconds* field is empty, this means "every second".
- In the *Days of weeks* and *Months* areas, all the checkboxes cleared means "every day" in the *Days of weeks* area and "every month" in the *Months* area.

❖ Example

Scheduling examples

Seconds	Minutes	Hours	Days	Days of Weeks	Months	Comments
5	15	1	Empty	All the checkboxes cleared	All the checkboxes cleared	Executes the job at 1:15:05 AM every day

Seconds	Minutes	Hours	Days	Days of Weeks	Months	Comments
10	40	23	1	All the check-boxes cleared	All the check-boxes cleared	Executes the job on the first of every month at 11:40 PM
10	0,10,20,30	9,17	Empty	All the days selected	All the check-boxes cleared	Executes the job on Monday-Sunday every 10 minutes for the first half hour of the 9 AM and 5 PM hours: • 9:00:10 • 9:10:10 • 9:20:10 • 9:30:10 • 17:00:10 • 17:10:10 • 17:20:10 • 17:30:10
30	30	4	1,15	<i>Fri</i> selected	All the check-boxes cleared	Executes the job at 4:30:30 AM on the 1st and 15th of each month, plus every Friday
0	0	0	19	All the check-boxes cleared	<i>Aug</i> selected	Executes the job at midnight on August 19th
1	Empty	Empty	Empty	All the check-boxes cleared	All the check-boxes cleared	Executes the job every second
0	30	1	Empty	All the check-boxes cleared	All the check-boxes cleared	Executes the job every day at 1:30 in the morning
0	30	22	1,11,21	All the check-boxes cleared	All the check-boxes cleared	Executes the job every day at 10:30 PM on the 1st, 11th and 21st of every month

Seconds	Minutes	Hours	Days	Days of Weeks	Months	Comments
0	59	0	1-7	<i>Sun</i> selected	All the check-boxes cleared	Executes the job at 12:59 AM on the first seven days of the month, and then on every subsequent Sunday after the 7th
0	30	19	Empty	<i>Tue, Thu, Sat</i> selected	All the check-boxes cleared	Executes the job at 19:30 PM on Tuesday, Thursday and Saturday of every month
0	59	23	31	<i>Fri</i> selected	<i>Dec</i> selected	Executes the job at one minute before the end of year if the last day of the year is Friday
0	45	17	7	All the check-boxes cleared	<i>Jun</i> selected	Executes the job at every year on June 7th at 17:45

2.1.4.8 Changing the Password in BART Tool

You can change your password at any time or when you have been prompted to change it.

- To change your password at any time, you must use the SAP CC *Core Tool user interface* to change the password for your user logon. See the section [Changing Your Password \[page 763\]](#) in the *primary help* for Core Tool.
- When you are prompted to change your password, you can complete this task with BART Tool directly and the *Changing Password* window is displayed.

Procedure

- When the *Changing Password* window is displayed in BART Tool, type the following:
 - Old Password*: Type the old password that you must change.
 - New Password*: Type your new password.
 - Retype New Password*: Retype your new password to confirm the first entry.

2. Click [OK](#).
3. The user interface displays its [main window \[page 8\]](#). You are ready to work with the application and complete your [regular or exceptional tasks \[page 42\]](#).

Related Information

[Changing Your Password \[page 763\]](#)

2.1.5 Troubleshooting

Troubleshooting Problems with Your Offline Charging Operations

Issues with CDR Acquisitions or Post Treatments

For each collected CDR, use its **status** to plan some troubleshooting.

- Duplicate CDR detected
- Failed consolidation
- Invalid CDR due to pricing configuration

See [CDR Status \[page 39\]](#).

Issues with Batch Rating and Charging

The rating and charging for a CDR may fail due to multiple technical or business reasons.

A system may be down or service pricing settings may be wrong.

Use the error code to troubleshoot your problems. See [Rating Error Codes \[page 40\]](#).

Troubleshooting Problems of the User Interface

You may have to troubleshoot some **user interface issues** when working with the [BART Tool](#) user interface:

- [Issues When Launching and Logging On to BART Tool \[page 55\]](#)

Enabling the Traces for Troubleshooting

For troubleshooting purposes, SAP SE recommends that you temporarily enable the logging and tracing functions in your user interface.

For more information, refer to the related topic in the SAP Convergent Charging 5.0 [Operations Guide](#).

2.1.5.1 Issues When Launching and Logging On to BART Tool

When [launching \[page 43\]](#) your BART Tool user interface, it may display the following windows:

- [Failed Login Authentication Attempts](#)
- [Password Modification](#)

Try the following suggestions to resolve the situation.

Failed Login Authentication Attempts (Window)

Symptom: BART Tool displays the window [Failed Login Authentication Attempts](#).

Details: The target system cannot authenticate. This window displays a list of all the previously failed logon attempts. Each logon attempt is displayed with the following information:

- The date and time of each failed attempt
- The IP address of the computer which is the cause of the failed authentication

Solutions: Depending on the recorded detailed information, contact your user administrator for SAP Convergent Charging or contact the SAP CC system administrators about this issue.

Password Modification (Window)

Symptom: BART Tool displays the window [Password Modification](#).

Details: The IT administrator for SAP Convergent Charging can configure the SAP CC Core Server system to use a password management policy which can oblige SAP CC users to change their password.

If the password management policy is enabled and if it applies to you, a message is displayed to inform that your password must be changed. A window is then displayed to change this password immediately.

Solutions: Change the password with BART Tool. See [Changing the Password in BART Tool \[page 53\]](#).

2.2 CAT Tool - IEC Application

Welcome to CAT Tool and IEC

[CAT Tool](#) and [IEC](#) are software components of SAP Convergent Charging 5.0 (SAP CC). They are dedicated to transfer, modify, and consolidate row data between the SAP CC systems and external systems, applications, sources, or other streams (down or up).

[IEC](#) includes a connector application (see [What You Can Do with IEC \[page 63\]](#)) that provides data import/export functions to and from SAP CC.

You can implement and use an import/export connector ([IEC](#)) application in your system landscape during the implementation project phase to:

- Test the overall implementation by:
- Enable (*) basic offline mediation functions (CDRs acquisition by BART Server ([Acquisition \(by BART\) \[page 138\]](#)), chargeable items acquisition by Core Server ([Acquisition \(by CC\) \[page 139\]](#)), or batch charging ([Rating \[page 136\]](#))) with low volume data and low throughput
- Transport data to a production system that is not live

⚠ Caution

Do not implement a remote IEC (see [Executing a Scenario \[page 88\]](#)) in a production system landscape.

→ Recommendation

SAP SE recommends that you implement a mediation system or a policy system to integrate the SAP CC software component as online charging system (OCS) or offline charging system (OFCS). For example, SAP Convergent Mediation by DigitalRoute allows you to implement convergent mediation or convergent policy business scenarios (*).

Customizing

The implementation project team configures an import/export connector (*IEC*) application by designing and setting up a scenario file with the *CAT Tool* user interface.

Purpose of This Primary Help

The primary help describes how to use CAT Tool to design and create a scenario (see [Scenarios \[page 93\]](#)) used by an *IEC* as configuration script. It explains:

- What's *CAT Tool*: [CAT Tool Overview \[page 58\]](#)
- [What You Can Do with CAT Tool \[page 58\]](#)
- What's *IEC*: [IEC Application Overview \[page 62\]](#)
- [What You Can Do with IEC \[page 63\]](#)
- [Working with an IEC \[page 65\]](#)

For more information about help, refer to [Help Resources \[page 66\]](#).

To help you get started with the basics of creating a scenario, the primary help includes a [Tutorial \[page 69\]](#).

Target Audience

This documentation is intended for implementation project teams, support specialists, and administrators of SAP CC.

They should have knowledge of:

- SAP CC Core Server
- SAP CC BART Server
- File management and database systems

The primary help is designed to present the most detailed information possible for implementing the *IEC* application in your SAP system landscape.

[What's New? \[page 57\]](#)

[Implementing an Import/Export Connector \[page 57\]](#)

[Troubleshooting \[page 156\]](#)

2.2.1 What's New?

This section highlights the main changes in this *SAP Product Document and User Assistance Deliverable*. They relate both to **new or changed features** in the SAP Convergent Charging 5.0 software and to **documentation enhancements** for enriching your SAP user experience continuously.

What's New in SP 4

Your *Primary Help* migrates to a new content management system. You can benefit from:

- Rich navigation between the other SAP product documents and user assistance deliverables
- PDF deliveries for offline consultation
- Powerful search and indexing tools
- Feedbacks and live comments

What's New in SP 0

This version includes the following changes:

- Links in the [Help Resources \[page 66\]](#) topic have been changed to access the new SAP Help Portal

2.2.2 Implementing an Import/Export Connector

- [What's New? \[page 57\]](#)
- [CAT Tool Overview \[page 58\]](#)
- [IEC Application Overview \[page 62\]](#)
- [Getting Help \[page 66\]](#)
- [Tutorial \[page 69\]](#)
- [Connectors \[page 82\]](#)
- [Scenarios \[page 93\]](#)
- [Components \[page 108\]](#)

- [Troubleshooting \[page 156\]](#)

2.2.2.1 CAT Tool Overview

SAP CC [CAT Tool](#) is a graphical user interface which defines and manages scenarios. A scenario describes how an import/export connector (IEC - see [Connectors \[page 82\]](#)) application and connected systems or accessible sources can interact together.

For example, scenarios can be used to:

- Test some business services in the system landscape by simulating a mediation system.
- Implement basic charging services with low volume data:
 - Rate and charge customer service consumptions in real-time (with SAP CC Core Server).
 - Rate and charge post consumptions in batch mode (with SAP CC BART Server).
 - Synchronize information between the SAP CC databases and external systems.

During the implementation project phase, the project team:

- Determines the business requirements (data flows, downstream systems, upstream systems).
- Defines the components of the system landscapes, designs and configures the relevant scenarios.
- Deploys, installs and configures the IEC applications.

For more information, refer to [Help Resources \[page 66\]](#).

2.2.2.1.1 What You Can Do with CAT Tool

Before using CAT Tool, you must have knowledge of the IEC component (see [What You Can Do with IEC \[page 63\]](#)) that allows you to perform scheduled data transfers between the SAP CC system and external systems.

CAT Tool Features

The main features of CAT Tool are the following:

- Scenario management ([Scenarios \[page 93\]](#)): a scenario describes a data transfer between the SAP CC system and an external system. A scenario is a sequence of basic actions such as:
 - Importing/exporting data from/to a file or database
 - Modifying data
 - Executing a Java class
 - Other basic actions

CAT Tool allows you to organize and manage all your scenarios.

- [Components \[page 108\]](#): a component specifies a basic action of a scenario. CAT Tool provides many components fulfilling the necessary actions to perform data transfers.

- Scheduler (see [Scheduler Information \[page 99\]](#)): to process a data transfer, a scenario is triggered by a scheduler function in the import/export connector (IEC) application depending on different scheduling policies.
- Connector management: [Connectors \[page 82\]](#) allow you to execute scenarios in stand-alone. In a development system landscape, CAT Tool allows you to manage remote connectors.

2.2.2.1.2 Getting Started with CAT Tool

- [Launching CAT Tool \[page 59\]](#)
- [Starting Your Work Session \[page 60\]](#)
- [Changing the Password \[page 62\]](#)
- [Quitting Your Work Session \[page 62\]](#)

2.2.2.1.2.1 Launching CAT Tool

Once the required files have been installed on your workstation by your administrator, you can launch the *CAT Tool* user interface.

Before you begin, make sure that you have the user names and passwords given by your administrator to:

- Execute a scenario (see [Executing a Scenario \[page 98\]](#))
- Export a scenario (see [Exporting a Scenario \[page 107\]](#)) to or import a scenario (see [Importing a Scenario \[page 108\]](#)) from a connector repository
- Export XCIs (see [Export to Database Action \[page 135\]](#)) to or import XCIs (see [Import XCI from Database Action \[page 114\]](#)) from the IEC database

Verify that you have the address to access the database of SAP CC or another database ([SQL Action 2 \[page 144\]](#)).

To launch Core Tool

This procedure is valid for a Windows environment.

1. Using Windows Explorer, open the `SAP Convergent Charging` folder.
2. Open the `Bin` folder and double-click the `cat_tool.bat` file. The main window of the application is displayed.

Password Modification window

The administrator can configure SAP CC Core Server to use a password management policy which can oblige SAP CC users to change their password.

If the password management policy is enabled and if it applies to you, a message is displayed to inform that your password must be changed. A window is then displayed to change this password (see [Changing the Password \[page 62\]](#)).

Main application window

If the password management policy does not apply to you, or if it has been disabled, SAP CC *Core Tool* starts and displays the main window (see [Starting Your Work Session \[page 60\]](#)).

For more information about implementation, refer to [Help Resources \[page 66\]](#).

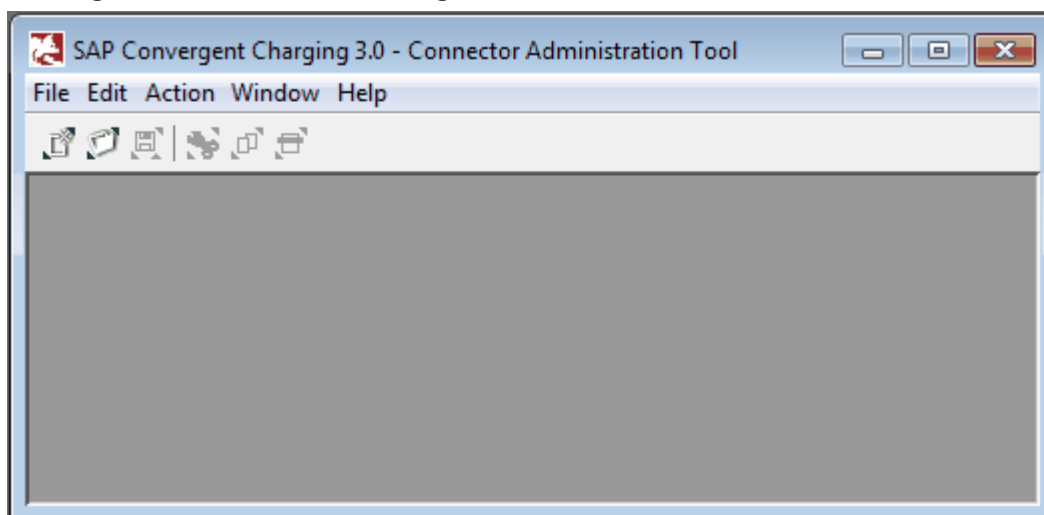
2.2.2.1.2.2 Starting Your Work Session

When launching *CAT Tool*, it displays one of the following windows:

- The main window of the application
- The window used to change your password (see [Changing the Password \[page 62\]](#))

Main Window

If the password management policy does not apply to you, or if it has been disabled, *CAT Tool* displays the following main window to start a working session:



The main window displays:

- A title bar
- A menu bar
- A tool bar

- A workspace

Menu Bar

The table below presents the menus and their functions:

With the menu	You can
<i>File</i>	Create a scenario Open a scenario Save a scenario Synchronize a scenario Export or import a scenario Exit CAT Tool
<i>Edit</i>	Cut a component Copy a component Paste a component
<i>Action</i>	Add or remove a component Execute or stop a scenario
<i>Window</i>	Display connectors Select a connector Select an open window
<i>Help</i>	Access primary help

Toolbar

The table below presents the tools and their functions:

With the tool	You can
	Create a new scenario
	Open a scenario
	Save the scenario in progress

With the tool	You can
	Cut a component
	Copy a component
	Paste a component

2.2.2.1.2.3 Changing the Password

You can change your password when you have been prompted to change it.

When you are prompted to change your password, the [Changing Password](#) window is displayed.

Changing Password window

Fill in the [Changing Password](#) window:

- [Old Password](#): Type the old password that you want to change.
- [New Password](#): Type your new password.
- [Retype New Password](#): Retype your new password.

2.2.2.1.2.4 Quitting Your Work Session

To quit your work session:

1. Save your work.
2. Click the [Close](#) button in the [Scenario](#) window.
3. To quit [CAT](#), do one of the following:
 - Click the [Close](#) button in the [CAT](#) window
 - On the [File](#) menu, click [Exit](#)

2.2.2.2 IEC Application Overview

SAP CC [IEC](#) is a connector application (see [Connectors \[page 82\]](#)) which imports and exports low volume data from/to different systems, applications, sources, and destinations.

The import/export connector (IEC) application performs scheduled data transfers between the SAP CC system and external systems.

IEC contains:

- *CAT Tool* (see [CAT Tool Overview \[page 58\]](#)) to create scenarios for describing data transfers between the SAP CC system and external systems
- Executable [Connectors \[page 82\]](#) to execute the scenarios

Tools

To perform its functions, *IEC* provides you with the following tools:

- *CAT Tool* for creating, executing, and stopping scenarios (see [CAT Tool Overview \[page 58\]](#))
- Executable files for launching [Connectors \[page 82\]](#)
- Configuration files for configuring *CAT Tool*

Architecture

IEC

- Is fully developed in Java
- Can work with SAP HANA, Sybase ASE, Oracle, SQL Server, or IBM DB2 databases

2.2.2.2.1 What You Can Do with IEC

This topic describes the main features of IEC.

IEC features

IEC allows you to:

- Transfer data between SAP CC systems and external systems
- Modify and consolidate transferred data whatever the type of the transfer mode

i Note

An IEC does not replace a mediation system but easily interfaces the SAP CC system with an information system or a mediation system.

Transferring data

IEC allows you to:

- Import data from the SAP CC system. For example, you can aggregate billing information to generate financial reports.

- Export data to the SAP CC system. For example, you can rate customers' consumptions or import customers' subscriptions from your CRM portal.

Modifying and consolidating data

[IEC](#) allows you to:

- Collect data from files or external databases
- Extract advanced lines from files, lines by lines, or extract all the lines which are inserted between two specific lines
- Modify advanced character strings such as CSV parsing
- Generate chargeable items from collected data
- Send XML API requests to SAP CC Core Server
- Execute SQL requests
- Process XML and XSL operations

2.2.2.2.2 Getting Started with an IEC

- [Launching an IEC \[page 64\]](#)
- [Working with an IEC \[page 65\]](#)

2.2.2.2.2.1 Launching an IEC

Launching an IEC means that you execute a scenario via an import/export connector (IEC) application (see [Connectors \[page 82\]](#)) installed in your system landscape.

To launch an import/export connector program

You can manually execute a stand-alone IEC scenario or a remote IEC scenario.

Caution

Do not implement a remote IEC (see [Executing a Scenario \[page 88\]](#)) in a production system landscape.

Related Information

[Working with an IEC \[page 65\]](#)

2.2.2.2.2 Working with an IEC

If you need to transfer data between the SAP CC system and an external system by using an import/export connector (IEC), you must first design and create a scenario (see [Scenarios \[page 93\]](#)) with the *CAT Tool* graphical user interface ([CAT Tool Overview \[page 58\]](#)).

Implementation example

Every hour, you want to rate and charge the CDRs of customers which are stored in CSV files by your offline mediation system. In the CSV files, every CDR will have the simple following format:

```
customerID;consumptionDate;serviceID
```

This format means that the end customer “customerID” used the customer service “serviceID” on the date “consumptionDate”.

Scenario analysis and design

To define the scenario, you must consider the following four steps:

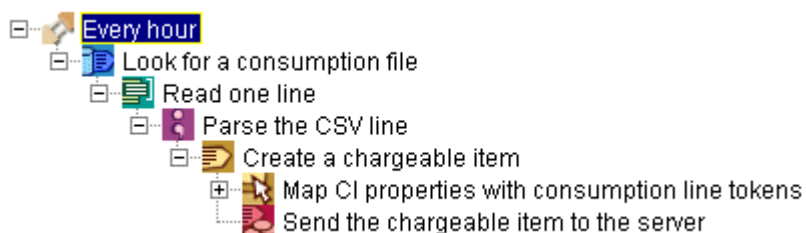
1. **Data Collection:** How to import the data in the scenario. In our example, the CDRs are collected from files, line by line.
2. **Data Modification:** How to make collected data exportable. You need to generate one chargeable item from one collected line. Each collected line must be parsed through a CSV parser. The *userID* property of the chargeable item must be mapped onto the *customerID* token of the collected line, the *consumptionDate* property with the *consumptionDate* token, and the *serviceID* property with the *serviceID* token.
3. **Data Export:** How to export data from the scenario. You need to send the chargeable items to be rated to SAP CC Core Server by using Message API, for example (see [Rating \[page 136\]](#)).
4. **Execution Period:** How to execute the scenario. The scenario is executed every hour.

i Note

For more information on scenario design, refer to [Modeling a Scenario \[page 97\]](#).

Scenario creation

Once you have designed the scenario, you can open *CAT*, create the scenario, and then insert appropriate components in the tree for describing actions.



This scenario means that:

1. Every hour, a CDR file is looked for.

2. When a CDR file has been found, the extractor reads one CSV line from this file.
3. The CSV line is parsed to extract token1, token2, and token3, for example.
4. A chargeable item is created.
5. The chargeable item properties are mapped onto token1, token2, token3.
6. The chargeable item is sent to the server through Message API.

When the scenario is complete, and then saved in XML file, you can execute it in an import/export connector (IEC) every hour ([Connectors \[page 82\]](#)).

i Note

For more information on scenario configuration, refer to [Building a Scenario \[page 97\]](#).

2.2.2.3 Getting Help

- [Help Resources \[page 66\]](#)
- [Typographical Conventions \[page 68\]](#)

2.2.2.3.1 Help Resources

To help you get the most out of SAP Convergent Charging 5.0, SAP SE provides you with an extensive list of resources you can use for support and guidance.

Integrated SAP Solution Scenarios

SAP Convergent Charging 5.0 is integrated with different software components of the SAP Business Suite: SAP CRM, SAP ERP/FI-CA, and SAP Convergent Invoicing in SAP ERP.

The primary help provides you with specific information and recommendations for configuring data in SAP Convergent Charging 5.0 for the integrated [SAP Solution](#) scenarios.

Consult the SAP Help Portal

On [SAP Help Portal](#), you find extensive documentation from the SAP Library on SAP products and solutions, along with additional information about the documentation, information design at SAP, educations services, and links to the SAP Community Network (SCN).

i Note

SAP Convergent Charging 5.0 is part of SAP Billing and Revenue Innovation Management. When your SAP CC system is connected to the SAP CRM system or to SAP Convergent Invoicing in the SAP ERP system, the following SAP libraries are relevant on [SAP Help Portal](#) at:

- [SAP EHP 4 for SAP CRM 7.0](#) > Application Help > SAP Library > SAP CRM for Industries > Telecommunications > Functions for Provider Sales and Order Management
 - Products > Cross Catalog Mapping
 - Business Agreement
 - Provider Order and Provider Contract
 - Sharing Contract

and at:

- [SAP EHP 8 for SAP ERP 6.0](#) > Application Help > SAP Library > Industries in SAP ERP > SAP Telecommunications > Contract Accounts Receivable and Payable > SAP Convergent Invoicing
- - Master Data
 - Rating
 - Billing
 - Discounts and Charges on Billable Items
 - Partner Settlement
 - Invoicing

Access the Reference Guides of SAP Convergent Charging

These guides are available in PDF format and provided on the DVD-ROM with the release of this product. They contain comprehensive information about each functional aspect of SAP Convergent Charging 5.0. The guides are also available on [SAP Help Portal](#) for online consultation or download.

- [Master Guide](#)
- [Operations Guide](#)
- [Installation and Upgrade Guide](#)

To find a key word once a guide is open, press CTRL + F (Windows users), type the word in the [Find](#) field, and then click [Find Next](#).

Access the Configuration Guide of SAP Convergent Charging

If you need more information about configuring and maintaining the master data for a service provider, we recommend that you consult the SAP Convergent Charging 5.0 [Tuning Guide](#) on SAP Help Portal.

Access the Primary Help for Subscription-Based Business

In case of a system landscape with customer master data including subscriptions, you can set up the SAP CC [Core Tool](#) user interface to work with all kinds of data related to the charging process based either on subscriptions or provider contracts.

Consult the [Primary Help of Core Tool \[page 356\]](#) and the [Logic Component Reference \[page 831\]](#) Reference on the SAP site.

Access the Application Help Documentation

The [Application Help](#) document is provided in the Software Development Kit (SDK) of SAP Convergent Charging 5.0. A version is available on SAP Help Portal for online consultation.

Access the Technical Documentation

The Web Services Documentation, the SAP CC Java/XML API References, and the SAP CC Error Code Reference documents are provided in the Software Development Kit (SDK) of SAP Convergent Charging 5.0. A version is available on SAP Help Portal for online consultation,

- [Web Services Documentation](#)
- [Core APIs](#)
- [Error Code Reference](#)

→ Tip

You can also download these product documents on [SAP Help Portal](#).

Access the SAP Notes

SAP Notes and SAP Knowledge Base Articles (KBA) help you find answers to questions that arise from your daily work with SAP Convergent Charging 5.0:

- [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#)

2.2.2.3.2 Typographical Conventions

The following typographical conventions are used in the primary help of SAP Convergent Charging 5.0:

- Text or a button that appears on the graphical user interface is written like *this*.

- System commands, names of folders and files, and codes used in APIs are written in `code` font.
- Menu choices are shown in this format: ► *menu name* ► *submenu name* ► *menu item name* ►.
- Text to be typed into a field is shown as follows: `userinput`

2.2.2.4 Tutorial

The tutorial is intended for users who have not any knowledge about *IEC*. This tutorial however does not cover all the features of *IEC* but allows you to handle the main concepts of it. For more information about these concepts, refer to the primary help of SAP Convergent Charging 5.0 (refer to [Help Resources \[page 66\]](#)).

Once you would have studied how to create a scenario with IEC, you will be able to create your own scenario.

2.2.2.4.1 Before You Begin

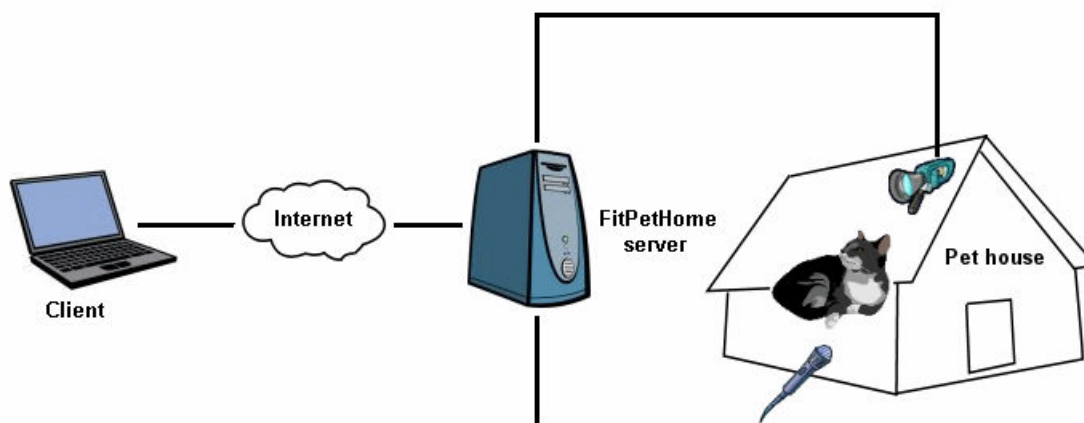
The tutorial is based on the following example:

FitPetHome, a fictitious company

FitPetHome is a company specialized in pet boarding. If you decide to take a journey from home, you can board your pet at FitPetHome. This company offers the usual services relating to pet boarding, such as feeding and grooming. Further, this company uses a guard system allowing you to observe and listen to your favorite pet from a remote computer or a mobile phone wherever you are.

This guard system, called PetMonitor, consists of a control device, a camera, and a microphone. The control device is installed on a server hosted by FitPetHome. Installed in the pet house, the camera and the microphone are connected to the control device.

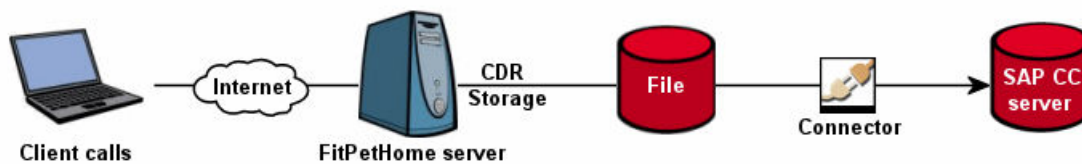
To watch your pet, you must connect to the service PetMonitor of FitPetHome through their Internet portal by using a laptop or a mobile phone equipped with a screen.



Storing and rating CDRs

In the previous example, CDRs are created every time that clients connect to the Internet portal of FitPetHome to watch their pet through PetMonitor.

The CDRs can be stored in a file depending on the consumption date. For example, a file can be created for every month of the year: january_2012, february_2012, march_2012, and so on. These files are stored in a specific directory periodically scanned by a connector as illustrated below. When a new file is found, the connector extracts the CDRs that are then processed and turned into chargeable item packages. The chargeable item packages are sent to the SAP CC Core Server for being rated.



Note

SAP CC Core Server can rate CDRs in real time or batch mode. In this tutorial, IEC rates the CDRs in batch mode.

Describing the CDR file

Here is an example of CDR file to process:

#duration,date,service,login

15,2012-10-03 11:55:26,Internet,Smith

623,2012-10-04 12:12:00,Internet,Smith

92,2012-10-05 08:05:00,Internet,Smith

500,2012-10-06 04:26:00,Internet,Smith

212,2012-10-07 14:48:00,Internet,Smith

300,2012-10-08 19:56:00,Internet,Smith

80,2012-10-09 10:11:00,Internet,Smith

Where:

- **duration**: Time during which the client has consumed the service PetMonitor
- **date**: Date on which the client has connected to the FitPetHome server to consume the PetMonitor service
- **service**: Service identifier consumed by the client
- **login**: User identifier allowing SAP CC Core Server to identify who has consumed the service

❖ Example

The first line of the CDR file shows that the client Smith consumed the Internet service PetMonitor on Wednesday the 03 of October 2012 at 11:55:26 during 15 seconds.

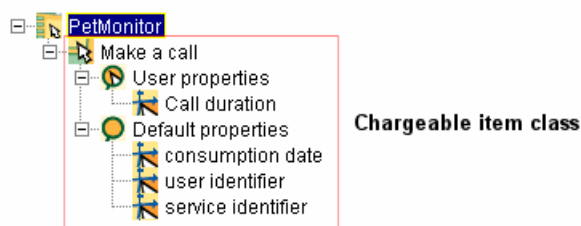
Describing a CSV file

The CDRs previously described can be stored in a file formatted according to the CSV format. CSV stands for Comma-Separated Value. CSV refers to an ASCII file where each individual data field is delimited by commas. It simply means that the individual items of data included in the file are separated by commas.

All the information needed to rate the CDRs are sorted and written on one line, in which a comma separates each information.

Processing the CDR file

In this tutorial, you will create a scenario with CAT to process the CDR file described earlier in this topic. Because SAP Convergent Charging 5.0 processes only chargeable item classes, the scenario will allow you to create the chargeable item class "Make a call" with the structure defined in the chargeable item package "PetMonitor":



Through the scenario, the connector will turn every CDR into a chargeable item class as shown in the following table:

CDR Format	Chargeable item class
<i>duration</i>	Call duration
<i>date</i>	Consumption date
<i>service</i>	Service identifier
<i>login</i>	User identifier

Because the CDRs are stored in a file, the scenario must:

- Search for the CDR file in a directory
- Extract lines from the CDR file
- Do not process the comment lines
- Extract from every line the properties *duration*, *date*, *service* and *login*
- Create chargeable item classes from these properties
- Send the chargeable item classes to rate to SAP CC Core Server

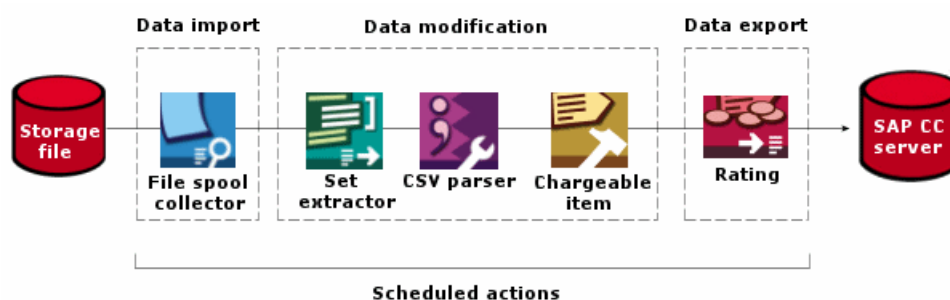
Next step: [Building Your Scenario \[page 72\]](#)

2.2.2.4.2 Building Your Scenario

To build your scenario, you must solve the following questions:

1. **Data import:** How to import the data in the scenario? In this tutorial, the CDRs are collected from files line by line. All the lines that start with '#' must not be processed.
2. **Data modification:** How to make collected data exportable? In this tutorial, every collected line must be turned into a chargeable item class. Every collected line will be parsed by using a CSV parser with ',' (comma) as a separator. The tokens that are created by the CSV parser will be mapped onto the properties of the chargeable item class.
3. **Data export:** How and where to export data? In this tutorial, data are turned into chargeable item classes, which are sent to SAP CC Core Server for rating.
4. **Execution period:** When to execute the scenario? In this tutorial, the scenario will be executed every day at 02:00 am.

You must thus build a scenario including the components shown in the illustration below:



These components do the following:

- **File Spool Collector:** Searches for files in directories according to search criteria, and then sends the files that were found to the *Fixed-Size Line Set Extractor*.
- **Fixed-Size Line Set Extractor:** Extracts lines set by set from the files that are sent by the *File Spool Collector*, and then filters and names these lines to make up properties.
- **CSV Parser:** Parses and divides into several tokens the properties that are created by the *Fixed-Size Line Set Extractor*.
- **Chargeable Item:** Creates an eXtended Chargeable Item (XCI) from the tokens that are created by the *CSV Parser*.
- **Rating:** Sends XCIs to rate to SAP CC Core Server.

Next step: [Creating a CDR File \[page 72\]](#)

2.2.2.4.3 Creating a CDR File

Before creating a scenario, create a CSV file containing the following lines:

```
#duration,date,service,login
```

```
15,2012-01-03 11:55:26,Internet,Smith
```

```
623,2012-01-04 12:12:00,Internet,Smith
```

92,2012-01-05 08:05:00,Internet,Smith
500,2012-01-06 04:26:00,Internet,Smith
212,2012-01-07 14:48:00,Internet,Smith
300,2012-01-08 19:56:00,Internet,Smith
80,2012-01-09 10:11:00,Internet,Smith

These lines are Smith's CDRs for January 2012.

To create a CSV file

1. Open a txt file.
2. Copy all of Smith's CDRs for January 2012 into the file.
3. Save your file in \MyFiles\fitPetHomeFileDir under Windows (/MyFiles/fitPetHomeFileDir under UNIX) with january_cdrs as the file name.
4. Close the january_cdrs file.
5. Convert the january_cdrs file into a CSV file by changing its extension.

Next step: [Creating Your Scenario \[page 73\]](#)

2.2.2.4.4 Creating Your Scenario

Once you have developed a scenario outline and created a file to be processed, you can open CAT and create the scenario by inserting appropriate components in the tree. These components will execute the actions that are described in your scenario outline.

This step also allows to set up the scheduler. In our example, the scenario is triggered periodically every 500 milliseconds.

To create a scenario

1. On the *File* menu, select New. The *New Scenario* window opens.
2. In the *Identification* area, do the following:
 1. In *Name*, type **FitPetHomeRating** as the name of your scenario.
 2. In *Description*, type **Rate the FitPetHome** service to describe the goal of the scenario.
3. Now you can set up the scheduler to define the execution period of the scenario. CDR files must be read every 500 milliseconds. In the *Scheduler* tab, click *Periodically* in the *Scheduler* list, and then do the following:
 1. In *Start Date*, select the current date.
 2. In *Period (in ms)*, type **500**.

After it is executed, the scenario is launched every 500 milliseconds.

Next step: [Saving Your Scenario \[page 74\]](#)

2.2.2.4.5 Saving Your Scenario

Use this procedure to save a scenario in a directory.

To save a scenario in a directory

1. On the *File* menu, click *Save*. The *Save* dialog box opens.
2. In the *Save* dialog box, search for a directory in *Look in*.
3. Type **FitPetHomeRating** as the *File name*.
4. Click *Save*. CAT displays a message informing you that the scenario configuration is not valid. Ignore this message.
5. Click *Yes* to close the message dialog box.

Next step: Learn how to add an import component ([Adding a File Spool Collector Component \[page 74\]](#)).

2.2.2.4.6 Adding a File Spool Collector Component

You add a File Spool Collector as the first component to the tree. This component searches for files in directories according to search criteria, and then sends the files that were found to the next component of the tree.

To add an import component

1. In the *Scenario* window, select *Imports* on the component toolbar, and then click *File Spool Collector*. A File Spool Collector component is added to the tree. You can set it up in the *Identification* area.
2. In *Name* of the *Identification* area, type **LoadFile** as the name of the component.
3. In *Description*, type **Search for CSV files** in the directory `fitPetHomeFileDir`.
4. Click the *Paths* tab.
5. In the *Paths* table, click  to add a new row to the table.
6. In the *Path* column, double-click the new row, and then type the directory path where the files are stored. Do not check the *Recursive* checkbox because there is no subdirectories to read in the directory `fitPetHomeFileDir`. In our tutorial:
 - Under Windows, type **C:\MyFiles\fitPetHomeFileDir**
 - Under Unix, type **/MyFiles/fitPetHomeFileDir**

7. In *Search Criteria*, click the *Select file with a specific extension* option, and then in *Extension*, type **csv** as the extension of the files to find. All the files that are found by the File Spool Collector make up a resource available for the next components of the tree. You can now name this new resource.
8. Click the *Sort* tab, and then in *Resource Key*, type **csvFile** that makes up a resource for the next components of the tree.
9. In *Files sort*, select *File Name Sort* in the list. The File Spool Collector sorts all the files before reading them.
10. In *File Filtering*, click the *Do not load already processed file* option. This option means that the File Spool Collector does not process the files already found.

All the files which has been found by the File Spool Collector make up a resource that can be read by the next component of the tree.

Next step: Add the first modifier ([Adding a Fixed-Size Line Set Extractor Component \[page 75\]](#)).

2.2.2.4.7 Adding a Fixed-Size Line Set Extractor Component

You add a Fixed-Size Line Set Extractor to the tree. This component:

- Reads line by line the resource that was found by the File Spool Collector
- Names the extracted lines
- Does not process each line starting with #
- Sends the lines to the next component of the tree

To add and set up a Fixed-Size Line Set Extractor

1. In the tree of the scenario window, make sure that the last component is active; otherwise, click the last component to make the component toolbar available.
2. On the component toolbar, select *Modifiers*, and then click *Fixed-Size Line Set Extractor*. A *Fixed-Size Line Set Extractor* component is added to the tree. You can set it up in the identification area.
3. In the *Identification* area, in *Name*, type **ReadConsumptions** as the name of the component.
4. In *Description*, type Read consumptions line by line from Input Stream.
5. Click the *Configuration* tab.
6. In the *Input Stream* list, select **csvFile** as the resource to read.
7. In the *Number of lines in set*, type **1**. The Fixed-Size Line Set Extractor reads the input stream set by set. In our tutorial, each set contains one line.
8. Click the *Mapping* tab.
9. In the *Mapping rules* table, click  to add a row to the table.
10. Double-click the *Name* column, and then type **consumptionLine**.
11. In the *Rules* column, select *is token number*.
12. In the *Value* column, type **0**. The line 0 is the first line of the line set. In this tutorial, the line 0 is named *consumptionLine*.

13. Click the [Advanced](#) tab.

14. In the [Comments](#) table, click  to add a row to the table.

15. Double-click the new row, and then type **#***. All the lines that start with #* will be removed.

16. Click the [Empty lines are removed](#) option to remove all the empty lines.

Next step: Learn how to add a second modifier ([Adding a CSV Parser Component \[page 76\]](#)).

2.2.2.4.8 Adding a CSV Parser Component

The line that is extracted by the previous Fixed-Size Line Set Extractor is made up of three fields. Each of these fields is separated by a comma. Example:

15,2012-01-03 11:55:26,Internet,Smith

Where:

- 15 is the call duration
- 2012-01-03 11:55:26 is the date
- Internet is the service identifier
- Smith is the login (or user identifier)

You add a CSV Parser to the tree. This component:

- Parses and divides into three tokens the line sent by the previous component
- Names each token
- Sends the tokens to the next component of the tree

To add and set up a CSV Parser

1. In the tree of the scenario window, make sure that the last component is active; otherwise, click the last component to make the component toolbar available.
2. On the component toolbar, select [Modifiers](#), and then click [CSV Parser](#). A CSV Parser component is added to the tree. You can set it up in the [Identification](#) area.
3. In the [Identification](#) area, in [Name](#), type **ReadCDRs** as the name of the component.
4. In [Description](#), type **Parse the CDRs with a CSV format.**
5. Click the [Configuration](#) tab.
6. In the [Property to parse](#) list, select the [consumptionLine](#) property created by the previous modifier component.
7. In [Field separator](#), click the [Comma](#) option. The [consumptionLine](#) property has a CSV format with a comma as a separator. You must now name the line tokens which are parsed according to the CDR file header:
#duration,date,service,login.
8. Click the [Mapping](#) tab.
9. In the [Mapping rules](#) table, click  four times to add four rows to the table.
10. Double-click the first row in the [Name](#) column, type **duration**, and then do the following:

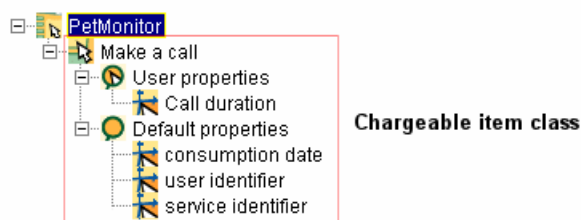
1. In the *Rules* column, select *is token number*.
2. In the *Value* column, type **0**.
11. Double-click the second line in the *Name* column, type **date**, and then do the following:
 1. In the *Rules* column, select *is token number*.
 2. In the *Value* column, type **1**.
12. Double-click the third line in the *Name* column, type **service**, and then do the following:
 1. In the *Rules* column, select *is token number*.
 2. In the *Value* column, type **2**.
13. Double-click the fourth line in the *Name* column, type **login**, and then do the following:
 1. In the *Rules* column, select *is token number*.
 2. In the *Value* column, type **3**.

Next step: Add the third modifier ([Adding a CSV Parser Component \[page 76\]](#)).

2.2.2.4.9 Adding a Chargeable Item Component

You add a Chargeable Item component, which is the last modifier of the tree. The Chargeable Item component allows you to create an eXtended Chargeable Item (XCI) from the tokens created by the previous CSV Parser.

In the SAP CC system, the chargeable item package represents a service which can be rated. The chargeable item class is an element of the chargeable item package as shown in the illustration below:

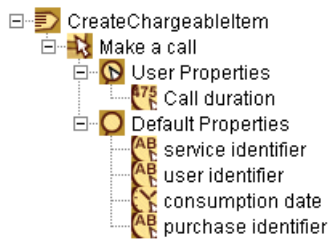


In *CAT*, the Chargeable Item component defines the service by means of properties. In this tutorial, the service *PetMonitor* consumed by the client is defined by the following properties:

- *Call duration*: Time during which the client has consumed the service *PetMonitor*
- *consumption date*: Date on which the client has connected to the FitPetHome server to consume the *PetMonitor* service
- *user identifier*: Identifier used by the SAP CC system to identify who has consumed the service
- *service identifier*: Identifier used by the SAP CC system to identify the service name

You can now create the Chargeable Item Class, which is made of two parts as shown in the illustration below:

- A *component* which you name **CreateChargeableItem**
- A *Chargeable Item* which you name **Make a call**



To add a Chargeable Item Creation Action

1. In the tree of the scenario window, make sure that the last component is active; otherwise, click the last component to make the component toolbar available.
2. On the component toolbar, select *Modifiers*, and then click *Chargeable Item Creation Action*. A *Chargeable Item Creation Action* component is added to the tree. You can set it up in the *Identification* area.

To name a Chargeable Item Creation Action

1. In the scenario tree, click  in the *Chargeable Item Creation Action* component.
2. In the *Identification* area, in *Name*, type **CreateChargeableItem** as the name of the component.
3. In *Description*, type **Create an eXtended Chargeable Item** (XCI).
4. In the scenario tree, click  in the *Chargeable Item Creation Action* component.
5. In the identification area, in *Name*, type **Make a call** as the name of the chargeable item.
6. In *Description*, type **Service consumed by the client**.
7. In the scenario tree, click the plus sign (+) in the *Chargeable Item Creation Action* component to expand the chargeable item. *User properties* and *Default properties* are displayed.

To set up User properties

1. In the scenario tree, click *User properties*.
2. On the component toolbar, select *Modifier*, and then click *Number Property*.
3. In the *Identification* area, in *Name*, type **Call duration**.
4. In *Description*, type **Duration of service in seconds consumed by the client**.
5. In the *Definition* tab, click *Use a property value*, and then select duration in the *Name* list.
6. Make sure that *Decimal separator* and *Group separator* displays the item none. You can now set up the default properties of the chargeable item.

To set up Default properties

1. In the scenario tree, under *Default Properties*, click *service Identifier*.
2. In the *Identification* area, in the *Definition* tab, click *Use a property value*, and then select service in the *Name* list. In this tutorial, Internet is the service identifier name.
3. In the scenario tree, under *Default Properties*, click *user Identifier*.
4. In the *Identification* area, in the *Definition* tab, click *Use a property value*, and then select login in the *Name* list. "login" is the name of the client. In this tutorial, login is Smith.
5. In the scenario tree, under *Default Properties*, click *consumption date*. The consumption date must be initialized with the property date. This property has the following format: year-month-day hour:minute:seconde.
6. In the *Identification* area, in the *Definition* tab, do the following:
 1. Click *Use a property value*, and then select date in the *Name* list.
 2. In *Format*, type **yyyy-MM-dd HH:mm:ss** as the date format.
 3. Select *English* in the *Language* list.

Next step: Rate the Chargeable Item by [Adding a Rating Component \[page 79\]](#).

2.2.2.4.10 Adding a Rating Component

The chargeable item is complete. Now you must add a Rating component to send the chargeable item to SAP CC Core Server.

Make sure that the parameters Server Host Name and Server Port relating to SAP CC Core Server are correct. Ask your Administrator, if you are not sure of these parameters.

To add and set up a Rating

1. In the scenario tree, click  in the *Chargeable Item Creation Action* component to make the component toolbar available.
2. On the component toolbar, select *Exports*, and then click *Rating (Message protocole)*. A *Rating* component is added to the tree. You can set it up in the *Identification* area.
3. In the *Identification* area, in *Name*, type **RateChargeableItem** as the name of the component.
4. In *Description*, type **Rate the chargeable item using the server localhost**.
5. In the *Definition* tab, do the following:
 1. In the *Input XCI key* list, select *XCI*.
 2. In *Server URL*, type the main public address to connect to the distant SAP CC Core Server system via the Message TCP technical interface. This Uniform Resource Locator (URL) applies to host machine of the master dispatcher instance of the SAP CC system. You can use DNS, IPv4 or IPv6 addresses. The URL must include the relevant communication port number. Type the URL address using the following syntax:
`tcp://<dns_name_or_ipv4_or_ipv6>:<port_nb>`
`tcps://<dns_name_or_ipv4_or_ipv6>:<port_nb>`

3. *Connection With Credentials*: select this option if you want to establish authenticated connection to the Message TCP technical interface of SAP CC.
4. *Login*: type the login of the service user.
5. *Password*: type the password of the service user.
6. In the *Transaction mode* list, select *All transactions*. All the transactions relating to the master charges, the dependent charges, and the recurring rate components are returned by the server. If necessary, the transactions can be retrieved through an XCI via a Java Action component.

2.2.2.4.11 Executing Your Scenario

You can execute the scenario depending on two modes: Stand alone or remote. In this tutorial, you will execute your scenario by using the remote mode. This mode requires the use of CAT to execute the scenario.

To execute a scenario, you do the following:

1. Start a connector.
2. Register the connector in the CAT address book.
3. Export the scenario that you have created to the connector repository.
4. Execute the scenario.

The connector is an executable file which is launched with three arguments:

- Repository path where scenarios are saved and executed
- Port number on which the connector is listening
- Repository where the logs are saved

To start a connector under Windows

1. Open a DOS window.
2. Type `cd <root>\bin`

i Note

`<root>` is the directory name containing the folder bin where the executable connector is stored. For example: Type `cd \Myhome\Myjob\bin`.

3. Press `ENTER`. The *DOS* window displays that you are in the directory bin. Now you can launch the connector by typing the next command.
4. Type `connector -repositoryDir=<YourRepository> -port=<YourPort> -logDir=<YourLogs>`
 - `<YourRepository>` is the directory where your scenarios are saved (by default, `\iec-repository`)
 - `<YourPort>` is the port on which the connector is listening (by default, 9001)
 - `<YourLogs>` is the directory where the logs are saved (by default, `\logs`)
 - `<YourRepository>`, `<YourPort>` and `<YourLogs>` can be replaced with your own values.
5. Press `ENTER`

To start a connector under UNIX

1. Open a UNIX window.
2. Type `<root>/bin/connector -repositoryDir=<YourRepository> -port=<YourPort> -logDir=<YourLogs>`
 - `<YourRepository>` is the directory where your scenarios are saved (by default, `\iec-repository`)
 - `<YourPort>` is the port on which the connector is listening (by default, 9001)
 - `<YourLogs>` is the directory where the logs are saved (by default, `\logs`)
 - `<YourRepository>`, `<YourPort>` and `<YourLogs>` can be replaced with your own values.
3. Press

After the connector runs, you can register its address in the CAT address book. A registered connector address is used to connect CAT to a connector running on a workstation.

To register the connector

1. On the *Window* menu, click *Connectors*. The *Connectors* window displays the existing connector addresses.
2. On the *Action* menu, click *New*. The *Enter server address* window opens.
3. In *Server HostName*, type the workstation name where the connector is running. You can type:
 - The remote or the local workstation name. Example, **MyWorkstation**.
 - The IP address of the remote or the local workstation. Example: **1.160.10.240**. You can use both IPv4 and IPv6 addresses.
 - **localhost**, if the connector is running on your workstation.
4. In *Port*, type the port number on which the connector is listening. For example, type **9001**, if the connector is listening on this port number.
5. In *Description*, type a connector name. For example, type **MyConnector**. The *Save* button appears after you fill in all the fields.
6. Click *Save*,

To export the scenario

1. Make sure that the connector is running; otherwise, *CAT* displays an error message.
2. Make sure that the scenario to be exported is opened and selected.
3. On the *File* menu, click *Export*. The *Select connector* window opens.
4. In the *Select connector* window, select the connector to which you want to export the scenario.
5. Click *OK*. The scenario is exported to the connector.

After the scenario has been exported, you can execute it.

i Note

In this tutorial, it is not necessary to import the scenario you want to execute because this scenario is already open; otherwise, before executing a scenario, you must import it from the connector repository.

To execute the scenario

1. Make sure that the connector is running. If not, [CAT](#) displays an error message.
2. Make sure that the scenario to be executed is selected; otherwise, click the scenario window.
3. On the [Action](#) menu, click [Execute](#). Once the scenario has been executed, [Activated](#) appears in the title bar. If the connector is not running, an error message is displayed.

To stop the scenario

- On the [Action](#) menu, click [Stop](#). Once the scenario has been stopped, [Stopped](#) appears in the title bar.

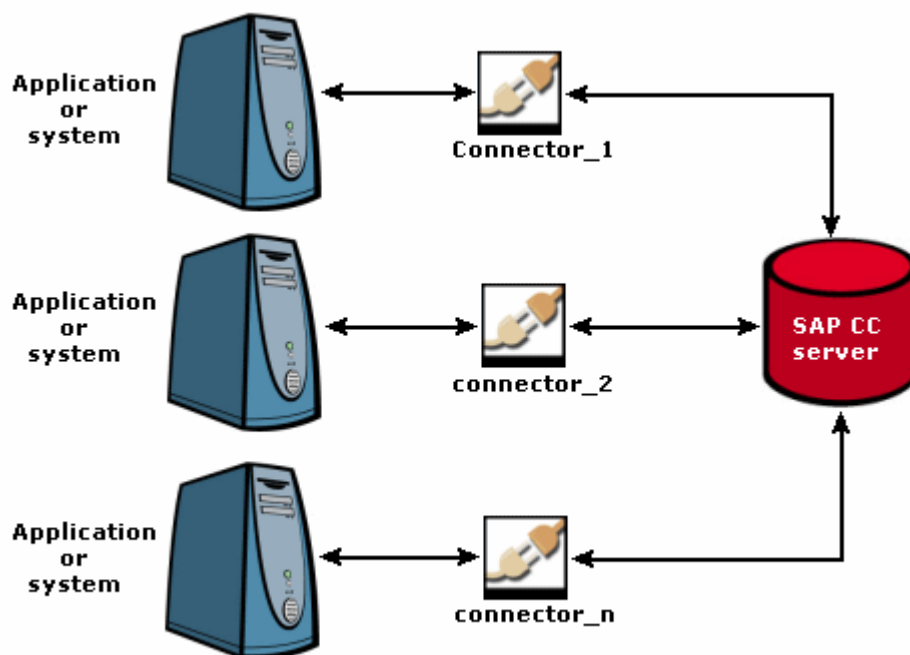
Next step: Check the results in the SAP CC database ([Checking the Results \[page 82\]](#)).

2.2.2.4.12 Checking the Results

Once the scenario has been executed, you can check the results in the SAP CC database by using the SAP CC system or another tool to view the transactions.

2.2.2.5 Connectors

An import/export connector (IEC) is an interface application for communicating with SAP CC systems from external applications, systems, or sources as illustrated below. The purpose of an IEC application is to execute scenarios to exchange or process data between applications or systems and the SAP CC systems (Core Server and BART Server).



Implementation

You implement a remote import/export connector (IEC) application during the implementation project phase to transport data to the SAP CC systems.

⚠ Caution

Do not implement a remote IEC in a production system landscape.

Note that you can install many connectors on a host depending on your business requirements (data flows, processes, performances).

Stand-alone IEC

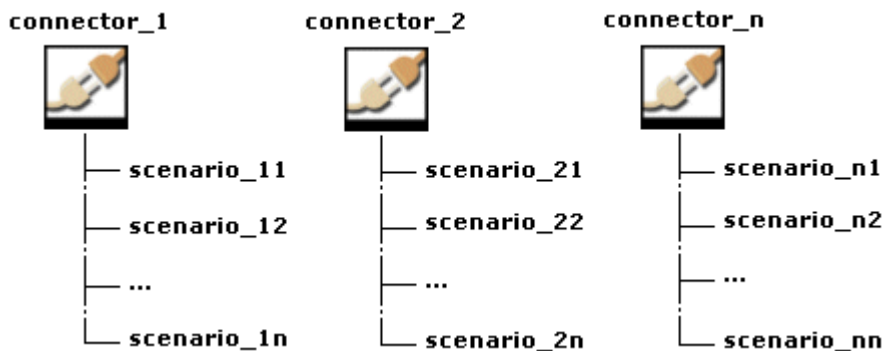
You execute scenarios saved as files in directories ([Executing a Scenario \[page 86\]](#)).

i Note

Unlike the remote mode, you do not use the CAT Tool graphical user interface to manage the execution of scenarios.

Remote IEC

You execute one or several scenarios at a time by using the *CAT Tool* graphical user interface ([Executing a Scenario \[page 88\]](#)). Each connector has its own repository to which you can export scenarios to be executed (see [Exporting a Scenario \[page 107\]](#)):



Managing the connector address book

Because you can launch many connectors on several host machines, you must register in *CAT Tool* the addresses of all the remote connectors so that *CAT Tool* can connect to them when needed. The connector address book (see [Managing the Connector Address Book \[page 91\]](#)) allows you to register all the IEC applications that are used or likely to be used.

Scheduler

An IEC application includes a scheduler function that triggers a scenario at a frequency set in it ([Scheduler Information \[page 99\]](#)).

Logs

An IEC application manages the logs in a directory (see [Log Management \[page 84\]](#)).

2.2.2.5.1 Log Management

The import/export connector (IEC) application manages logs during the business operations.

Log directory

The import/export connector (IEC) manages a log directory that includes several files and the following subfolders:

- Accepted
- Filtered
- Rejected

Acquisition reports

The import/export connector (IEC) generates a report log file with acquisition errors or not for each file being successfully processed when IEC is executing a scenario including the [Acquisition \(by BART\) \[page 138\]](#) component. This report contains the following information:

- `START DATE`
- `END DATE`
- `DURATION`
- `NB ITEMS`: Is the number of lines read from the input file
- `NB ACCEPTED`: Is the number of lines accepted in the scenario
- `NB REJECTED`: Is the number of lines rejected by the scenario if the line could not be properly mapped to a chargeable item structure
- `NB FILTERED`: Is the number of lines filtered by the scenario (per the IEC filter configuration)

→ Remember

`NB ITEMS = NB ACCEPTED + NB REJECTED + NB FILTERED`

❖ Example

The contents of the report log file are:

`START DATE = 2011-05-24T14:33:35`

`END DATE = 2011-05-24T14:33:35`

```
DURATION = 0 sec
NB ITEMS = 10
NB ACCEPTED = 10
NB REJECTED = 0
NB FILTERED = 0
```

Other processing logs

The log files contain monitoring information related to any filtering or error event that happened when IEC is executing a scenario. Refer to the following components for more information:

- [File Spool Collector \[page 113\]](#)
- [Log Action \[page 150\]](#)

Accepted Logs

❖ Example

```
# Accepted [LOGGER_1]

S#6105000020#00000001#20121116#20121116#0056#5600#US#-1#1#10.00#USD#0#-1#-1#19700
101#ZITU#4F#361285480#i_software
```

Filtered Logs

The `filtered` subfolder contains the data item that has been filtered when IEC is executing and processing a set of components in a scenario. `Filtered` means that a data item such as a chargeable item has not been processed. This is not an error but the expected result. The following components can filter data items:

- [Delimited Line Set Extractor \[page 118\]](#)
- [Fixed Size Line Set Extractor \[page 116\]](#)
- [File Spool Collector \[page 113\]](#)
- [Acquisition \(by BART\) \[page 138\]](#)

The filtered data items are grouped according to their source name.

Rejected Logs

The `rejected` subfolder contains the data item that has been rejected when IEC is executing and processing a set of components in a scenario. For example, the [Reject \[page 125\]](#) component can reject data items.

❖ Example

```
# Rejected [MESSAGE_RATING_ACTION_2]

# Invalid Item Exception (Division by zero.) rejected by Send to CC

DEFERRED,2012-11-16T00:00:00,2012-11-16T00:00:00,USD,
2000000.000000,1.000000,23130050,32650016,D5942G/A,ZITU,
0056,,5600,01,01,907040,IS02,5601,IS,D5942G/A,
```

```
5600,US,-1,2013/04|-449315.07;2013/05|-147945.21;2013/06|-147945.21;2013/07|-1863
01.37;2013/08|-147945.21;2013/09|-147945.21;2013/10|-186301.37;2013/11|-147945.21
;2013/12|-147945.21;2014/01|-186301.37;2014/02|
23668.22,365.000000,-1.000000,2012-11-12T00:00:00,2013-11-12T00:00:00,-1.000000,-
1,,i_software,,1.000000,0,4F,361304891,2012-11-16T00:00:00
```

2.2.2.5.2 Stand-Alone IEC

- [Executing a Scenario \[page 86\]](#)

2.2.2.5.2.1 Executing a Scenario

You can execute a scenario on a host machine if:

- An import/export connector (IEC) is installed on the host
- The scenario to be executed is saved in a directory

You can execute only one scenario at a time with one connector. To execute a scenario, you launch a connector executable with the scenario filename as an argument.

Procedures

Refer to the table below:

Environment	Executable	Procedures
<i>MS Windows</i>	<code>iec.bat</code>	To launch a connector program 1. Open a <i>COMMAND</i> window 2. Type: <code>cd</code> <code><IEC_INSTALL_DIR>\bin</code> 3. Press ENTER 4. Then type: <code>iec.bat</code> <code><ARGUMENTS></code> 5. Press ENTER To stop a connector, close the <i>COMMAND</i> window in which the scenario is running in a connector.

Environment	Executable	Procedures
<i>UNIX</i>	<code>iec.sh</code>	To launch a connector program 1. Open a <i>UNIX</i> console window 2. Type: <code><IEC_INSTALL_DIR>/bin/ iec.sh <ARGUMENTS></code> 3. Press ENTER To stop a connector, close the <i>UNIX</i> console window in which the scenario is running in a connector.

Where:

- `<IEC_INSTALL_DIR>` is the installation directory of an import/export connector (IEC) program; Its launch scripts are available in the `bin` subfolder.
- `<ARGUMENTS>` are the mandatory and optional options to be executed

The description of the command arguments is the following:

```
-login <USR_LOGIN> -password <USR_PASSWORD> <SCENARIO_DIR> -uri <CCD_URIS> [-  
rootDir [<LOG_DIR>]] [-scheduled]
```

Where:

- `<USR_LOGIN>` is the logon of a power user or administrator having the right to execute the connector program
- `<USR_PASSWORD>` is the password of the technical user identified with `<USR_LOGIN>`
- `<SCENARIO_DIR>` is the path to the scenario file to be executed by the connector
- `<CCD_URIS>` is the comma-separated URIs of the dispatcher instances of SAP CC Core Server; The URI syntax is `<PROT>://<HOST_ADDRESS>:<MSG_TCP_PORT>` where:
 - `<PROT>` is the communication protocol; the possible values are: `tcp` and `tcps` (secured channel).
 - `<HOST_ADDRESS>` is the hostname or the IP address (IPv4 or IPv6) of the machine hosting the dispatcher instance related to the URI; View the instance map of the SAP CC system.
 - `<MSG_TCP_PORT>` is the port number of the host that is dedicated to the dispatcher instance for the communications via the *Message TCP* technical interface; View the instance map of the SAP CC system.

Note

- The syntax `<HOST_ADDRESS>:<MSG_TCP_PORT>` is deprecated and replaced by the syntax based on *tcp* and *tcps* prefixes.
- When the UDP discovery function is available in SAP CC Core Server, you can replace the URI list by the following entry: `udp://<IP_ADDRESS>:8910/?SID=SCC`; the import/export connector (IEC) discovers the SAP CC system and connects to it via the Message TCP technical interface by using the relevant security level. View the current system settings to check if the function is enabled. Get the values of the following system parameters: `EXTERNAL_DISCOVERY_ENABLED`, `EXTERNAL_DISCOVERY_MULTICAST_ADDRESS`, and `EXTERNAL_DISCOVERY_PORT`

- **-rootDir** [**<LOG_DIR>**] is an optional argument; **<LOG_DIR>** is the directory where the log files are saved (refer to [Log Management \[page 84\]](#)); if **<LOG_DIR>** is not mentioned, the default directory is the user working directory that depends on the procedure used to launch the connector program.
- **-scheduled** is an optional argument; this argument enables the scheduler as configured in the scenario to be executed (refer to [Scheduler Information \[page 99\]](#)); if this argument is not mentioned, the scenario is executed only once even if the scenario defines regular activities

2.2.2.5.3 Remote IEC

- [Executing a Scenario \[page 88\]](#)
- [Managing the Connector Address Book \[page 91\]](#)

2.2.2.5.3.1 Executing a Scenario

You must start a remote connector before executing a scenario.

Caution

Do not implement a remote import/export connector (IEC) in a production system landscape during the production operation phase. You implement a remote IEC during the implementation project phase to transport data to the SAP CC systems.

Starting a remote connector

To establish a connection with the [CAT Tool](#) user interface, you start a connector by launching an executable file with the following arguments:

- The repository path where the scenarios are saved and executed
- The port number on which the connector is listening
- The repository where the logs are saved

Procedures

Refer to the table below:

Environment	Executable	Procedures
<i>MS Windows</i>	<code>iec_remote.bat</code>	To launch a remote connector program 1. Open a <i>COMMAND</i> window 2. Type: <code>cd</code> <code><IEC_INSTALL_DIR>\bin</code> 3. Press ENTER 4. Then type: <code>iec_remote.bat</code> <code><ARGUMENTS></code> 5. Press ENTER To stop a connector, close the <i>COMMAND</i> window.
<i>UNIX</i>	<code>iec_remote.sh</code>	To launch a remote connector program 1. Open a <i>UNIX</i> console window 2. Type: <code><IEC_INSTALL_DIR>/bin/</code> <code>iec_remote.sh</code> <code><ARGUMENTS></code> 3. Press ENTER To stop a connector, close the <i>UNIX</i> console window in which the scenario is running in a connector.

Where:

- `<IEC_INSTALL_DIR>` is the installation directory of an import/export connector (IEC) program; Its launch scripts are available in the `bin` subfolder.
- `<ARGUMENTS>` are the mandatory and optional options to be executed

The description of the command arguments is the following:

```
[-repositoryDir=<SCN_REP_DIR>] -uri <CCD_URIS> [-port=<IEC_PORT_NB>] [-logDir=<LOG_DIR>]
```

Where:

- `<SCN_REP_DIR>` is the file directory where the scenarios are stored (by default, under MS Windows: `.. \iec-repository`; under UNIX: `../iec-repository`)
- `<CCD_URIS>` is the comma-separated URIs of the dispatcher instances of SAP CC Core Server; The URI syntax is `<PROT>://<HOST_ADDRESS>:<MSG_TCP_PORT>` where:
 - `<PROT>` is the communication protocol; the possible values are: `tcp` and `tcps` (secured channel).
 - `<HOST_ADDRESS>` is the hostname or the IP address (IPv4 or IPv6) of the machine hosting the dispatcher instance related to the URI; View the instance map of the SAP CC system.
 - `<MSG_TCP_PORT>` is the port number of the host that is dedicated to the dispatcher instance for the communications via the Message TCP technical interface; View the instance map of the SAP CC system.

- **<IEC_PORT_NB>** is the communication port number on which the import/export connector program is listening (by default: 9002) on the host machine; CAT Tool connects to this port to manage the scenarios in the remote connector.
- **<LOG_DIR>** is the directory where the logs are saved; if **<LOG_DIR>** is not mentioned, the default log directory is the logs subfolder in the scenario repository: under MS Windows: **<SCN_REP_DIR>\logs**; under UNIX: **<SCN_REP_DIR>/logs**;

❖ Example

The table below shows some examples to start a remote connector:

Environment	Command
Windows	<pre>iec_remote -repositoryDir=C:\home\job\MyRepository -port=2002 -logDir=c:\home\job\MyLogs</pre>
UNIX	<pre>iec_remote -repositoryDir=/home/job/MyRepository -port=2002 -logDir=/home/job/MyLogs</pre>

Executing and stopping a scenario

After a remote connector starts, you can manage the execution of a scenario by using the *CAT Tool* user interface.

To execute a scenario

1. Make sure that the remote connector is running; otherwise, *CAT Too* displays an error message.
2. Open *CAT Tool* to execute a scenario.
3. Import the scenario ([Importing a Scenario \[page 108\]](#)) to be executed from the connector repository.
4. Make sure that the scenario to be executed is selected; otherwise, click the *Scenario* window, and then select the scenario.
5. On the *Action* menu, click *Execute*. After the scenario has been executed, the message *Activated* appears in the title bar. If the remote connector is not running, an error message is displayed.
6. Monitor the logs saved by the remote connector (refer to [Log Management \[page 84\]](#)).

To stop a scenario

- On the *Action* menu, click *Stop*. After the scenario stops, the message *Stopped* appears in the title bar.

Stopping a connector

Close the window (*COMMAND* or *UNIX*) in which the connector program is running.

2.2.2.5.3.2 Managing the Connector Address Book

The connector address book is a table in which you register the addresses of the connectors which are running or not (see [Registering a New Connector Address \[page 91\]](#)). If you want to use a connector address to execute an action, the connector relating to the address must be running. For example, if you want to use a connector address to export a scenario, the related connector must be running.

You use a connector address to connect CAT Tool to a connector which is running on a host machine. You use a connector address each time that you want to:

- Export a scenario: [Exporting a Scenario \[page 107\]](#)
- Import a scenario: [Importing a Scenario \[page 108\]](#)
- Synchronize a scenario: [Synchronizing a Scenario \[page 105\]](#)
- Execute a scenario: [Executing a Scenario \[page 98\]](#)

In the connector address book, you can:

- View the existing connector addresses: [Viewing Existing Connector Addresses \[page 91\]](#)
- Register new connector addresses: [Registering a New Connector Address \[page 91\]](#)
- Remove connector addresses: [Removing a Connector Address \[page 92\]](#)

2.2.2.5.3.2.1 Viewing Existing Connector Addresses

Use this procedure to view all the connector addresses.

To view existing connector addresses

- On the *Window* menu, click Connectors. The *Connectors* window displays the existing connector addresses.

2.2.2.5.3.2.2 Registering a New Connector Address

Registering allows you to add a connector address to the connector address book. A connector address is defined by:

- *The server host name*: Workstation name where the connector is running

- *The port number*: Port on which the connector is listening
- *The description*: Name that you give to the connector address

i Note

In the *Enter server address* dialog box, you must fill in all the fields.

To register a connector address

1. On the *Window* menu, click *Connectors*. The *Connectors* window displays the existing connector addresses.
2. On the *Action* menu, click *New*. The *Enter server address* dialog box opens.
3. In *Server HostName*, type the workstation name where the connector is running. You can type:
 - The remote or local workstation name. Example, **MyWorkstation**.
 - The IP address of the remote or local workstation. You can use both IPv4 and IPv6 addresses. Example: **1.160.10.240**.
 - **localhost**, if the connector is running on your workstation.
4. In *Port*, type the port number on which the connector is listening. For example, type **9001**, if the connector is listening on this port number.
5. In *Description*, type a connector name. For example, type **MyConnector**. The *Save* button appears after you fill in all the fields.
6. Click *Save*.

2.2.2.5.3.2.3 Removing a Connector Address

Use this procedure to remove a connector address.

1. Open the *Connectors* window
2. In the *Connectors* window, select a connector address.
3. On the *Action* menu, click *Remove*. The *Remove connector address* dialog box opens.
4. In the *Remove connector address* dialog box, click *Yes*. The connector address is removed from the address book.

2.2.2.5.4 Monitoring the Logs

Once you have executed a scenario, you can monitor the logs saved by the import/export connector (IEC) in the log directory.

Related Information

[Executing a Scenario \[page 98\]](#)

[Log Management \[page 84\]](#)

2.2.2.6 Scenarios

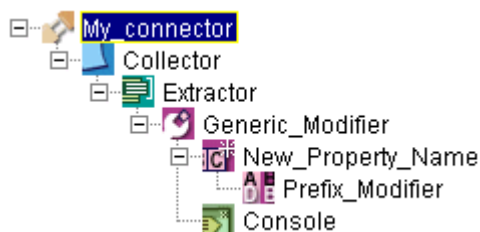
If you want to change all the prefixes `key` into `code` in each line of a file, the scenario must include the following steps:

1. Searching for the file to parse.
2. Extracting each line from this file.
3. Changing the old prefix `key` into `code` in each line .
4. Displaying the result on a console.

The tree illustrating the previous scenario example will include the following components:

- File collector ([File Spool Collector \[page 113\]](#))
- Line extractor ([Fixed Size Line Set Extractor \[page 116\]](#))
- [Generic Modifier \[page 123\]](#)
- Modifier to rename a property ([Property Rename \[page 125\]](#))
- Modifier to change a prefix ([Property Prefix Modifier \[page 127\]](#))
- [Console Action \[page 148\]](#)

In the scenario window, the tree will appear as shown below:



Implementation

Modelling and building a scenario

Before [Building a Scenario \[page 97\]](#), you must model it ([Modeling a Scenario \[page 97\]](#)).

If you are in doubt about how to build a scenario, refer to the [Tutorial \[page 69\]](#).

Business operations

Executing a scenario

When a scenario is completely built, you can execute it ([Executing a Scenario \[page 98\]](#)) in an import/export connector installed in your system landscape. You must choose the mode ([Executing a Scenario \[page 98\]](#)) in which you will execute the scenario.

Managing scenarios

The procedures to save, view or modify scenarios vary according to the execution mode (refer to [Saving a Scenario \[page 106\]](#), [Viewing an Existing Scenario \[page 104\]](#) and [Modifying a Scenario \[page 105\]](#)).

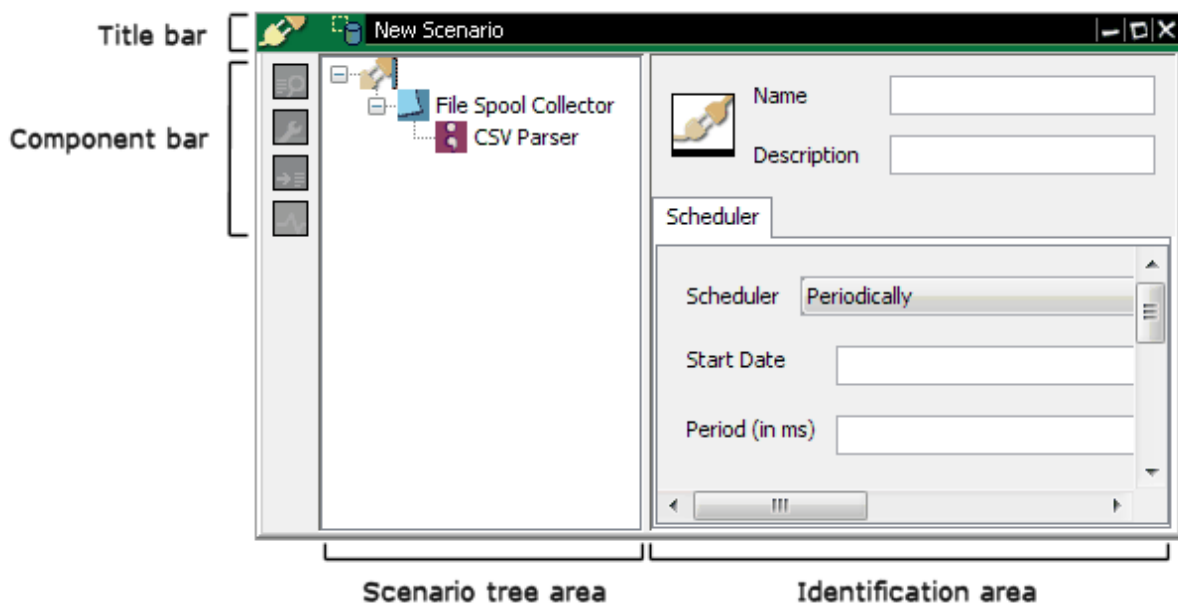
Transport

In a production system landscape, you copy a scenario to the host machines installed with an import/export connector application. You organize your backup copy.

In a development system landscape, you can use a remote connector.

2.2.2.6.1 Scenario Window

The scenario window is a workspace where you create, set up, and modify a scenario with the *CAT Tool* user interface.



This window consists of four parts:

- Title bar with scenario path and name
- Component toolbar
- Scenario tree area
- Identification area

i Note

You can open an unlimited number of scenario windows and work with each window.

Component toolbar

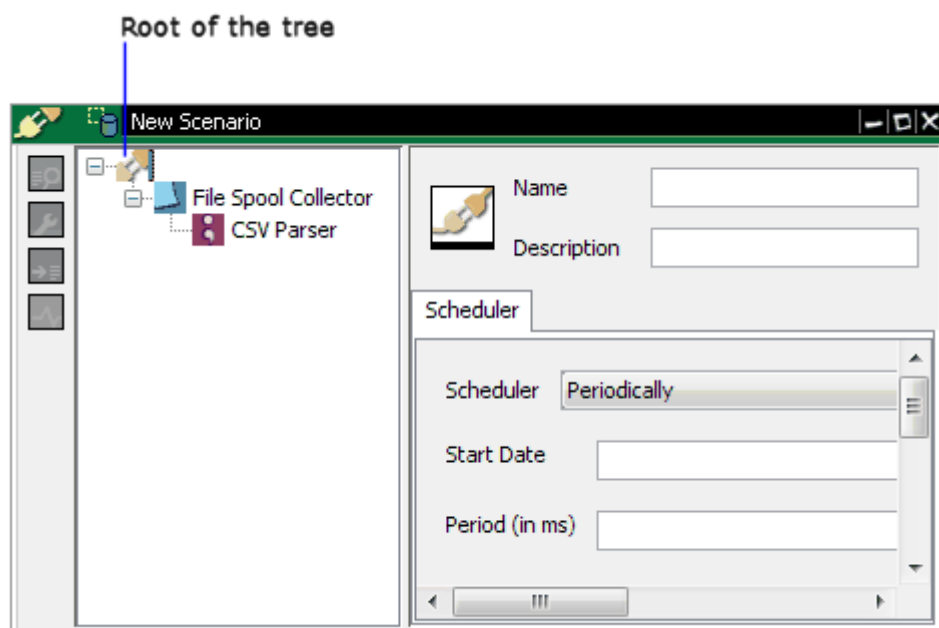
The table below shows the components that you can insert in the tree area:

Component family	Component name
Imports (Collectors)	File Spool Collector [page 113]
	Import XCI from Database Action [page 114]
Modifiers	Fixed Size Line Set Extractor [page 116]
	Delimited Line Set Extractor [page 118]
	CSV Parser [page 119]
	Fixed Width Field Parser [page 121]
	XML Transformation [page 122]
	Generic Modifier [page 123]
	Property Comparison [page 123]
	Property Rename [page 125]
	Reject [page 125]
	Property Concatenation [page 126]
	Property Prefix Modifier [page 127]
	String Property Introducer [page 128]
	Chargeable Item Creation Action [page 128]
	String Property [page 129]
	Number Property [page 130]
	Date Property [page 131]
	BART Acquisition Session [page 132]
Exports	Export to Database Action [page 135]
	Rating [page 136]
	Acquisition (by BART) [page 138]
Miscellaneous	SQL Action [page 142]

Component family	Component name
	SQL Action 2 [page 144]
	Java Action [page 146]
	Console Action [page 148]
	XML File Export Action [page 148]
	Log Action [page 150]
	Multi Threader [page 152]
	XML API Request [page 152]
	Property File Writer Action [page 153]

Scenario tree area

This area contains the tree made up of components. The first component in the tree, referred to as the root of the tree, identify the scenario. When you open a new scenario, the scenario tree area already includes this component as shown in the following illustration:



Before adding components to your tree ([Building a Scenario \[page 97\]](#)), make sure that you have given a name to your scenario, and then that you have configured the scheduler ([Scheduler Information \[page 99\]](#)).

Identification area

This area contains all the parameters related to a component to set up. For example, the first component (the root of the tree) is your scenario name. The parameters related to this first component correspond to the scheduler.

Every time that you add a component to the tree, the *identification* area changes and displays the corresponding parameters.

2.2.2.6.2 Modeling a Scenario

In this *Customizing* activity, you design a new scenario (see [Scenarios \[page 93\]](#)) depending on your business requirements.

Before [Building a Scenario \[page 97\]](#), you must solve the following questions:

1. *Data import*: How to import the data in the scenario?
2. *Data Modification*: How to make collected data exportable?
3. *Data Export*: How and where to export data?
4. *Execution Period*: How to execute the scenario?

If you are in doubt about how to build a scenario, refer to the [Tutorial \[page 69\]](#).

2.2.2.6.3 Building a Scenario

In this *Customizing* activity, you configure a new scenario depending on your business requirements (see [Scenarios \[page 93\]](#)).

This procedure shows the main steps for building a scenario.

Prerequisites

- You have analyzed the business requirements.
- The design of the expected scenario is available ([Modeling a Scenario \[page 97\]](#)).

To configure a scenario

1. Create a new scenario: [Creating a New Scenario \[page 104\]](#)
2. Set up the scheduler: [Setting Up the Scheduler \[page 100\]](#)
3. Add components to the scenario tree: [Adding a Component \[page 110\]](#)

4. Set up each component: [Setting Up a Component \[page 112\]](#)
5. At this step, you can do one of the following:
 - Export your scenario to a connector repository ([Exporting a Scenario \[page 107\]](#)) where you can execute it with [Remote IEC \[page 88\]](#) in a development system landscape ([Executing a Scenario \[page 98\]](#))
 - Save your scenario ([Saving a Scenario \[page 106\]](#)) to execute with [Stand-Alone IEC \[page 86\]](#) ([Executing a Scenario \[page 98\]](#))

2.2.2.6.4 Executing a Scenario

Once you have created, and then saved a scenario with *CAT Tool*, you can trigger its execution in an import/export connector (*IEC*) application depending on the two following possibilities:

- Use a [Stand-Alone IEC \[page 86\]](#) (**recommended**)
- Use a [Remote IEC \[page 88\]](#)

Caution

Do not implement a remote import/export connector (IEC) in a production system landscape during the production operation phase. You implement a remote IEC during the implementation project phase to transport data to the SAP CC systems.

Whatever which option you chose, each scenario is scheduled depending on the scheduler configuration ([Scheduler Information \[page 99\]](#)).

Preparing a scenario to be executed with a stand-alone IEC

You do the following:

1. Create a new scenario with the *CAT Tool* user interface: [Creating a New Scenario \[page 104\]](#)
2. Save the scenario in a directory: [Saving a Scenario \[page 106\]](#)
3. Execute the scenario by an *IEC* application: [Executing a Scenario \[page 86\]](#)

You can view ([Viewing an Existing Scenario \[page 104\]](#)), and then modify ([Modifying a Scenario \[page 105\]](#)) an existing scenario that is saved in a directory.

Preparing a scenario to be executed with a remote IEC

You do the following with *CAT Tool*:

1. Create a new scenario: [Creating a New Scenario \[page 104\]](#)
2. Register the remote connector to which you want to export the scenario: [Managing the Connector Address Book \[page 91\]](#)
3. Export the scenario to the connector repository of the selected IEC: [Exporting a Scenario \[page 107\]](#)

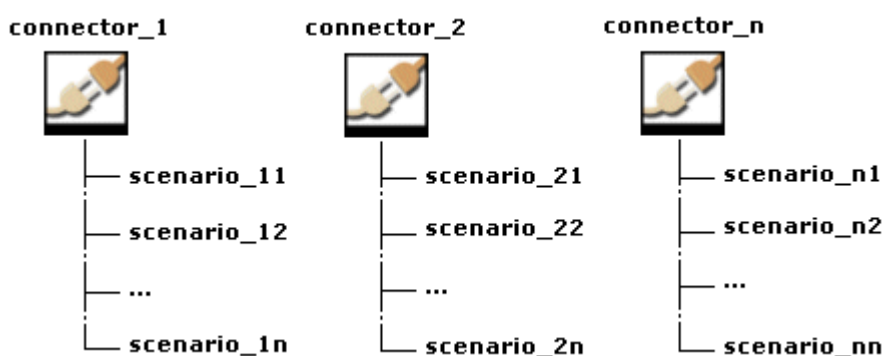
4. Trigger the execution of this scenario by the remote IEC: [Executing a Scenario \[page 88\]](#)

Connector address book

You use the addresses that are registered in the connector address book (see [Managing the Connector Address Book \[page 91\]](#)) each time that you want to export, import, synchronize or execute a scenario.

Connector repository

A repository is assigned to each remote connector (see [Connectors \[page 82\]](#)). In this repository, you can save many scenarios as illustrated below:



Each repository allows you to regroup scenarios depending on specific tasks relating to a connector.

You can:

- Save a scenario in a repository by exporting the scenario
- Import a scenario from a repository to view, synchronize or execute the scenario

A connector can only execute the scenarios which are included in its repository. According to the previous illustration, if you want to execute *the scenario_11 by the connector_2*, you must first export *the scenario_11 to the connector_2 repository*.

i Note

A unique database is dedicated to a repository.

If a scenario in a repository needs to use a database for a specific task ([SQL Action \[page 142\]](#), for example), all the scenarios that you export to this repository will use the same database. If a scenario must use another database, do one of the following:

- Export your scenario ([Exporting a Scenario \[page 107\]](#)) to another connector repository where the scenario can use the appropriate database
- Create a new connector to save your scenario ([Saving a Scenario \[page 106\]](#))

2.2.2.6.5 Scheduler Information

An import/export connector (*IEC*) can trigger a scenario at a frequency based on the chosen policy. You set up this policy in each scenario.

You can apply different scheduling policies ([Setting Up the Scheduler \[page 100\]](#)):

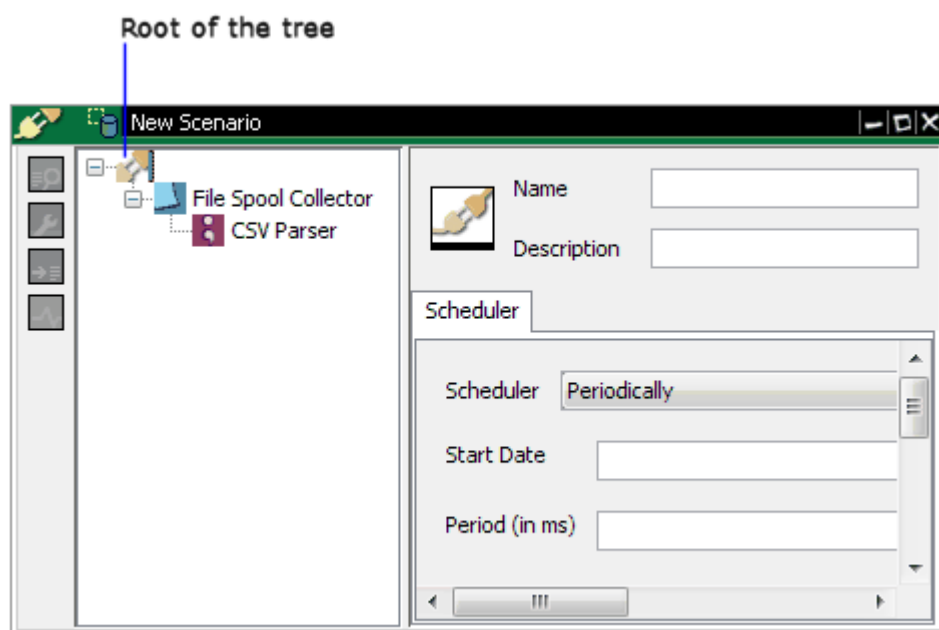
- Periodic policy using a date
- Recurring policy (based on Unix cron grammar) such as:
 - Hourly
 - Daily
 - Weekly
 - And other recurring policies
- Mix of periodic and recurring policy

i Note

You must specify the **-scheduled** command option when executing a scenario with scheduler information in a stand-alone *IEC*.

2.2.2.6.5.1 Setting Up the Scheduler

Once you have created a new scenario (see [Creating a New Scenario \[page 104\]](#)), the scenario window includes the root of the tree as shown below:



Before building the tree ([Building a Scenario \[page 97\]](#)), you must:

- Type the *Name* and the *Description* of the scenario
- Fill in the *Scheduler* tab

Scheduler (Tab)

This tab allows you to choose and set up a scheduling policy.

Scheduler: Provides the list of scheduling policies. Select a scheduling policy: [Recurrent](#) or [Periodic](#).

Recurrent Scheduling

To apply this mode, select [On a recurrence](#) in the **Scheduler** field. This configuration is based on the Unix cron grammar. The table below shows you the used format to type scheduling parameters:

Format	Meaning
*	In the Unix cron grammar, "all possible values" is represented by an asterisk. In the Scheduler tab, "all possible values" is represented by: • An empty field in the Seconds, Minutes, Hours or Days fields • All the checkboxes cleared in the Weekdays or Months areas
n	A single integer is used to match that exact value.
m-n	Two integers separated by a dash are used to match a value within the range.
m,n	A list of integers separated by commas are used to match any one of the values.

Time units are expressed in second, minute, hour or day.

i Note

An empty field means "every". For example, if the [Hours](#) field is empty, this means "every hour".

Seconds: Type a number between 0 and 59.

Minutes: Type a number between 0 and 59.

Hours: Type a number between 0 and 23 (hour of the day).

Days: Type a number between 1 and 31 (day of the month). If necessary, select [Include the last day of month](#).

i Note

In the [Weekdays](#) and [Months](#) areas, all the checkboxes cleared means every day in the [Weekdays](#) area and every month in the [Months](#) area.

Weekdays: Provides the list of days. Select a day on which you want to execute the scenario.

Months: Provides the list of months. Select a month in which you want to execute the scenario.

❖ Example

Scheduling Examples:

<i>Seconds</i>	<i>Minutes</i>	<i>Hours</i>	<i>Days</i>	<i>Weekdays</i>	<i>Months</i>	<i>Comments</i>
5	15	1	Empty	All the check-boxes cleared	All the check-boxes cleared	Executes the scenario at 1:15:05 AM every day
10	40	23	1	All the check-boxes cleared	All the check-boxes cleared	Executes the scenario on the first of every month at 11:40 PM
10	0,10,20,30	9,17	Empty	All the days selected	All the check-boxes cleared	Executes the scenario on Monday-Sunday every 10 minutes for the first half hour of the 9 AM and 5 PM hours: 9:00:10 9:10:10 9:20:10 9:30:10 17:00:10 17:10:10 17:20:10 17:30:10
30	30	4	1,15	<i>Fri</i> selected	All the check-boxes cleared	Executes the scenario at 4:30:30 AM on the 1st and 15th of each month, plus every Friday
0	0	0	19	All the check-boxes cleared	<i>Aug</i> selected	Executes the scenario at midnight on August 19th
1	Empty	Empty	Empty	All the check-boxes cleared	All the check-boxes cleared	Executes the scenario every second

<i>Seconds</i>	<i>Minutes</i>	<i>Hours</i>	<i>Days</i>	<i>Weekdays</i>	<i>Months</i>	<i>Comments</i>
0	30	1	Empty	All the check-boxes cleared	All the check-boxes cleared	Executes the scenario every day at 1:30 in the morning
0	30	22	1,11,21	All the check-boxes cleared	All the check-boxes cleared	Executes the scenario every day at 10:30 PM on the 1st, 11th and 21st of every month
0	59	0	1-7	<i>Sun</i> selected	All the check-boxes cleared	Executes the scenario at 12:59 AM on the first seven days of the month, and then on every subsequent Sunday after the 7th
0	30	19	Empty	<i>Tue, Thu</i> and <i>Sat</i> selected	All the check-boxes cleared	Executes the scenario at 19:30 PM on Tuesday, Thursday and Saturday of every month
0	59	23	31	<i>Fri</i> selected	<i>Dec</i> selected	Executes the scenario at one minute before the end of year if the last day of the year is Friday
0	45	17	7	All the check-boxes cleared	<i>Jun</i> selected	Executes the scenario at every year on June 7th at 17:45

Periodic scheduling

To apply this mode, select *Periodically* in the *Scheduler* field.

Start Date: Click the calendar, and then select a date on which the scenario is executed periodically.

Period (in ms): Type a number that corresponds to the period duration.

2.2.2.6.6 Managing Scenarios

- [Creating a New Scenario \[page 104\]](#)
- [Viewing an Existing Scenario \[page 104\]](#)
- [Modifying a Scenario \[page 105\]](#)
- [Synchronizing a Scenario \[page 105\]](#)
- [Saving a Scenario \[page 106\]](#)
- [Exporting a Scenario \[page 107\]](#)
- [Importing a Scenario \[page 108\]](#)

2.2.2.6.6.1 Creating a New Scenario

Use this procedure to create a scenario during the implementation project phase.

To create a new scenario

1. On the *File* menu, click *New*. A new scenario window is displayed
2. In the identification area, type the *Name* and the *Description* of the scenario
3. Set up the *Scheduler*

Related Information

[Scenarios \[page 93\]](#)

[Setting Up the Scheduler \[page 100\]](#)

[Saving a Scenario \[page 106\]](#)

2.2.2.6.6.2 Viewing an Existing Scenario

You can view an existing scenario saved in a directory or in a remote connector repository.

To view an existing scenario saved in a directory

1. On the *File* menu, click *Open*. The *Open* dialog box opens.
2. In the *Open* dialog box, search for a directory in *Look in*.

3. In the directory, select the file that you want to view.
4. Click [Open](#).

To view an existing scenario stored in a remote connector repository

- See [Importing a Scenario \[page 108\]](#)

2.2.2.6.6.3 Modifying a Scenario

You can modify an existing scenario saved in a directory or in a remote connector repository.

To modify a scenario saved in a directory

1. Open an existing scenario.
2. Make changes to the scenario.
3. Save the modified scenario.

To modify a scenario stored in a remote connector repository

- See [Synchronizing a Scenario \[page 105\]](#)

Related Information

[Viewing an Existing Scenario \[page 104\]](#)

[Saving a Scenario \[page 106\]](#)

2.2.2.6.6.4 Synchronizing a Scenario

Use this procedure to modify a scenario saved in a connector repository.

To synchronize a scenario

1. Make sure that the connector is running; otherwise, *CAT* displays an error message.
2. Import a scenario.
3. Make changes to the scenario.
4. On the *File* menu, click *Synchro*. The *Synchronization* dialog box is displayed.
5. Click *Yes* to synchronize the scenario. The changes are saved. You can close or execute the scenario.

Related Information

[Executing a Scenario \[page 88\]](#)

[Importing a Scenario \[page 108\]](#)

2.2.2.6.6.5 Saving a Scenario

You can save a scenario in a directory or in a remote connector repository.

i Note

All the scenarios are saved in XML format.

To save a scenario in a directory

1. On the *File* menu, click *Save*. The *Save* dialog box opens.
2. In the *Save* dialog box, search for a directory in *Look in*.
3. Type a *File name*.
4. Click *Save*.

The *Save as* command is used to save a file:

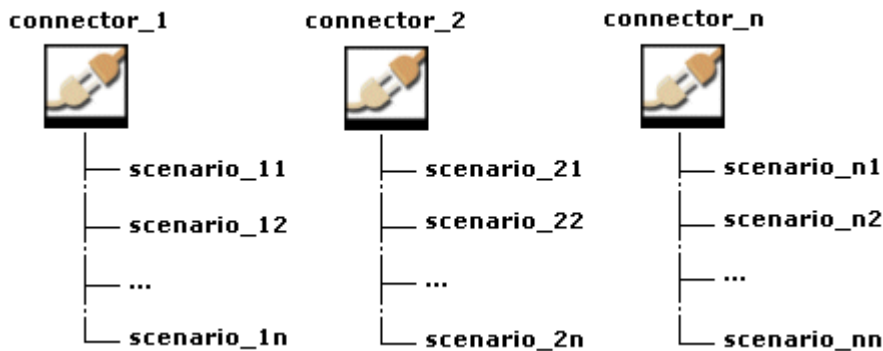
- In another directory
- With another name

To save a scenario in a connector repository

- See [Exporting a Scenario \[page 107\]](#)

2.2.2.6.6 Exporting a Scenario

You export a scenario when you want to save it in a connector repository. You can save as many scenarios as you want in a connector repository as shown in the illustration below:



Exporting scenarios to a connector allows you to execute these scenarios from the [CAT Tool](#) graphical user interface ([Executing a Scenario \[page 88\]](#)).

To export a scenario

1. Make sure that the connector is running ([Executing a Scenario \[page 88\]](#)). If not, *CAT* displays an error message.
2. Make sure that the scenario to be exported is opened and selected. If several scenarios are opened, select the scenario that you want to export.
3. On the *File* menu, click *Export*. The *Select connector* window opens. Make sure that the window is not empty; otherwise, register the connector address (see [Registering a New Connector Address \[page 91\]](#)).
4. In the *Select connector* window, select a connector to which you want to export a scenario.
5. Click *OK*. The *Connection* dialog box opens.
6. In the *Connection* dialog box, type your login user name and password (*). The user name must correspond to an individual user.
7. Click *OK*. The scenario is exported to the connector.

(*) If you fail to authenticate, the system displays one of the following windows:

- The list of previously failed login authentication attempts
- The window used to change your password

Failed Login Authentication Attempts window

This window displays a list of all the previously failed login attempts. Each login attempt is displayed with the following information:

- The date and time of each failed attempt
- The IP address of the computer which is the cause of the failed authentication (you can use both IPv4 and IPv6 addresses)

Password Modification window

You can configure SAP CC Core Server to use a password management policy which can oblige users to change their password.

If the password management policy is enabled and if it applies to you, a message is displayed to inform that your password must be changed. A window is then displayed to change this password (see [Changing the Password \[page 62\]](#)).

2.2.2.6.6.7 Importing a Scenario

Importing a scenario allows you to:

- Open a scenario saved in a connector repository
- Execute this scenario, if necessary (refer to [Executing a Scenario \[page 88\]](#))

To import a scenario

1. Make sure that the connector is running (see [Executing a Scenario \[page 88\]](#)); otherwise, *CAT Tool* displays an error message.
2. In the *File* menu, click *Import*. The *Select connector* window opens. Make sure that the window is not empty; otherwise, register the connector address ([Registering a New Connector Address \[page 91\]](#)).
3. In the *Select connector* window, select a connector from which you want to import a scenario.
4. Click *OK*. The *Connection* dialog box opens.
5. In the *Connection* dialog box, type your login user name and password. The user name must correspond to an individual user.
6. Click *OK*. The *Select scenario* window opens (*).
7. In the *Select scenario* window, select a scenario to import.
8. Click *OK*. The window of the imported scenario opens.

i Note

If you fail to authenticate, refer to the [Exporting a Scenario \[page 107\]](#) procedure for more information.

2.2.2.7 Components

A component is a basic unit for building a scenario ([Scenarios \[page 93\]](#)). *CAT Tool* includes a set of different components that allows you to configure a scenario to import, extract, modify, and export data when an import/export connector (*IEC*) application runs this scenario.

For more information on component families:

- [Import Components \[page 112\]](#)

- [Modifier Components \[page 115\]](#)
- [Export Components \[page 132\]](#)
- [Miscellaneous Components \[page 141\]](#)

2.2.2.7.1 Managing Components

Managing components consists in:

- Editing (cut, copy, paste) components which are included in the scenario tree ([Editing a Component \[page 109\]](#))
- Adding a new component to the end of the scenario tree ([Adding a Component \[page 110\]](#))
- [Inserting a Component \[page 111\]](#) between two other components
- [Removing a Component \[page 111\]](#) from a scenario tree

You can also set up a component ([Setting Up a Component \[page 112\]](#)):

- Each time that you add a new component to the scenario tree
- Once you have fully built the scenario tree

2.2.2.7.1.1 Editing a Component

You can cut, copy or paste components which are included in a scenario tree.

Cutting a component

When you cut a component, you remove the selected component and all the next ones from the scenario tree. All these components are copied to the clipboard. You can reuse these components by pasting them at the end of the scenario tree.

To cut a component

1. In the scenario tree, select the component that you want to cut.
2. Do one of the following:
 - Right-click to open the shortcut menu, and then click [Cut](#).
 - On the [Edit](#) menu, click [Cut](#).

The selected component and all the next ones are removed from the scenario tree and copied to the clipboard.

Copying a component

When you copy a component, the selected component and all the next ones are copied to the clipboard. You can reuse these components by pasting them at the end of the scenario tree.

To copy a component

1. In the scenario tree, select the component that you want to copy.
2. Do one of the following:
 - Right-click to open the shortcut menu, and then click *Copy*.
 - On the *Edit* menu, click *Copy*.

The selected component and all the next ones are copied to the clipboard.

Pasting a component

You can paste a component that is saved in the clipboard at the end of the scenario tree.

i Note

- You cannot paste a component in the middle of a scenario tree
- The clipboard can contain one or several components

To paste a component

1. Select the last component of the scenario tree.
2. Do one of the following:
 - Right-click to open the shortcut menu, and then click *Paste*.
 - On the *Edit* menu, click *Paste*.

The component is pasted at the end of the scenario tree.

2.2.2.7.1.2 Adding a Component

To build a scenario, you usually add some components after the last component of the scenario tree; however, if you want to add a component in the middle of the scenario tree, you must insert the component.

To add a component

1. In the scenario tree, select the component after which you want to add a new component.
2. Add the new component by doing one of the following:
 - Click the appropriate icon on the toolbar.

- Right-click to open the shortcut menu, select [Add Component](#), and then click the component to be added.
- On the [Action](#) menu, select [Add Component](#), and then click the component to be added.

Related Information

[Inserting a Component \[page 111\]](#)

2.2.2.7.1.3 Inserting a Component

Use this procedure to insert a component in a scenario tree.

To insert a new component

1. In the scenario tree, select the component before which you want to insert a new component.
2. Right-click to open the shortcut menu, and then click [Cut](#). The selected component and all the next ones are removed from the scenario tree.
3. Add the new component to the end of the scenario tree.
4. Select the component that you have just added.
5. Right-click to open the shortcut menu, and then click [Paste](#). All the components that you have cut in step 2 are copied to the end of the tree.

Related Information

[Adding a Component \[page 110\]](#)

2.2.2.7.1.4 Removing a Component

You can permanently remove a component and all the next ones from the scenario tree. These components are not copied to the clipboard.

To remove a component

1. In the scenario tree, select the component that you want to remove.
2. On the [Action](#) menu, click [Remove](#). The selected component and all the next ones are removed permanently from the scenario tree.

2.2.2.7.1.5 Setting Up a Component

After adding or inserting a component, you can set it up.

To set up a component

On the right side of the scenario window, do the following in the [Identification](#) area:

1. Type the [Name](#) and [Description](#) of the component. [Name](#) is mandatory while [Description](#) is optional.
2. Select or type the appropriate parameters in each tab.

2.2.2.7.2 Import Components

You use the import components to configure how to:

- Collect data from applications or systems by connecting to external sources
- Send a data stream or data collection to the next component of the scenario tree.

The external sources are the following:

- [File](#): CSV, FWF, and so on
- [Database](#): IEC connects to SAP HANA, Sybase ASE, Oracle, MS SQL Server, or IBM DB2

Related Information

[File Spool Collector \[page 113\]](#)

[Import XCI from Database Action \[page 114\]](#)

2.2.2.7.2.1 File Spool Collector

This component allows you to search for files in directories according to search criteria. The files that are found by the *File Spool Collector* component are sent file by file to the next component of the scenario tree.

i Note

This *File Spool Collector* has its own [Log Action \[page 150\]](#) that logs the data collections rejected, accepted, or filtered. Do not insert any *Log Action* component after the *File Spool Collector* component.

Log files are stored in the log directory (refer to [Log Management \[page 84\]](#)) and named depending on the following syntax:

- `<FILENAME>.rejected`: Contains the rejected data collection. Example: `crds.txt.rejected`.
- `<FILENAME>.filtered`: Contains the filtered data collection. Example: `tickets.csv.filtered`.
- `<FILENAME>.accepted`: Contains the accepted data collection. Example: `clientnames.csv.accepted`.

Where:

- `<FILENAME>`: File name that is processed by the *File Spool Collector*. Example: `crds.txt`

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#).

Paths tab

This tab allows you to:

- Create a table of directory paths where the *File Spool Collector* must search for files
- Choose the search criteria that are associated to each directory path



: Adds a new row to the *Paths* table.



: Removes a row from the *Paths* table.



: Opens the *Open* dialog box to choose a directory on your computer.

Paths: In each of the new row, type the directory path where the *File Spool Collector* must search for files. You can also open the Open dialog box, and then select a directory on your computer.

Recursive: If this option is selected and if the directory contains subdirectories, the *File Spool Collector* searches for files in all the subdirectories.

Search Criteria: Choose one of the following search criteria:

- *Select all files*: The *File Spool Collector* searches for all the files
- *Select files with a specific extension*: The *File Spool Collector* searches only for the files whose extension you type
- *Select files with a specific name*: The *File Spool Collector* searches only for the files whose name you type

Sort tab

All the files that are found by the *File Spool Collector* make up a resource available for the next component of the tree.

Resource Key: Type the name of the set of files found by the *File Spool Collector*. The next components of the tree use this key to access to these files.

Files sort: Provides the list of sort criteria. Select a criterion if you want that the *File Spool Collector* sorts the files before processing them. Otherwise, select *None*.

- *Decreasing*: Click to sort the files in decreasing order

File Filtering:

- *Do not load file that has already been processed*: If this option is selected, the *File Spool Collector* do not process the files that it has already found.

Encoding tab

This tab allows you to encode every file read by the *File Spool Connector*.

Input File Encoding: Provides the list of encoding formats compliant with a Java Virtual Machine. Select an encoding format or select Default (UTF-8).

2.2.2.7.2.2 Import XCI from Database Action

This component allows you to configure the extraction of all the extended chargeable items (XCIs) that are stored in the IEC database. These XCIs make up a resource usable for the next component of the scenario tree to consolidate or to trigger some batch charging operations.

See also [Rating \[page 136\]](#) component.

Prerequisites

The extended chargeable items (XCIs) are stored in the dedicated IEC database. They have been created by an IEC application configured to export the relevant data. Refer to the [Export to Database Action \[page 135\]](#) for more information.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You set up all information relating to the IEC database system that includes the extended chargeable items (XCIs).

Database: Select or type the necessary information for retrieving XCIs from the IEC database:

- **Database:** The following databases are available: SAP HANA, Sybase ASE, Oracle, MS SQL Server, or IBM DB2. Select the used database.
- **Host name:** Type the machine name on which the database is installed. You can use both IPv4 and IPv6 addresses.
- **Host port:** Type the communication port number in the host machine.
- **Instance name:** Type the database name.
- **Log on:** Type the login to access the database.
- **Password:** Type the password to access the database.
- **Driver pool size:** Type the pool size of the driver used to access the database system.

Extracted XCI Key: Type the name of the extracted XCI set. This resource can be used by the next component of the scenario tree.

2.2.2.7.3 Modifier Components

The modifier components:

- Receive data from the previous import component.
- Transform these data into new lines, new properties, or new XCIs. These new data make up a new data collection.

Related Information

[Fixed Size Line Set Extractor \[page 116\]](#)

[Delimited Line Set Extractor \[page 118\]](#)

[CSV Parser \[page 119\]](#)

[Fixed Width Field Parser \[page 121\]](#)

[XML Transformation \[page 122\]](#)

[Generic Modifier \[page 123\]](#)

[Property Comparison \[page 123\]](#)

[Property Rename \[page 125\]](#)

[Reject \[page 125\]](#)
[Property Concatenation \[page 126\]](#)
[Property Prefix Modifier \[page 127\]](#)
[Property Suffix Modifier \[page 127\]](#)
[String Property Introducer \[page 128\]](#)
[Chargeable Item Creation Action \[page 128\]](#)
[String Property \[page 129\]](#)
[Number Property \[page 130\]](#)
[Date Property \[page 131\]](#)
[BART Acquisition Session \[page 132\]](#)

2.2.2.7.3.1 Fixed Size Line Set Extractor

This component:

- Extracts lines set by set from a data stream
- Compares each line with a filter
- Creates new properties with the lines that match the comparison

The *Fixed-Size Line Set Extractor* component uses a filter that:

- Compares each line with an alphanumeric string
- Compares the position of each line in a set with an integer

The new properties are available for the next components of the tree

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

You define the source and the number of lines for each set to be extracted.

Input stream: Provides the list of resources. Select an input stream.

i Note

The list *Input stream* is empty if no resources are available.

Number of Lines in Set: The number of lines that are included in a set ranges from one to n lines. Type the number of lines per set which is extracted at a time from the input stream by the *Fixed-Size Line Set Extractor*.

Mapping tab

The *Mapping rules* table allows you to create a set of comparison values. Each set of lines extracted by the Fixed-Size Line Set Extractor is filtered depending on the following options:

- Each line is compared to an alphanumeric string (*matches pattern*)
- The position of each line in the set is compared to an integer (*is token number*)

If a line or its position matches one of the values defined in the Value column entries, this line makes up a new property whose name is defined by the related *Name* column entry in the table.



: Adds a new row to the *Mapping rules* table.



: Removes a row from the *Mapping rules* table.

Optional: If this option is not selected, an error is generated if the *Fixed-Size Line Set Extractor* does not find a line or position that matches the *Value*. If this option is selected, no error is generated whatever the search result.

Name: Type the name of the line that matches the related *Value* column entry in the table.

Rules: For each row that you add to the *Mapping rules* table, you can select one of the two options: *matches pattern* or *is token number*.

- *matches pattern:* Defines *Value* as an alphanumeric string. Each line is compared to the alphanumeric string that you type in *Value*.
- *is token number:* Defines *Value* as an integer. The position of each line is compared to the integer that you type in *Value*. The lines of a set are sequentially numbered from 0 to n. The first line of a set is always numbered 0. *Value* represents the position of a line in a set. For example, if a set contains six lines, they are numbered from 0 to 5.

Value: Type an alphanumeric string or an integer depending on the *Rules* that you have selected. If you have selected:

- *matches pattern:* Type an alphanumeric string that uses a regular expression
- *is token number:* Type an integer

Advanced tab

On this tab, you give the conditions to process specific lines from the data stream. You can decide to ignore the header, the comment, and empty lines. But you can decide to extract other lines by indicating their *Position in the stream* in the last area. For example, you extract the last line of a file because it contains information relating to all the previous lines.

i Note

Advanced tab provides the following features:

- You can extract lines that you have first ignored in the *Mapping rules* of the *Configuration* tab.
- You can ignore the header lines by correctly setting up *Header size*. Even if the *Header size* field is correctly set up, the Fixed-Size Line Set Extractor allows you to retrieve the header lines by typing their *Position in the stream*.



: Adds a row to the table.



: Removes a row from the table.

Header size: Type the number of header lines that the component must not process.

Comments: Allows you to create the list of lines that the component must not process. For each row that you add to the table, you can type a regular expression. For example, if you type “//*”, the component does not process the comment lines that start with the character “//”.

- **Empty lines are removed:** If this option is selected, the component does not process the empty lines.

Default Lines:

- **Position in Stream:** Allows you to create the list of specific lines to be extracted. The lines of the stream are numbered from 0 to n. If you want to retrieve a specific line, add a row to the table, and then type its **Position in the stream**.
- **From the Last:** Starts the counter from the first or the last line of the data stream:
 - If **From the Last** is selected, the line extracted is `default_lines.last-x` with *x* = position of the line
 - If **From the Last** is not selected, the line extracted is `default_lines.x` with *x* = position of the line

2.2.2.7.3.2 Delimited Line Set Extractor

This component:

- Extracts from a data stream a block of lines that is defined by a start line and an end line
- Filters the lines
- Creates new properties with the lines that match the comparison

The **Delimited Line-Set Extractor** component uses a filter that:

- Compares each line with an alphanumeric string
- Compares the position of each line in a set with an integer

The new properties are available for the next components of the tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

You define the source, the beginning, and the end of the block to be extracted.

Input stream: Provides the list of resources. Select an input stream.

i Note

The list *Input stream* is empty if there are no resources available or if the resources are already used by a previous component of the tree.

i Note

Line set starts with: Defines the first line of the block to be extracted. The block starts after the first *Line That Matches a Pattern value*. You can type a regular expression. If *Pattern Value* is empty, the block starts after the first empty line. Select *Included* if you want to include in the block the line that matches the pattern.

Line set ends with: Defines the last line of the block to be extracted. The block stops before the *Empty Line* or before the first *Line That Matches a Pattern value*. You can type a regular expression. Select *Included* if you want to include in the block the line that matches the pattern.

Mapping tab

The mapping rules are the same as those of the [Fixed Size Line Set Extractor \[page 116\]](#) component.

Advanced tab

The rules are the same as those of the [Fixed Size Line Set Extractor \[page 116\]](#) component.

2.2.2.7.3.3 CSV Parser

This component allows you to parse and divide an existing property into several new properties. This parsing is based on a specific character or separator. The *CSV Parser* component parses the properties that are created by the previous components of the scenario tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

The properties that are created by the previous components of the tree appear in the *Property to parse* list. In the *Configuration* tab, you choose:

- The property to be parsed
- The separator that is used for parsing the property
- The rules for removing the padding characters

Property to Parse: Provides the list of all the properties that are created by the previous components of the tree. Select a property to be divided into several new properties.

Note

Property to Parse is empty if no properties of string type are available.

Delimiter: Provides the set of separators that is used to parse the property. Select a separator (*Semicolon*, *Tab*, and so on), or click *Other*, and then type a character that you want as a separator.

Unpadding: Removes the padding characters before or after each new property:

- Remove white space before and after each created token: All the spaces are removed before and after each new property.
- **Left Unpadding with Value:** On the left side of the property, removes all the characters that match the value that you type. Example: the padding characters are "xxxxx". If you type "x" in *Value*, all the padding characters are removed.
- **Right Unpadding with Value:** On the right side of the property, removes all the characters that match the value that you type. Example: the padding characters are "yxxyx". If you type "yx" in *Value*, all the padding characters are removed.

Mapping tab

The *Mapping rules* table allows you to create a set of comparison values. Depending on the parsing rules, each property parsed by the *CSV Parser* creates a set of new properties. You can compare:

- Each property with an alphanumeric string (*matches pattern*)
- The position of each property in the set with an integer (*is token number*)

If a property or its position matches one of the values defined in the *Value* column entries, this line makes up a new property whose name is defined by the related *Name* column entry in the table.



: Adds a new row to the *Mapping rules* table.



: Removes a row from the *Mapping rules* table.

Optional: If this option is not selected, an error is generated if the CSV Parser does not find a property or its position that matches the *Value*. If this option is not selected, no error is generated whatever the search result.

Name: Type the name of the new property that matches the related *Value* column entry in the table.

Rules: For each row that you add to the *Mapping rules* table, you can select one of the two options:

- *matches pattern*: Defines *Value* as an alphanumeric string. Each new property of the set is compared with the alphanumeric string that you type in *Value*.
- *is token number*: Defines *Value* as an integer. The position of each new property is compared with the integer that you type in *Value*. The properties of a set are sequentially numbered from 0 to n. The first

property of a set is always numbered 0. *Value* represents the position of a property in a set. For example, if a set contains six properties, they are numbered from 0 to 5.

Value: Type an alphanumeric string or integer depending on the *Rules* that you have selected. If you have selected:

- *matches pattern*: Type an alphanumeric string using a regular expression
- *is token number*: Type an integer

2.2.2.7.3.4 Fixed Width Field Parser

This component allows you to parse and divide an existing property into several new properties. Each property is made up of tokens which are parsed depending on their length. The *Fixed Width Field Parser* parses the properties that are created by the previous components of the tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

The properties that are created by the previous components of the tree appear in the *Property to parse* list. In the *Configuration* tab, you choose:

- The property to be parsed
- The token length
- The rules for removing the padding characters

Property to Parse: Provides the list of all the properties that are created by the previous components of the tree. Select a property to be divided into several new properties.

i Note

The list *Property to Parse* is empty if no properties of string type are available.

Token Length: Parses the property depending on the length of each token. Type the length of each token by using a comma as a separator. For example: 9,9,19,7,2.

Unpadding: Removes the padding characters before or after each new property:

- *Remove white space before and after each created token*: All the spaces are removed before and after each new property.
- *Left Unpadding with Value*: On the left side of a property, removes all the characters that match the value that you type. Example: the padding characters are "xxxxx". If you type "x" in *Value*, all the padding characters are removed.

- *Right Unpadding with Value*: On the right side of a property, removes all the characters matching the value that you type. Example: the padding characters are "yxyx". If you type "yx" in *Value*, all the padding characters are removed.

Mapping tab

The rules are the same as those of the [CSV Parser \[page 119\]](#).

2.2.2.7.3.5 XML Transformation

This component allows you to transform an XML stream into another document format according an XSL template. For example, you can use an XSL template to produce HTML or a different XML structure.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#).

Definition tab

This tab allows you to:

- Select an XML stream to be parsed
- Select an XSL template used to parse an XML stream
- Name the new result document

XML Stream: Provides the list of XML stream. Select an XML stream to be parsed according to the XSL template.

XSL Stream: Provides the list of resources. Select an XSL template.

i Note

The list *XML stream* is empty if there are no resources available or if the resources are already used by a previous component of the scenario tree.

XML Output Stream: Type the name of the result document.

Transformer Factory Class: Displays the used class. Do not change the class name.

2.2.2.7.3.6 Generic Modifier

This component allows you to modify existing properties. You can:

- Rename or concatenate a property
- Compare a property with a character string
- Create new properties

In order to modify or create a new property, you must add this component to the end of the tree to make the following components available:

- [Property Comparison \[page 123\]](#)
- [Property Rename \[page 125\]](#)
- [Reject \[page 125\]](#)
- [Property Concatenation \[page 126\]](#)
- [Property Prefix Modifier \[page 127\]](#)
- [Property Suffix Modifier \[page 127\]](#)
- [String Property Introducer \[page 128\]](#)

i Note

About the list of components above.

- These components are available on the toolbar only if you add a [Generic Modifier](#) component to the scenario tree.
- Once you have added to the tree a component that is included in the previous list, all the other components ([Imports](#), [Modifiers](#), [Exports](#) and [Miscellaneous](#)) are unavailable on the toolbar.

2.2.2.7.3.7 Property Comparison

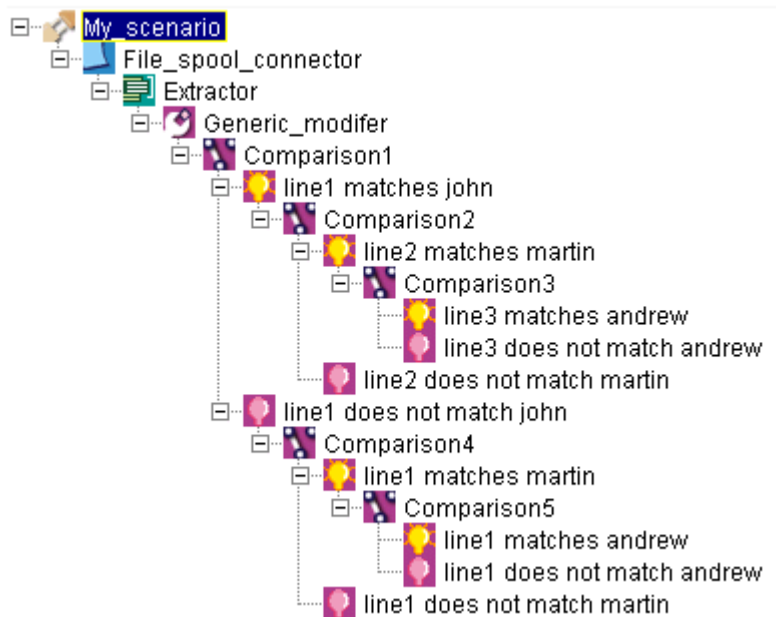
This component allows you to compare an existing property with a character string. When adding this component to a scenario tree, you create two conditional branches:

- A first branch that matches the condition
- A second branch that does not match the condition

This comparison is similar to: If (condition) then seq1 (first branch) else seq2 (second branch).

i Note

You can add successive comparisons as many times as you want in conditional branches. Refer to the illustration below.



i Note

In the conditional branches, you can use and add only the following components:

- This component (Property Comparison)
- [Property Rename \[page 125\]](#)
- [Reject \[page 125\]](#)
- [Property Concatenation \[page 126\]](#)
- [Property Prefix Modifier \[page 127\]](#)
- [Property Suffix Modifier \[page 127\]](#)
- [String Property Introducer \[page 128\]](#)

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

The properties created by the previous components of the tree appear in the [Property Name](#) list. In the [Configuration](#) tab, you choose the property that you want to compare with a character string.

[Property Name](#): Provides the list of existing properties. Select a property.

i Note

The list [Property name](#) is empty if no properties of string type are available.

Comparison Value: Type the character string to be compared with the property value.

2.2.2.7.3.8 Property Rename

This component allows you to copy and rename an existing property created by the previous components of the scenario tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

Property to Save: Provides the list of existing properties. Select the property that you want to copy and rename.

i Note

The list *Property to save* is empty if no properties of string type are available.

New property name: Type the name of the new property.

2.2.2.7.3.9 Reject

This component allows you to reject the current item.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Reject tab

This component is usually used to reject an item that does not include the expected property.

For example, you can insert the *Reject* component in a If-Then-Else statement (*Property Comparison component*). If the expected comparison is false, the item is rejected.

i Note

When an import/export connector (*IEC*) application executes a scenario including this *Reject* component, the *IEC* application records the rejected items in logs (see `rejected` subfolder).

Related Information

[Connectors \[page 82\]](#)

2.2.2.7.3.10 Property Concatenation

This component allows you to concatenate existing properties with a character string depending on three possible choices:

- Property + property
- Property + character string
- Character string + property

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

The second property (or character string) is concatenated with the first property (or character string)

First Character String: You select either a property or a character string:

- *Property:* Provides the list of existing properties. Select a property.
- *Default Value:* Type a character string.

Second Character String: You select either a property or a character string:

- *Property:* Provides the list of existing properties. Select a property.
- *Default Value:* Type a character string.

New Property Name: Type the name of the new property.

2.2.2.7.3.11 Property Prefix Modifier

This component allows you to replace the beginning of an existing property with a character string.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

Property to Modify: Provides the list of existing properties. Select a property.

i Note

The list *Property to Modify* is empty if no properties of string type are available.

Prefix to Replace: Type the beginning of the property that you want to replace.

New Prefix: Type the new character string.

New Property Name: Type the name of the new property.

2.2.2.7.3.12 Property Suffix Modifier

This component allows you to replace the end of an existing property with a character string.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

Property to Modify: Provides the list of existing properties. Select a property.

i Note

The list *Property to Modify* is empty if no properties of string type are available.

Suffix to Replace: Type the end of the property that you want to replace.

New Suffix: Type the new character string.

New Property Name: Type the name of the new property.

2.2.2.7.3.13 String Property Introducer

This component allows you to create a new property from a character string.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

New Property Name: Type the name of the new property.

New Property Value: Type the character string of the new property.

2.2.2.7.3.14 Chargeable Item Creation Action

This component allows you to create an eXtended Chargeable Item (XCI) made up of two property types:

- *User properties*: These properties are optional. You can create as many user properties as you want from an existing property. There are three user property types:
 - [String Property \[page 129\]](#)
 - [Number Property \[page 130\]](#)
 - [Date Property \[page 131\]](#)
- *Default properties*: These properties are not created from existing properties. They exist by default in a chargeable item. Default properties are the following:
 - Service identifier (String Property), the technical ID of the customer service
 - User identifier (String Property), the technical ID of the end customer that consumed (used) the service
 - Consumption date (Date Property)

i Note

About user and default properties:

- On the *Definition* tab of a User or Default property, *Use a property value* is empty if no properties of string type are available.

- Unlike the properties created by some components, User and Default properties are not available for the next components of the tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Information tab

→ Remember

Make sure to fill in the *Name* field.

This component creates a chargeable item from properties that are created by the previous components of the scenario tree.

Output XCI Property Key: Type the name of the XCI output stream. This resource can be used by the next components of the scenario tree.

Definition tab

→ Remember

Make sure to fill in the *Name* field.

2.2.2.7.3.15 String Property

This property type is only used for the User properties or Default properties of chargeable items (see [Chargeable Item Creation Action \[page 128\]](#)). This property is of a string type.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You assign a property value or constant value to a User property or Default property.

Computed Value: Select one of the two following value type:

- *Use a Property Value:* Provides the list of existing properties. Select the property value to be assigned to a User property or Default property.
- *Use a Constant Value:* Type the character string to be assigned to a User property or Default property.

i Note

The list *Use a Property Value* is empty if no properties of string type are available.

2.2.2.7.3.16 Number Property

This property type is only used for the User properties or Default properties of chargeable items (see [Chargeable Item Creation Action \[page 128\]](#)). This property is of a number type.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You assign a property value or constant value to a User property or Default property, and then define how the computed value is formatted.

Computed Value: Select one of the two following value types:

- *Use a property value:* Provides the list of existing properties. Select:
 - The *Name* of the property value to be assigned to a User property or Default property
 - The property value format (*Decimal Separator* and *Group Separator*)
- *Use a constant value:* Type the numeric value to be assigned to a User property or Default property.

i Note

The list *Use a property value* is empty if no properties of string type are available.

2.2.2.7.3.17 Date Property

This property type is only used for the User properties or Default properties of chargeable items (see [Chargeable Item Creation Action \[page 128\]](#)). This property is of a date type.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You assign a property value or constant value to a User property or Default property, and then define how the computed value is formatted.

i Note

The option *Use a property value* is empty if no properties of string type are available.

Computed Value: Select one of the three following value types:

- *Use a property value*: Provides the list of existing properties. Select a property, its format, and the language that is adapted to the locale.
 - *Name*: Select the property value to assign to a User or Default property
 - *Format*: Select or type the format of the property. While selecting or typing a format, you can check the result that is displayed above this field. For more information about formats, consult the note at the end of this topic.
 - *Language*: Select a language if the input file contains names such as month or day names in this language. For example, if the format is "MMMM dd", you need to select English in order to parse dates such as "July 10", or you need to select French in order to parse dates as "10 juillet".
- *Use a constant value*: Click the calendar, and then select a date.
- *Use the current date*: Type the date.

i Note

Format	Result
yyyy.MM.dd G HH:mm:ss z	2018.05.02 AD 11:52:36 CEST
EEE, MMM d, yy	Wed, May 2, 18
h:mm a	11:52 AM
K:mm a, z	11:52 AM, CEST
yyyyy.MMMMM.dd G hh:mm aaa	02018.May.02 AD 11:52 AM
EEE, d MMM yyyy HH:mm:ss Z	Wed, 2 May 2018 11:52:36 +0200

Format	Result
yyMMddHHmmssZ	180502115236+0200
yyyy-MM-dd HH:mm:ss.SSSZ	2018-05-02 11:52:36.540+0200
yyyy-MM-dd HH:mm:ss.SSSXXX	2018-05-02 11:52:36.540+02:00

2.2.2.7.4 Export Components

The export components:

- Store XCIs into the IEC database
- Send XCIs to SAP CC Core Server

→ Tip

See also the [Miscellaneous Components \[page 141\]](#) to export data to files or databases.

Related Information

[Export to Database Action \[page 135\]](#)

[Rating \[page 136\]](#)

[Acquisition \(by BART\) \[page 138\]](#)

[Acquisition \(by CC\) \[page 139\]](#)

2.2.2.7.4.1 BART Acquisition Session

This component allows you to start an acquisition session between an *IEC* application (see [What You Can Do with IEC \[page 63\]](#)) and the BART Server system, allowing BART (*) to acquire consumption detail records (CDRs) converted from extended chargeable items (XCIs) and processed by the IEC application (please refer to [Chargeable Item Creation Action \[page 128\]](#)).

(*) The import/export connector (*IEC*) converts an Extended Chargeable Item (XCI) to a CDR (Consumption Detail Record) that is managed in BART Server. For more information on BART, refer to [Help Resources \[page 66\]](#). In a scenario, the acquisition action must be preceded by an XCI creation (see the [Chargeable Item Creation Action \[page 128\]](#) component).

In a scenario, the [BART Acquisition Session](#) component requires the use of the [Acquisition \(by BART\) \[page 138\]](#) component for exporting the XCIs to BART Server.

i Note

- If an error occurs when launching the acquisition session, the acquisition session stops.
- If an error occurs when the acquisition is being finished, the session remains in progress. You must manually close the session by using the *BART Tool* user interface. An error will be logged.

❖ Example

These examples show how to use the components *BART Acquisition Session* and *Acquisition (by BART)* in three different scenarios:

Simple acquisition (one XCI)	File acquisition	Multi thread acquisition
To perform a simple acquisition: 1. Create a scenario 2. Add a <i>BART Acquisition Session</i> component 3. Add a <i>Chargeable Item Creation Action</i> [page 128] component 4. Add an <i>Acquisition (by BART)</i> [page 138] component 5. Launch the BART Server system 6. Open the <i>BART Tool</i> user interface 7. Run the scenario with a stand-alone <i>IEC</i> (<i>Executing a Scenario</i> [page 86]) or with a remote <i>IEC</i> (<i>Executing a Scenario</i> [page 88]) 8. Make sure that the session is created and the chargeable item is acquired by BART Server	To perform a file acquisition: 1. Create a scenario 2. Add a <i>File Spool Collector</i> [page 113] component 3. Add a <i>BART Acquisition Session</i> component 4. Add a <i>Fixed Size Line Set Extractor</i> [page 116] component 5. Add a <i>Chargeable Item Creation Action</i> [page 128] component 6. Add an <i>Acquisition (by BART)</i> [page 138] component 7. Launch BART Server 8. Open <i>BART Tool</i> 9. Run the <i>CAT</i> scenario 10. Make sure that the session is created and all the chargeable items are acquired by BART Server	To perform a multi thread acquisition: 1. Create a scenario 2. Add a <i>File Spool Collector</i> [page 113] component 3. Add a <i>BART Acquisition Session</i> component 4. Add a <i>Fixed Size Line Set Extractor</i> [page 116] component 5. Add a <i>Chargeable Item Creation Action</i> [page 128] component 6. Add a <i>Multi Threader</i> [page 152] component 7. Add an <i>Acquisition (by BART)</i> [page 138] component 8. Launch BART Server 9. Open <i>BART Tool</i> 10. Run the <i>CAT</i> scenario 11. Make sure that the session is created and all the chargeable items are acquired by BART Server

Setting up the component

Refer to [Setting Up a Component](#) [page 112]

Configuration tab

Output Session Key: Type the name of the acquisition session. This information is reused by any *Acquisition (by BART)* [page 138] component.

Acquisition Session: Select or type the necessary information for acquiring XCIs by BART Server:

- **Description:** Allows you to describe the session.
- **Source:** Is a descriptive string regarding the origin of data acquired during the session. Type a description, or select a source in the list. This information is not reused in the next components of the tree but can be reused by BART. For example, if you select a source in the list, the source name is turned into an access path to the resource key directory when the scenario is carried out.
- **Mode:** Provides the list of acquisition modes executed in BART Server. You must select one of the following modes in which BART will acquire the CDRs exported by IEC:
 - **Acquire:** BART acquires all XCIs without deduplicating them
 - **Acquire and DeDuplicate:** BART acquires all XCIs and deduplicates them; The IEC records the duplicates in logs (see filtered subfolder).
 - **Acquire and Reject Duplicate:** BART acquires all XCIs, deduplicates them and rejects the duplicates; The IEC records the duplicates in logs (see rejected subfolder).

Note

The list of **Source** is empty if no sources are available.

- **BART Configuration:** Allows you to describe the configuration for connecting an **IEC** application to SAP CC BART Server.
- **Server URL:** Type the Uniform Resource Locator (URL) of the machine that hosts BART Server by using the following format: <SCHEME>://<HOST_ADDRESS>:<HOST_PORT>/, where:
 - <SCHEME> is the communication protocol which must be used to send the converted CDRs (tcp, tcps, http, https, and so on)
 - <HOST_ADDRESS> is either the hostname or the IP address (IPv4 or IPv6) of the machine which hosts BART Server
 - <HOST_PORT> is the communication port number in the host which is used by BART Server to receive the converted CDRs

Report tab

A report can be created and saved for each acquisition session that is fully complete between IEC and BART. Select one of the following modes to create reports:

- **None:** No report is created and saved.
- **Default Report:** If selected, the default report creates a file for each acquisition session. The filename format is 'report_YYYYMMDDHHMMSS.txt', and the file format is described below (*). In **Folder**, type the path to the folder for saving files.
- **Specific Report:** A Java class can be implemented and plugged by your customer project team for creating a report designed according to your business needs:
 - **Class Name:** Type the Java class name to be executed. When executing a scenario, the Java class name must be in the classpath of the related connector.
 - **Properties:** Each row that you add to the table makes up a property that is used to initialize the fields of the Java class. Click  to add a new row to the table, or click  to remove a row from the table. For each row that you add to the table, type the property name (**Key**) and its **Value**.

Example

(*) Example of a default report:

- START DATE = 2008-12-20T16:20:49
- END DATE = 2008-12-20T16:22:07
- DURATION = 78 sec
- NB ITEMS = 478
- NB ACQUIRED = 468
- NB REJECTED = 10
- NB FILTERED = 0

2.2.2.7.4.2 Export to Database Action

This component allows you to configure the export of extended chargeable items (XCIs) to an IEC database. You use this component to:

- Test some business services by simulating an offline mediation system
- Implement basic offline charging services in your system landscape with low-volume data and low traffic

The function enables basic detection of duplicate items.

See also [Import XCI from Database Action \[page 114\]](#), [SQL Action 2 \[page 144\]](#).

Prerequisites

The system landscape must include the IEC database system. Refer to the SAP CC [Installation and Upgrade Guide](#) for more information about the preparation and installation of this particular database.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You set up information related to the IEC database system.

Database: Select or type the necessary information for exporting XCIs to the IEC database:

- **Database:** The following database systems are available: SAP HANA, Sybase ASE, Oracle, MS SQL Server, or IBM DB2. Select the database system type to which you want to export XCIs.

- **Host name:** Type the name of host machine on which the database system is installed. You can use both IPv4 and IPv6 addresses.
- **Host port:** Type the communication port number in the host machine that is dedicated to the database system.
- **Instance name:** Type the database name.
- **Log on:** Type the login to access to the database
- **Password:** Type the password to access to the database.
- **Driver pool size:** Type the pool size of the driver used to access to the database server.

Input XCI Key: Provides the list of XCI resources. Select an XCI resource that you want to export to the IEC database.

Duplicate Detection tab

On the **Duplicate Detection** tab, you select the criteria to avoid duplicating XCIs in the IEC database system. The equality rule specifies that an XCI matches another XCI if both XCIs are made up of the same properties and if the properties contain the same values. According to this rule, an XCI is not copied in the database if the same XCI is already stored in it.



: Clears all the selected properties.



: Selects all the properties.

You can however manually select or clear each property.

If **Enable Duplicate Detection** is selected, all the properties that make up an XCI are displayed. Click the properties that define the equality rule to avoid duplicating XCIs.

For example, you have created XCIs that are made up of the following properties:

- **Service Identifier**
- **User Identifier**
- **Consumption Date**

If you select **Service Identifier** and **User Identifier** in the table, this means that two XCIs are equal if the **Service Identifier** and **User Identifier** properties of each XCI contain the same values. If you select **Service Identifier**, **User Identifier** and **Consumption Date** in the table, two XCIs are equal if these three properties of each XCI contain the same values.

2.2.2.7.4.3 Rating

Using the **Message TCP technical interface**, this component allows you to send extended chargeable items (XCIs) to be rated and charged by SAP CC Core Server in batch mode.

i Note

- You need to add first a [File Spool Collector \[page 113\]](#) component or a [Log Action \[page 150\]](#) component in the scenario tree if you want that the import/export connector (*IEC*) manages logs for these batch charging operations.
- For compatibility reason, the name of this component remains "Rating".

You use this component in an offline charging and postpaid environment to test some batch charging operations by simulating an offline mediation system.

i Note

SAP SE recommends that you implement SAP CC BART Server or SAP Convergent Invoicing (SAP CI) in your system landscape to provide offline charging services.

See also [Multi Threader \[page 152\]](#)

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You define:

- The XCI resource to be charged in batch mode
- The relevant URL of the connected SAP CC Core Server system
- The transactions returned by the server system

Input XCI key: Provides the list of XCI resources. Select a resource to charge in batch mode.

i Note

The list *Input XCI key* is empty if no XCIs are available.

Server URL: Type the Uniform Resource Locator (URL) of the machines that hosts a dispatcher instance of the SAP CC Core Server system. This URL must respect the following syntax: <SCHEME>: //

<HOST_ADDRESS>:<HOST_PORT>/, <URL2>, where:

- <SCHEME> is the communication protocol which must be used (tcp or tcps)
- <HOST_ADDRESS> is either the DNS name or the IP address of the machine which hosts the master dispatcher instance; you can use both IPv4 and IPv6 addresses.
- <HOST_PORT> is the communication port which is used by the dispatcher to receive the batch charging operation requests (by default: 2000)

i Note

To manage the SAP CC system failover, you can fill the *Server URL* field with multiple values by using a comma separator. Every occurrence of this list is used to try to connect to the SAP CC Core Server system.

If the URL does not correspond to an existing dispatcher instance, another attempt is made with the next occurrence.

Connection With Credentials: Select this option if you want to establish an authenticated connection to the Message TCP technical interface of SAP CC. Only the machines (service users) are allowed to connect to the Message TCP technical interface (refer to the SAP CC [Security Guide](#)). If the service user does not exist, you must first create the service user in the database through Core Tool, which is the graphical user interface of SAP CC (refer to the [Primary Help of Core Tool \[page 356\]](#)).

Login: Type the login of the service user.

Password: Type the password of the service user.

Transaction Mode: Provides the list of transactions which are returned by the connected SAP CC system. The transactions can be retrieved through an XCI via a Java Action component provided by professional services (refer to the related documentation). If your Java Action does not require the transaction mode or if you have no Java Action in your scenario, select the default mode (No transactions) because the transaction mode can significantly decrease the system's performance. Otherwise, if your Java Action requires the transaction mode, select one of the following options:

- **No transactions:** The SAP CC system returns no transactions (default mode)
- **Master transactions only:** The server only returns the transactions relating to the master charges
- **All transactions:** The server returns all the transactions relating to the master and dependent charges
- **All transactions and recurring:** The server returns all the transactions relating to the master charges, the dependent charges, and the recurring fees

i Note

Make sure that the number of possible connections of an *IEC* application that executes a *Rating* component in your scenario is less than the maximum number of connections available in the SAP CC Core Server system. See the `BATCH_SERVICE_THREAD_COUNT` parameter for more information. For example, if a [Multi Threader \[page 152\]](#) component precedes a *Rating* component, you must check that the number of threads do not exceed the maximum number of possible connections.

2.2.2.7.4.4 Acquisition (by BART)

This component allows you to configure the conversion of XCIs to consumption detail records (CDRs) and to send them to the connected SAP CC BART Server system for further offline processing.

i Note

- When executing this component, the import/export connector (*IEC*) application will log an acquisition report ([Log Management \[page 84\]](#)) for each file being successfully processed (with acquisition errors or not).
- During the acquisition of CDRs, if BART Server finds an invalid CDR, it rejects the invalid CDR and all the CDRs (valid, invalid, or not yet processed) belonging to the same block.

Prerequisites

- In a scenario, you must add a [BART Acquisition Session \[page 132\]](#) component before inserting this *Acquisition (by BART)* component.
- To increase the performances, you must add a [Multi Threader \[page 152\]](#) component in the scenario tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

Input Session Key: Provides the list of sessions defined in previous *BART Acquisition Session* components. Select a session.

Input XCI Key: Provides the list of XCI keys defined in previous components such as the [Import XCI from Database Action \[page 114\]](#) or the [Chargeable Item Creation Action \[page 128\]](#). Select an XCI key.

Acquisition Mode: Allows you to define the number of XCIs to be acquired by the SAP CC BART Server system. The IEC application can export one XCI or several XCIs at a time ([What You Can Do with IEC \[page 63\]](#)). Select one of the two following options:

- *Acquire one XCI*: An XCI at a time is exported to BART Server
- *Acquire Multiple XCI*: XCIs are exported to BART Server when the number of XCIs in the queue is reached or when the timeout expires
 - *Number of XCIs*: Type the number of XCIs to be acquired by BART Server.
 - *Timeout (ms)*: Type the number of milliseconds after which the XCIs are exported to BART Server even if the number of XCIs in the queue is still not reached. If you type the value of 0, XCIs are exported one by one.

Source: Allows you to define the origin of data acquired by the SAP CC BART Server system. You can type a string, or select one of the following options:

- *None*: No source is used
- *Same as Session*: The source is the same as that described in the *BART Acquisition Session* component
- *Other*: Select a string property in the list

2.2.2.7.4.5 Acquisition (by CC)

This component allows you to configure the transfer of XCIs and send them through the Message TCP technical interface to the connected SAP CC Core Server system for further offline processing. Each XCI is previously converted to a chargeable item (CI). SAP CC Core Server system processes the chargeable items and stores them in temporary files. You use this component in an offline charging environment with the deferred charging feature:

- To test deferred charging operations by simulating an offline mediation system
- To implement the batch acquisition function in a production system landscape with low volume of data and low throughput

i Note

You need to add first a [File Spool Collector \[page 113\]](#) component or a [Log Action \[page 150\]](#) component in the scenario tree if you want that the import/export connector (IEC) manages logs for this batch acquisition of chargeable items.

In an SAP solution scenario with SAP Convergent Invoicing (SAP CI) in SAP ERP/FI-CA, the SAP CC system converts and posts the items to SAP CI.

i Note

The *IEC* application groups and exports sets of XCIs provided by the input XCI key to the SAP CC Core Server system. The acquisition of each set by the SAP CC Core Server system is defined by a specified number of XCIs and for a specified period. For each set, SAP CC Core Server acquires XCIs as long as the period or the number of XCIs is not reached.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

Input XCI Key: Provides the list of XCI keys defined in previous components such as the [Import XCI from Database Action \[page 114\]](#) or the [Chargeable Item Creation Action \[page 128\]](#). Select an XCI key.

Server URL: Type the main public address to connect to the distant SAP CC Core Server system via the Message TCP technical interface. This Uniform Resource Locator (URL) applies to host machine of the master dispatcher instance of the SAP CC system. You can use DNS, IPv4, or IPv6 addresses. The URL must include the relevant communication port number. Type the URL address using the following syntax:

```
tcp://<DNS_NAME_OR_IPV4_OR_IPV6>:<PORT_NB>
```

```
tcps://<DNS_NAME_OR_IPV4_OR_IPV6>:<PORT_NB>
```

i Note

The former format is deprecated. You must precise the protocol scheme (tcp or tcps). Check out your existing scenarios and test the changes.

Example

In a development system landscape where the *IEC* application and the SAP CC Core Server system are both installed on your local personal computer, you set up the value:

```
tcp://localhost:2000
```

In a production system landscape with secured communications, you set up the value:

```
tcps://myhostname.mycompany.corp:2000
```

Connection With Credentials: Select this option if you want to establish an authenticated connection to the Message TCP technical interface of SAP CC. Only the machines (service users) are allowed to connect to the Message TCP technical interface (refer to the SAP CC [Security Guide](#)). If the service user does not exist, you must first create the service user in the database through Core Tool, which is the graphical user interface of SAP CC (refer to SAP CC [Primary Help of Core Tool \[page 356\]](#)).

Login: Type the login of the service user.

Password: Type the password of the service user.

Acquisition of XCLs: Allows you to define the number of XCLs for each set and the time for its acquisition:

- **Number of XCLs:** Type the number of XCLs for a set
- **Period (in ms):** Type the number of milliseconds to acquire a set of XCLs by the SAP Core Server system

2.2.2.7.5 Miscellaneous Components

The miscellaneous components:

- Process different input resources (database, connected Core Server)
- Process different output streams (database, CSV file, XML file, connected Core Server)
- Customize the processing with an external Java class: [Java Action \[page 146\]](#)
- Display data collections ([Console Action \[page 148\]](#)) on screen
- Increase performances by decreasing the data processing time: [Multi Threader \[page 152\]](#)

Related Information

[SQL Action \[page 142\]](#)

[SQL Action 2 \[page 144\]](#)

[Java Action \[page 146\]](#)

[Console Action \[page 148\]](#)

[XML File Export Action \[page 148\]](#)

[Log Action \[page 150\]](#)

[Multi Threader \[page 152\]](#)

[XML API Request \[page 152\]](#)

[Property File Writer Action \[page 153\]](#)

2.2.2.7.5.1 SQL Action

This component allows you to perform tasks relating to the SAP CC database through SQL statements. You can:

- Retrieve data
- Update data
- Delete data
- Do other tasks

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

This tab includes a text area and a table: *SQL Request* and *Parameters*. Before executing a statement, the Java Action parses the SQL statement that you type in *SQL Request*. In a WHERE clause, the Java Action replaces each '?' by the value of successive properties that you have selected in *Parameters*. The number of '?' in *SQL Request* must match the number of properties of the *Parameters* table.

i Note

In a WHERE clause, the '?' replaces the value that you usually type after an operator such as '=', '>', '<>', 'LIKE' and other operators. Instead of typing `SELECT * FROM Persons WHERE year > 1965`, you type `SELECT * FROM Persons WHERE ? > ?`.

For example, you want to make the following search: `SELECT * FROM Persons WHERE FirstName='John' AND LastName='Smith'`. In *SQL Request*, you first type `SELECT * FROM Persons WHERE FirstName=? AND LastName=?`. In *Parameters*, you add two lines and choose two properties whose values are respectively John and Smith. The Java Action will therefore execute the SELECT statement with the values 'John' and 'Smith'.

SQL Request: Type a SQL statement to query the database by using '?' in a WHERE clause. For example, if you want to execute `SELECT * FROM Persons WHERE year > 1965`, type `SELECT * FROM Persons WHERE ? > ?`. The Java Action will replace the first '?' by the value of the first property of the *Parameters* table, and then will replace the second '?' by the value of the second property of the *Parameters* table.



: Adds a new row to the table.



: Removes a row from the table.

Parameters: Provides the list of properties created by the previous components of the tree. For each '?' that you type in *SQL Request*, you must add a new row to the table, and then choose a property. For example, if you want to execute `SELECT * FROM Persons WHERE year > 1965`, you must type `SELECT * FROM Persons WHERE ?`

> ? in [SQL Request](#), and then you must add two rows to the Parameters table. In the first row, you choose a property with 'year' as its value, in the second row you choose a property with '1965' as its value.

The result is a result set: The result from a SQL query is stored in a result set. Select this box if the [SQL Request](#) contains a SELECT statement. For the other statements, do not select this box because the expected result is a number.

Output Value Name: Type the name of the result set returned by the SQL Request.

Database tab

You define the database environment of the SAP CC system that you want to query.

URI JDBC: Type the address to access to the database. You can use both IPv4 and IPv6 addresses.

Log on: Type the login to access to the database.

Password: Type the password to access to the database.

Number of Connections: Type the number of connections used to access to the database.

Mapping tab

The [Mapping Rules](#) allow you to make up a property set from a result set. For example, you have retrieved a result set from the database, and you want to create a new property set by retrieving data from this result set:

LastName	FirstName	City	Country
Hansen	Ola	Oslo	Norway
Albertini	Remo	Roma	Italy
Dupont	Jean	Paris	France
Smith	John	London	UK

All result sets obey the following rule: Each datum in a result set is numbered sequentially (from 0 to n-1), from left to right, row by row, as illustrated in the table below:

LastName	FirstName	City	Country
0	1	2	3
Hansen	Ola	Oslo	Norway
0	1	2	3
Albertini	Remo	Roma	Italy
0	1	2	3
Dupont	Jean	Paris	France

LastName	FirstName	City	Country
0	1	2	3
Smith	John	London	UK

Therefore, once you have added a line in *Mapping Rules*, you type the *Position* of the datum that you want to retrieve from the result set, and then you type the *Name* of the property that will contain this datum. All the retrieved data will make a new data collection usable for the next components of the tree.



: Adds a new row to the table.



: Removes a row from the table.

Mapping Rules: Add a row to the table for each property that you want to create. Type the *Position* of the datum in the result set, and then type the *Name* of the property that will contain the retrieved data.

Optional: If this option is not selected, an error is generated if the SQL Action does not find a line or position that matches the *Value*. If this option is selected, no error is generated whatever the search result.

2.2.2.7.5.2 SQL Action 2

This component allows you to perform tasks relating to the SAP CC database through SQL statements. You can:

- Retrieve data
- Update data
- Delete data
- Do other tasks

The database can be the Core Database of SAP CC or another database in the system landscape:

- Customer Database: A database containing information on end customers
- BART Database: The back-end database of SAP CC BART Server

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

This tab includes a text area and a table: *SQL Request* and *Parameters*. Before executing a statement, the Java Action parses the SQL statement that you type in *SQL Request*. In a WHERE clause, the Java Action replaces each '?' by the value of successive properties that you have selected in *Parameters*. The number of '?' in *SQL Request* must match the number of properties of the *Parameters* table.

Note

In a WHERE clause, the '?' replaces the value that you usually type after an operator such as '=', '>', '<>', 'LIKE' and other operators. Instead of typing `SELECT * FROM Persons WHERE year > 1965`, you type `SELECT * FROM Persons WHERE ? > ?`.

For example, you want to make the following search: `SELECT * FROM Persons WHERE FirstName='John' AND LastName='Smith'`. In SQL Request, you first type `SELECT * FROM Persons WHERE FirstName=? AND LastName=?`. In *Parameters*, you add two lines and choose two properties, the values of which are respectively John and Smith. The Java Action will therefore execute the SELECT statement with the values 'John' and 'Smith'.

SQL Request: Type a SQL statement to query the database by using '?' in a WHERE clause. For example, if you want to execute `SELECT * FROM Persons WHERE year > 1965`, type `SELECT * FROM Persons WHERE ? > ?`. The Java Action will replace the first '?' by the value of the first property of the *Parameters* table, and then will replace the second '?' by the value of the second property of the *Parameters* table.



: Adds a new row to the table.



: Removes a row from the table.

Parameters: Provides the list of properties created by the previous components of the tree. For each '?' that you type in *SQL Request*, you must add a new row to the table, and then choose a property. For example, if you want to execute `SELECT * FROM Persons WHERE year > 1965`, you must type `SELECT * FROM Persons WHERE ? > ?` in *SQL Request*, and then you must add two rows to the *Parameters* table. In the first row, you choose a property with 'year' as its value, in the second row you choose a property with '1965' as its value.

The result is a result set: The result from a SQL query is stored in a result set. Select this box if the SQL Request contains a SELECT statement. For the other statements, do not select this box because the expected result is a number.

Output Value Name: Type the name of the result set returned by the SQL Request.

Database tab

You define the database environment that you want to query.

JDBC Driver class: Type the class used to access to the database. For more information, visit the following website: [Java SE - Database](#).

Database URL: Type the address to access to the database system. You can use both IPv4 and IPv6 addresses. For more information, visit the following website: [Java SE - Database](#).

Log on: Type the logon to access to the database.

Password: Type the password to access to the database.

Number of Connections: Type the number of connections used to access to the database.

Mapping tab

The [Mapping Rules](#) allow you to make up a property set from a result set. For example, you have retrieved a result set from the database, and you want to create a new property set by retrieving data from this result set:

LastName	FirstName	City	Country
Hansen	Ola	Oslo	Norway
Albertini	Remo	Roma	Italy
Dupont	Jean	Paris	France
Smith	John	London	UK

All result sets obey the following rule: Each datum in a result set is numbered sequentially (from 0 to n-1), from left to right, row by row, as illustrated in the table below:

LastName	FirstName	City	Country
0	1	2	3
Hansen	Ola	Oslo	Norway
0	1	2	3
Albertini	Remo	Roma	Italy
0	1	2	3
Dupont	Jean	Paris	France
0	1	2	3
Smith	John	London	UK

Therefore, once you have added a line in [Mapping Rules](#), you type the [Position](#) of the datum that you want to retrieve from the result set, and then you type the [Name](#) of the property that will contain this datum. All the retrieved data will make a new data collection usable for the next components of the tree.



: Adds a new row to the table.



: Removes a row from the table.

[Mapping Rules](#): Add a row to the table for each property that you want to create. Type the [Position](#) of the datum in the result set, and then type the [Name](#) of the property that will contain the retrieved data.

[Optional](#): If this option is not selected, an error is generated if the SQL Action does not find a line or position that matches the [Value](#). If this option is selected, no error is generated whatever the search result.

2.2.2.7.5.3 Java Action

This component allows you to execute a Java class by an [IEC](#) application. The [Java Action](#) component processes the input stream sent by the previous component of the scenario tree.

This component allows you to execute customized tasks that are adapted to your specific business requirements. For example, if you want to save some properties in a specific format, you develop a Java class to perform this task. You can then execute this Java class through the *Java Action* component.

i Note

A Java class is implemented and developed by professional services that provide also the documentation to use, install, and administer the Java class.

Prerequisites

Make sure that the *IEC* application can access to the Java classes which are used by the *Java Action* component configured in the scenario. For more information, refer to [Help Resources \[page 66\]](#).

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

You define the environment to execute a Java class.

Java Class Name: Type the Java class name to be executed the IEC application.



: Adds a new row to the table.



: Removes a row from the table.

Module Properties: Each row that you add to the table makes up a property used to initialize the fields of the Java class. For each row added to the table, type the property name (*Key*) and its *Value*.

Module Context Properties: Each row that you add to the table makes up an expected property which is returned by the Java class. For each row added to the table, type the property *Name* and its *Type* (number, string, and so on). These properties will make up a new data collection usable by the next components of the tree.

i Note

In *Module context properties*, you can choose one of the following types:

- *String*
- *Date*
- *Number*
- *Resource* (file or URL)

- [Other](#)

2.2.2.7.5.4 Console Action

This component allows you to display on console screen all the data collections that are collected or created by the previous components of the scenario tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition

All the data collections that are created by the previous components ([Import Components \[page 112\]](#), [Modifier Components \[page 115\]](#), [Miscellaneous Components \[page 141\]](#)) are displayed on the console screen of the running IEC application.

Related Information

[Connectors \[page 82\]](#)

2.2.2.7.5.5 XML File Export Action

This component allows you to save to a file all the XML data collections that are collected or created by the previous components of the scenario tree.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

You save to a file all the XML data collections that are collected or created by the previous components of the scenario tree:

- [Import Components \[page 112\]](#)
- [Modifier Components \[page 115\]](#)
- [Miscellaneous Components \[page 141\]](#)



: Open the [Open](#) dialog box to save XML data collections in a directory.

File Name: Type the name of the file where you want to save all the XML data collections (*). Open the [Open](#) dialog box, and then save your XML data collections in a directory.

(*) The XML Schema Description (XSD) of the contents of the saved file is the following:

Output Code

```
<?xml version="1.0"?>
  <xs:schema xmlns:xs="http://www.w3.org/2001/
XMLSchema">
    <xs:element name="iecreports">
      <xs:complexType>
        <xs:choice>
          <xs:element name="datacollection"
type="datacollection" maxOccurs="unbounded"/>
          <xs:element name="xci" type="xci"
maxOccurs="unbounded"/>
        </xs:choice>
      </xs:complexType>
    </xs:element>
    <xs:complexType name="datacollection">
      <xs:choice>
        <xs:element name="dcproperty"
type="dcproperty" maxOccurs="unbounded"/>
        </xs:choice>
        <xs:attribute name="uid" type="xs:string"/>
        <xs:attribute name="reusable"
type="xs:boolean" default="false"/>
      </xs:complexType>
      <xs:complexType name="dcproperty">
        <xs:sequence>
          <xs:element name="value" type="value"
minOccurs="0" maxOccurs="1"/>
        </xs:sequence>
        <xs:attribute name="name" type="xs:string"
use="required"/>
        <xs:attribute name="value" type="xs:string"
use="optional"/>
      </xs:complexType>
      <xs:complexType name="value">
        <xs:sequence>
          <xs:element name="anyTransactiveType"
type="anyTransactiveType" minOccurs="1" maxOccurs="1"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="xci">
        <xs:choice>
          <xs:element name="ci" type="ci"
minOccurs="0" maxOccurs="1"/>
          <xs:element name="order" type="order"
minOccurs="0" maxOccurs="1"/>
        </xs:choice>
```

```

type="xs:string"/>
type="xs:string"/>
type="xs:dateTime"/>
type="xs:dateTime"/>
type="xs:string"/>
</xs:complexType>
<!-- Refer to the SAP CC Java/XML API References
of com.highdeal.pnr.hci.ChargeableItem -->
<xs:complexType name="ci"/>
<!-- Refer to the SAP CC Java/XML API References
of com.highdeal.pnr.hci.PurchaseOrder -->
<xs:complexType name="order"/>
<!--All objects implementing the XMLMarshallable
interface of Transactive -->
<xs:complexType name="anyTransactiveType"/>
</xs:schema>

```

Encoding tab

This tab allows you to encode every file written by this *XML File Export action*.

Output File Encoding: Provides the list of encoding formats compliant with a Java Virtual Machine. Select an encoding format or select *Default* (UTF-8).

2.2.2.7.5.6 Log Action

This component allows you to log the data collections that are rejected, accepted, or filtered in a scenario. In the scenario tree, this *Log Action* component must be inserted before the component generating the log files that you want to save in the log directory (see [Log Management \[page 84\]](#)).

→ Remember

The *File Spool Collector [page 113]* component has its own logging function; therefore, do not add a *Log Action* component to a scenario tree that already contains a *File Spool Collector* component.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Definition tab

To log the data collections, you can use either the default logger or a specific logger.

In files with the default logger: Click to use the default logger. If you select the default logger, the *IEC* application creates three log files:

- A file containing the data collections which are rejected by an action. For example, a data collection is rejected because a data is missing.
- A file containing the data collections which are filtered by an action. For example, a data collection is filtered because it is not usable.
- A file containing the data collections which are accepted by the scenario.

Log files are stored in the *logs* directory and named depending on the following format:

- `log_YYYY-MM-ddTHHmmss.rejected`: Contains the rejected data collection. Example:
`log_2004-04-09T162930.rejected`.
- `log_YYYY-MM-ddTHHmmss.filtered`: Contains the filtered data collection. Example:
`log_2004-08-11T162500.filtered`.
- `log_YYYY-MM-ddTHHmmss.accepted`: Contains the accepted data collection. Example:
`log_2004-04-10T162758.accepted`.

Where:

- `log`: Constant
- `YYYY`: Year
- `MM`: Month
- `dd`: Day
- `T`: Constant
- `HHmmss`: Current time in which HH is the hour of the current day based on a 24-hour day, mm is the minute of the current day, ss is the second of the current day.

With a specific logger: Click to use a specific logger, and then fill in *Logger Classname*.

Logger Class Name: Allows you to type the name of the class implementing the *UserLogger* interface that must be in the classpath. The *UserLogger* interface informs the user through five events:

- `Init`: Is invoked to initialize the *UserLogger* at the time of its creation.
- `Close`: Is invoked when the execution of the *UserLogger* is complete.
- `Terminated`: Is invoked by an action (its id is the `actionUid` parameter) when the execution of the data collection is complete and successful.
- `Rejected`: Is invoked by an action (its id is the `actionUid` parameter) when the execution of the data collection is complete but failed. Two parameters give more details about the failure: The reason code and the array of parameters related to the reason code.
- `Filtered`: Is invoked by an action (its id is the `actionUid` parameter) when the execution of the data collection is complete and filtered.

For more information about how to use a specific logger, refer to [Help Resources \[page 66\]](#).

Encoding tab

This tab allows you to encode every file written by the [Log Action](#).

[Output File Encoding](#): Provides the list of encoding formats compliant with a Java Virtual Machine. Select an encoding format or select [Default](#) (UTF-8).

2.2.2.7.5.7 Multi Threader

This component runs as a system of parallel processing to decrease the data processing time.

When the [Multi Threader](#) component is inserted in a scenario tree, the [IEC](#) application will execute in parallel the next component configured in the scenario tree depending on the number of threads that you have chosen. You can therefore process many data collections at a time.

❖ Example

You can set up a [Multi Threader](#) component before the [Acquisition \(by BART\)](#) [page 138] component, the [Acquisition \(by CC\)](#) [page 139] component, or the [Rating](#) [page 136] component.

Setting up the component

Refer to [Setting Up a Component](#) [page 112]

Multi Threader

To improve the data processing time, you provide the number of threads depending on your application. Determining the correct number of threads is empirical. You must try many values before correctly adjusting your [Multi Threader](#) component.

[Number of Threads](#): Type the appropriate number of threads to execute your scenario in a running [IEC](#) application.

2.2.2.7.5.8 XML API Request

This component asks the running [IEC](#) application to send an XML stream to the connected SAP CC Core Server system by using the [HTTP Communication Interface \(HCI\)](#), technical interface based on a proprietary XML/ HTTP protocol. After the process is complete, the SAP CC system sends an XML response back to the [IEC](#).

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

Configuration tab

To retrieve information from the database through SAP CC Core Server, you define:

- The XML file to send to the server
- The URL address using an HTTP connection
- The XML file name that is used for the server response

XML Input Stream: Provides the list of XML resources. Select a resource.

i Note

The list *XML Input Stream* is empty if there are no XML resources available or if the XML resources are already used by a previous component of the tree.

Server URL: Type the URL address using an HTTP connection (for example, <http://localhost:9000/>). You can use both IPv4 and IPv6 addresses.

XML Output Stream: Type the name of the XML result stream that is sent back by the SAP CC Core Server system.

2.2.2.7.5.9 Property File Writer Action

This component allows you to write a property or resource values into an output file. Data are written into the output file according to the CSV format.

Each time this component processes the data collection, it executes the main following:

1. Extract the property or resource values from the data collection.
2. Write these values into a line by adding specific character strings (line beginning, value separator, and line end).
3. Write this line into an output file.

Setting up the component

Refer to [Setting Up a Component \[page 112\]](#)

A few examples and notes

To correctly fill in these tabs, do the following:

- Choose the properties or resources to write into the output file (*Properties* tab).
- Define *Begin*, *Separator* and *End* (*General* tab).
- Define the output filename and the writing mode (*General* tab).

Begin, *End* and *Separator* defines the character strings that are used to separate the values in a line.

❖ Example

Example of a line to be written into an output file: *Begin* + value1 + *Separator* + value2 + *Separator* + value3 + *End*

where:

- *Begin* = "start"
- *Separator* = "/"
- *End* = "stop"
- value1 = "Paris"
- value2 = "Tokyo"
- value3 = "Madrid"

❖ Example

Another example of a line with no *Separator* because there is one single value: *Begin* + value1 + *End*

where:

- *Begin* = "[["
- *End* = "]]"
- value1 = "Tokyo"

❖ Example

Another example of a line with a file as a resource value: *Begin* + "Paris London Madrid New-York" + *End*

where:

- *Begin* = "[["
- *End* = "]]"

i Note

If the resource value is a file, the value of the file is a character string. Example of a file value: "Paris London Madrid New-York".

❖ Example

If the data collection contains property values and resource values, the line that is written into the output file can contain the following, for example:

Begin + value1 + *Separator* + value2 + *Separator* + filevalue1 + *End*

where:

- *Begin* = "start"
- *Separator* = "/"
- *End* = "stop"
- value1 = "Roma"
- value2 = "Tokyo"
- filevalue1 = "Paris London Madrid New-York"

Prefix and *Suffix* define the naming rules for the output file. These rules depend on the *Writing mode*:

- *Sequential Files*: Filename = *Prefix* + sequence number + *Suffix*
- *Rewrite*: Filename = *Prefix* + *Suffix*
- *Append*: Filename = *Prefix* + *Suffix*

Note

- The sequence number is incremented each time a data collection is processed
- If *Prefix* and *Suffix* are empty, the default filename will be `result.log`

❖ Example

If *Prefix* = File, *Suffix* = .tmp, sequence number = 1. Depending on the *Writing mode*, the result is:

- *Sequential Files*: Output filename = File1.tmp
- *Rewrite*: Output filename = File.tmp
- *Append*: Output filename = File.tmp

❖ Example

Another example: If *Prefix* = "", *Suffix* = "", sequence number = 12. Depending on the *Writing mode*, the result is:

- *Sequential Files*: Output filename = result12.log
- *Rewrite*: Output filename = result.log
- *Append*: Output filename = result.log

General tab

You fill in the parameters to write the property or resource values into an output file.

Output Folder: Is the folder path where the output files are stored. Type a path.

Prefix: Is the first part of a filename. Type a string.

Suffix: Is the last part of a filename. Type a string.

Begin: Is the first character string that is inserted into a line. Type a character string.

End: Is the last character string that is inserted into a line. Type a character string.

Separator: Is the character string that is inserted between two values in a line. Type a character string.

Writing mode: Defines the mode in which lines are written into the output file. For each data collection that are processed by this *Property File Writer action*, if you select:

- *Sequential Files*: The lines are written into a different output file
- *Rewrite*: The lines overwrite the same output file
- *Append*: The lines are written at the end of the same output file

Property tab

This tab allows you to choose the property or resource values that you want to write into an output file.



: Adds a new row to the table.



: Removes a row from the table.

Properties: Provides the list of properties or resources. For each row that you add to the table, select a property or resource that you want to write into an output file.

Encoding tab

This tab allows you to encode every file written by this *Property File Writer action*.

Output File Encoding: Provides the list of encoding formats compliant with a Java Virtual Machine. Select an encoding format or select *Default* (UTF-8).

2.2.3 Troubleshooting

Enabling the Traces for Troubleshooting

For troubleshooting purposes, SAP SE recommends that you temporarily enable the logging and tracing functions in the graphical user interface.

For more information, refer to the related topic in the SAP CC [Operations Guide](#).

Related Information

[Help Resources \[page 66\]](#)

2.3 Cockpit

Cockpit is an intuitive web application and a central tool that enables the SAP CC administrators and pricing specialists to manage the SAP Convergent Charging 5.0 systems and data quickly and efficiently.

[What's New in Cockpit? \[page 157\]](#)

[Getting Started \[page 161\]](#)

[Tasks with Cockpit \[page 170\]](#)

[Cockpit Apps \[page 176\]](#)

[FAQs and Tips About Cockpit \[page 339\]](#)

[Troubleshooting with Cockpit \[page 342\]](#)

2.3.1 What's New in Cockpit?

This section highlights the main changes in this *SAP Product Document and User Assistance Deliverable*. They relate both to **new or changed features** in the SAP Convergent Charging 5.0 software and to **documentation enhancements** for enriching your SAP user experience continuously. **Cockpit** is a web application that enables the SAP CC administrators and pricing specialists to manage the SAP Convergent Charging systems and data quickly and efficiently.

What's New in SP 6

As of SP 6 for release 5.0, the **Cockpit** launchpad provides you with the following enhancements for a better SAP user experience:

- Appearance: A **new high-contrast theme** *SAP Belize High Contrast White* is available for light sensitive situations. It is a *black-on-white* scheme that displays black texts on a white background. It helps users to see more details. See [Themes \[page 166\]](#) and [High-Contrast Themes \[page 169\]](#).
- Tools: In the apps for pricing specialists, three buttons facilitate the sorting, filtering, and grouping actions with the search result lists: $\updownarrow$, ∇ , and $\equiv$.
- Your app tiles are now reorganized in new predefined categories, according to your role: *Pricing Data Structures*, *Pricing Definition*, *Pricing Administration*, *System Information*, and *System Configuration*.

As of SP 6, Convergent Charging Cockpit provides you with some new apps and features:

Domain	App in Cockpit	Change Details
Pricing Data Structure	Manage Chargeable Item Classes	What's New? [page 220]
	Manage Charged Item Classes (new app)	What's New? [page 229]

Domain	App in Cockpit	Change Details
	Manage Mapping Table Classes	What's New? [page 246]
	Manage Range Table Classes	What's New? [page 282]
Pricing Definition	Manage Mapping Tables	What's New? [page 269]
	Manage Range Tables	What's New? [page 297]
Pricing Administration	Process a Chargeable Item (new app)	What's New? [page 331]

What's New in SP 5

As of SP 5 for release 5.0, each *Manage* catalog objects app of Convergent Charging Cockpit keeps unsaved changes after a user session expiration or user sign out while an editing activity.

As of SP 5, the **Cockpit** launchpad provides you with the following enhancements for a better SAP user experience:

- A **new theme** *SAP Quartz Light* (aka Fiori 3) as a [default theme \[page 166\]](#) for the SAP CC 5.0 Cockpit launchpad. The new quartz theme is lighter and more neutral, to blend more into the background, giving application content the center stage. It is simple and minimalist.
- A **new header bar** (aka "shell bar") changes the order and placement of elements such as the user's image that moves to the right. Instead of having a dedicated home button, users can navigate to the home page by clicking on the SAP logo. The notification icon button becomes a bell and counts the unread messages.
- A **new representation** for the *Me* area and the *Notification* area. They are no longer part of an animated panel on the left and right of the screen. Instead, they appear as overlays of the currently visible screen whenever the respective icon in the new header bar is clicked on.

As of SP 5, Convergent Charging Cockpit provides you with some new apps and features:

Domain	App in Cockpit	Change Details
Service Pricing Configuration	Manage Chargeable Item Classes (new app)	What's New? [page 220]
	Manage Mapping Table Classes	What's New? [page 246]
	Manage Mapping Tables	What's New? [page 269]
	Manage Range Table Classes (new app)	What's New? [page 282]
	Manage Range Tables (new app)	What's New? [page 297]
System Administration	Display User Operations	What's New? [page 211]

What's New in SP 4

As of SP 4 for release 5.0, Convergent Charging Cockpit provides you with some new features:

Domain	App in Cockpit	Change Details
Service Pricing Configuration	Manage Mapping Table Classes	What's New? [page 246]
	Manage Mapping Tables	What's New? [page 269]
System Administration	Display System Status	What's New? [page 186]

Your [Primary Help](#) migrates to a new content management system. You can benefit from:

- Rich navigation between the other SAP product documents and user assistance deliverables
- PDF deliveries for offline consultation
- Powerful search and indexing tools
- Feedbacks and live comments

What's New in SP 3

As of SP 3, SAP CC Cockpit provides you with some new features (see SAP Note [2632128](#)):

- Convergent Charging Cockpit is also dedicated to SAP CC users who need to set up some pricing elements in a catalog. The web application supports the business role Pricing Specialist (Convergent Charging). SAP CC Cockpit provides some new tools for the pricing configuration of the end-customer services before bringing them to the market.
- In the Cockpit launchpad, your app tiles ([Cockpit Apps \[page 176\]](#)) are organized by predefined categories: [Pricing Configuration](#), [System Configuration](#), [System Information](#), and [Help](#).
- To facilitate the data configuration for the business data tables (mapping tables in pricing catalogs, subscriber mapping tables for subscribers accounts and provider contracts), **two new apps** are available in your Cockpit launchpad:

Manage Mapping Table Classes

As of SP 3, **Manage Mapping Table Classes** is a new app in the SAP CC Cockpit application that enables the Pricing Specialist (Convergent Charging) to create and maintain some mapping table classes in the pricing catalog for a service provider company that want to monetize its marketable end-customer services.

You configure these data templates to define the multicolumn structure and key characteristics for some sets of mapping tables or subscriber mapping tables.

Manage Mapping Tables

As of SP 3, **Manage Mapping Tables** is a new app in the SAP CC Cockpit application that enables the SAP CC pricing specialists to create and maintain some mapping tables in the pricing catalog for a service provider company that want to monetize its marketable end-customer services.

You configure these data tables and the associated pricing logic (reusable charges, pricing macros) to model multicurrency and multidimensional pricing.

What's New in SP 2

Display System Status

As of SP 2, SAP CC Cockpit provides you with a new app for verifying the overall status and availability of an SAP CC Core Server system quickly and efficiently.

Display System Status is a new app in the SAP CC Cockpit application that enables the SAP CC administrators and operations team to always have a clear view of the system status and availability.

You view and inspect the system instances quickly and efficiently. You ensure that the instances are up and running or restarting smoothly after a system and software maintenance.

Display User Operations

As of SP 2, SAP CC Cockpit provides you with a new app for searching and displaying audit records of user operations.

As of SP 2, **Display User Operations** is a new app in the SAP CC Cockpit application that enables the SAP CC administrators to view the audit records of user operations and the related object changes.

What's New in SP 1

Cockpit Enhancement

A new app named **Analyze Item Files** is available in the SAP CC Cockpit application. This app enables the SAP CC administrators and operations team to monitor the high-volume item files generated by the SAP CC Core Server systems.

You can use the app Analyze Item Files to visualize and analyze the metadata related to the item files (also known as output data files in the SAP documentation) that result from the business operations (charging, refilling, activation).

What's New in SP 0

Convergent Charging Cockpit

Convergent Charging Cockpit is your new Web application to administer the SAP CC systems in your landscape. It is based on SAP Fiori, the new user experience (UX) for SAP software that applies modern design principles. In your Internet browser, Convergent Charging Cockpit becomes your favorite access point to manage the SAP CC system parameters.

The first version of Convergent Charging Cockpit includes a tool that allows you to inspect and configure all the system parameters.

Related Information

[What's New in Support Package 6](#)

2.3.2 Getting Started

Getting Started with the User Interface

If this is your first time using the SAP CC Cockpit user interface, get started by working through this topic to familiarize yourself with the application. Then, you can use the web-based user interface to perform your daily tasks quickly and easily.

Cockpit is the new web-based user interface of SAP Convergent Charging 5.0. It is a modern Launchpad application that allows you to manage local or remote instances of a running SAP CC Core Server systems and data.

It is a role-based and personalized work center for SAP Convergent Charging for pricing specialists, system administrators, and support specialists.

Cockpit is based on SAP Fiori, the new user experience (UX) for SAP software that applies modern design principles. The Cockpit web application and its apps are built using the SAPUI5 powerful user interface (UX) technology and OData Services. It benefits from easy-to-use interfaces and apps, role-based navigation, and intelligent user guidance. It simplifies and emphasizes your day-to-day work and tasks. You increase your productivity by doing more work in less time.

[Target Audience \[page 161\]](#)

[Application Highlights \[page 162\]](#)

[Technical Requirements \[page 163\]](#)

[Authorizations \[page 163\]](#)

[Notes on SAP CC Implementation \[page 164\]](#)

[Explore the Workspace for Convergent Charging Cockpit \[page 165\]](#)

2.3.2.1 Target Audience

Convergent Charging Cockpit is a **central tool** with role-based apps. It is intended for both *business configuration* of master data (pricing settings) and some *system administration*.

The primary target audiences are the pricing specialists and the system administrators for SAP Convergent Charging. Note that the user interface is also available for the support specialists who can view and audit the systems and data:

Business Configuration (Pricing Settings)	System Administration (Monitoring, Configuration, Audit, Technical Operations)	Technical Support (Inspection)
• Pricing Specialist (Convergent Charging) • IT Consultant • Power User • Project Team Member (Implementation, Integration)	• IT Administrator • Operations Team Expert	• Support Specialist (SAP SE, Local Support Team)

→ Tip

On the launchpad, app visibilities and capabilities depend on your granted role and associated authorizations.

Related Information

[Authorizations \[page 163\]](#)

2.3.2.2 Application Highlights

Refer to the regular or exceptional [Tasks with Cockpit \[page 170\]](#) that you can perform with your Cockpit application.

→ Tip

An Pricing Specialist (Convergent Charging) is a typical individual user of SAP Convergent Charging 5.0 who is responsible for designing and configuring the end-customer service pricing.

As an Pricing Specialist (Convergent Charging), you complete the following tasks:

- Translate the pricing requirements in collaboration with the marketing team
- Design charge plans in collaboration with an *SAP CC pricing manager*
- Cooperate with the application administrator for SAP CC to ask for some system configuration:
 - System settings for implemented business features (charging, precision, tax)
 - Business and custom data such as currencies, value added taxes (VAT)⁶
- Configure and maintain the pricing logic based on charge plans and pricing data tables
- Test and debug charge plans and tables
- Notify other stakeholders when charge plans are ready for validation
- Investigate and fix charge plan and table issues

⁶ Value Added Tax

2.3.2.3 Technical Requirements

Supported Browsers

The front-end application of the Cockpit user interface for SAP Convergent Charging supports the following web browsers:

- Microsoft Edge
- Microsoft Internet Explorer ⁷
- Mozilla Firefox
- Google Chrome

→ Recommendation

This list may change. Always refer to the up-to-date technical release information in the Product Availability Matrix (PAM) for SAP Convergent Charging 5.0 at support.sap.com/pam.

See the two pages:

- [Supported Web Browsers](#)
- [Technical Release Information](#)

Note that the PAM also defines the technical requirements for the Cockpit back-end application.

2.3.2.4 Authorizations

In the SAP system landscape, SAP Convergent Charging manages the security and protection for the SAP CC systems and controls the accesses for SAP CC users. To work with the Convergent Charging Cockpit launchpad and its [various apps \[page 176\]](#), you must have:

- An unlock individual user ID (or user name) for SAP Convergent Charging
- An unexpired password
- Some specific roles set in your *SAP CC user profile* to work with your apps and complete your [tasks \[page 170\]](#)
- No pricing catalog restrictions (when the user administrator associates your user ID with a specific catalog)

i Note

App visibility and capabilities depends on your user settings and granted roles. Verify the *Authorization* sections in the primary help for your apps to know the user roles that you need. Contact your user administrator to [change your SAP CC user profile \[page 765\]](#).

⁷ We recommend that you do not use the *Microsoft F12 Developer Tools* window of IE11 because of potential [known issues \[page 347\]](#).

Service Pricing Configuration

As a pricing specialist, see the possible authorizations for:

- [Manage Chargeable Item Classes \[page 219\]](#)
- [Manage Charged Item Classes \[page 228\]](#)
- [Manage Mapping Table Classes \[page 245\]](#) and [Manage Mapping Tables \[page 268\]](#)
- [Manage Range Table Classes \[page 281\]](#) and [Manage Range Tables \[page 296\]](#)
- [Process a Chargeable Item \[page 331\]](#)

System Administration

As an IT administrator, see the possible authorizations for:

- [Analyze Item Files \[page 178\]](#)
- [Display System Status \[page 186\]](#)
- [Display Usage Metrics \[page 197\]](#)
- [Display User Operations \[page 212\]](#)
- [Manage SAP CC System Parameters \[page 317\]](#)

For more information and user assistance about the necessary authorizations, refer to the [SAP CC 5.0 Security Guide](#) about the following concepts:

- [User Administration and Authentication](#)
- [Authorizations](#)

⚠ Caution

For security reasons, SAP recommends that you always **lock** your SAP CC Cockpit application and **sign out** when you are done with your tasks.

Closing the web browser does not end the user session.

Related Information

[Users \[page 760\]](#)

[Setting Up a User \[page 766\]](#)

2.3.2.5 Notes on SAP CC Implementation

SAP CC Cockpit is an optional software component. If you want to implement it in your SAP system landscape, consider the following documentation and user assistance:

- *Procedures for Installing SAP CC Cockpit*: See [Installing and Launching Cockpit](#) section in the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation
- *Procedures for Securing an SAP CC System Landscape*: [Securing a Landscape](#) section in the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation
- *Procedures for Securing Communications with Cockpit and Tomcat Server*: [Securing Communications with Cockpit and Tomcat Server](#) section in the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation

2.3.2.6 Explore the Workspace for Convergent Charging Cockpit

SAP CC Cockpit is a Launchpad application that allows you to open your role-based apps and to start working with SAP Convergent Charging.

Your Convergent Charging Cockpit offers a user centric and role based starting point. To use the intuitive user interface optimally, read this section and consult the user guides for SAP Fiori Launchpad.

[Date and Time Information \[page 165\]](#)

[Themes \[page 166\]](#)

[Automatic Sign-Out When Inactive \[page 167\]](#)

[Working with Notifications \[page 167\]](#)

[Usability Features in the Launchpad \[page 167\]](#)

2.3.2.6.1 Date and Time Information

Date and Time Information

In the SAP CC 5.0 Cockpit user interface, your apps may **display some useful date/time information**. It relates to the date and time of the SAP CC system instance that registered the information. It is generally the date and time for the operating system (OS) of the host on which this system instance is installed. Its time zone may differ from the time zone of either your web browser or the OS of your computer.

In an SAP CC system landscape, all the SAP CC systems use the same time zone definition and its associated offset ahead or behind the Coordinated Universal Time (UTC⁸). This time offset can change throughout the year because of *Daylight Saving Time (DST)* adjustments.

In Cockpit and as of SP 5 for release 5.0, your app:

- Displays dates/times in the format of the unique time zone that is defined for SAP Convergent Charging and its systems.
- Does not indicate the time zone's offset (number of hours or minutes ahead of or behind UTC) such as (UTC+02:00) in the date/time fields.

→ Remember

When you work with your app, keep in mind that:

- The SAP CC systems may have a different time zone than you.
- The app does not display the offset (number of hours or minutes ahead of or behind UTC).

⁸ Coordinated Universal Time

→ Recommendation

In an SAP CC system landscape, all the Core Server system instances on the same host have the same date and time. Instances on different SAP CC hosts may have different date and time references when the host clocks are not synchronized.

SAP highly recommends that you synchronize the clocks of the hosts that compose your SAP CC system. You can implement a Network Time Protocol (NTP) server as detailed in the [SAP CC 5.0 Installation and Upgrade Guide](#). See [Setting Up the System Time Zone](#).

This date/time information facilitates your technical operations, administrative tasks, or business configuration.

For example, you can easily correlate the date/time information displayed in your app with the date/time information that is stored in the logs and traces for each SAP CC system instance. Business data is released with a validity period based on dates and times.

❖ Example

When a Pricing Specialist (Convergent Charging) sets up an additional information item, the app displays:
`Enter a time that exists in the time zone for the Web server.`

This message warns and instructs the SAP CC user what to do. The entered date/time value is not valid for the time zone used by the intermediate Java Web Server system on which the Cockpit back-end application is installed and deployed on.

When an SAP CC administrator works with an app, the displayed or entered dates/times are defined in the time zone for the SAP CC system landscape. These dates/times correspond to the date/time information recorded in the logs and traces. It facilitates the technical operations.

2.3.2.6.2 Themes

Various themes are predefined to assist SAP CC users with various color and vision preferences.

The launchpad offers two [high-contrast themes \[page 169\]](#) to support readability in light sensitive situations.

Usually, you can choose between the following themes for the appearance interface:

- [SAP Quartz Light](#) (SAP default theme) - The new quartz theme is lighter and more neutral, to blend more into the background, giving application content the center stage. It is simple and minimalist.
- [SAP Belize](#)
- [SAP Belize Plus](#)
- [SAP Belize High Contrast Black](#)
- [SAP Belize High Contrast White](#) (as of support package 6 for release 5.0)

2.3.2.6.3 Automatic Sign-Out When Inactive

For security reasons, usually a time for automatic sign-out is set. Your IT administrator can define the time, when the sign-out should happen. When you have not been active in the launchpad for this time, you are automatically signed out.

It can be configured that a few minutes before this timeout, a warning is displayed, informing you that you will be signed out soon. You can choose to stay signed in (this resets the timeout) or sign out directly.

2.3.2.6.4 Working with Notifications

Your Convergent Charging Cockpit launchpad provides a *Notifications* window that lets you know about important tasks and requests requiring your timely action or knowledge. They allow you to view immediate updates on the latest and most important events that are related to your role.

2.3.2.6.5 Usability Features in the Launchpad

Your Convergent Charging Cockpit launchpad includes usability features, such as keyboard-only navigation, screen reader support, and high contrast themes to assist you while working in the launchpad. SAP CC users seeking information about accessibility may also find some valuable information here.

[Keyboard Navigation \[page 167\]](#)

[Screen Reader Support in the Launchpad \[page 169\]](#)

[High-Contrast Themes \[page 169\]](#)

2.3.2.6.5.1 Keyboard Navigation

To navigate in the launchpad using the keyboard instead of the mouse, you use a combination of the **Tab**, **F6**, and **Shift** keys:

- **F6** to move the focus on the next group of user interface elements
- **Tab** to move the focus on the next user interface element
- **Shift** + **F6** and **Shift** + **F6** to move the focus on the reverse direction

You may need to first press **Enter** or the **Space** bar to open or view the selected user interface element.

For more information and user assistance, refer to the user guides for SAP Fiori Launchpad.

→ Tip

Power users prefer keyboard navigation because it is faster and more accurate. View the [available keyboard shortcuts \[page 168\]](#).

Keyboard Shortcuts [page 168]

Use keyboard shortcuts to navigate between the user interface elements, reach active screen elements, and save you lots of time.

2.3.2.6.5.1.1 Keyboard Shortcuts

Use keyboard shortcuts to navigate between the user interface elements, reach active screen elements, and save you lots of time.

In Convergent Charging Cockpit, you can use keyboard shortcuts to perform actions in the launchpad and its apps. The following shortcuts are available:

Shortcut (Qwerty Keyboard)	Action	Example
<code>Tab</code>	Select the next user interface element. In editing mode, navigate within the interactive elements in a cell or move across next editable cells.	Press <code>Tab</code> to move forward until the focus is on the expected user interface element. Tip: Use <code>F6</code> to speed up the navigation.
<code>Shift</code> + <code>Tab</code>	Select the previous control in the user interface.	Move backward.
<code>Space</code>	If the element is selectable, toggle the select/deselect. If the element is not selectable, trigger the corresponding associated action.	Turn on/off a checkbox. Trigger the action associated with a button.
<code>Enter</code>	Trigger the action associated with a button, an item in a list.	Execute buttons or menu items.
<code>F6</code>	Move the focus to the next group of user interface elements. This key is fundamental.	Press <code>F6</code> several times to move the focus and activate the user interface element that you want.
<code>Shift</code> + <code>F6</code>	Group navigation – move to the previous control before the current group.	
<code>UP arrow</code>	Move to the previous item within a control.	Traverse the items in a list.
<code>DOWN arrow</code>	Move to the next item within a control.	Traverse the items in a list such as a value list or a result list.
<code>LEFT arrow</code>	Move to the left within a control.	Traverse the columns in a row of a table. Move to the next left tab in a tab bar.
<code>RIGHT arrow</code>	Move to the right within a control.	Traverse the columns in a row of a table. Move to the next right tab in a tab bar.
<code>Home</code>	Focus on the first item within a control.	Traverse the items in a list.
<code>End</code>	Focus on the last item within a control.	Traverse the items in a list.

Shortcut (Qwerty Keyboard)	Action	Example
Ctrl + A	If items of a control are selectable, toggle select/deselect of all items.	
F2	If the item has a Detail event, trigger the Detail event.	
F4	Open a Value Help dialog box.	
Escape	Close down dialog boxes (aka popup windows).	

2.3.2.6.5.2 Screen Reader Support in the Launchpad

The screen reader reads out the contents of the user interface to you. Labels, headings, and descriptions help describe the contents and visual elements of an application.

Screen reader support in SAP Fiori launchpad is based on built-in keyboard navigation and roles, and the names and states of functional elements and areas. For example, in the launchpad the screen reader announces:

- Menu options and how many there are
- Which tiles and which groups are in focus

2.3.2.6.5.3 High-Contrast Themes

High-contrast themes help users to see more details.

Various [themes \[page 166\]](#) are predefined to assist SAP CC users with various color and vision preferences. The Convergent Charging Cockpit launchpad offers two high-contrast themes to support readability in light sensitive situations.

In your user preferences, choose the theme [SAP Belize High Contrast Black](#). It is a *white-on-black* scheme that displays white texts on a black background.

In bright environments, choose the theme [SAP Belize High Contrast White](#). It is a *black-on-white* scheme that displays black texts on a white background.

2.3.3 Tasks with Cockpit

Activities and Tasks

You use Convergent Charging Cockpit regularly or exceptionally to inspect, administer, or configure the SAP CC Core Server systems and data.

- If these administrative or configuration tasks are part of your **daily activities**, take few minutes to discover this new user interface in your web browser. Navigate to the home page and benefit from a modern and efficient user experience.
- If you want to complete an **occasional task** successfully, [get started \[page 161\]](#) with the user interface concepts and perform one of the following tasks depending on your goals and responsibilities:

[Launching Cockpit \[page 170\]](#)

How to start your web interface properly.

[Tasks for Pricing Specialists \[page 172\]](#)

As an SAP CC pricing specialist, you use the Convergent Charging Cockpit launchpad to configure the pricing for the subscription- and usage-based services to monetize.

[Tasks for System Administrators \[page 174\]](#)

As an SAP CC system administrator, you regularly or exceptionally use Convergent Charging Cockpit to inspect or configure the SAP CC Core Server system.

2.3.3.1 Launching Cockpit

How to start your web interface properly.

Executing the User Interface

To start your Convergent Charging Cockpit:

- Open a web browser.
- Just enter the URL⁹ that corresponds to your favorite SAP CC Cockpit application and distant Core Server system.

→ Tip

URL Syntax

Use the following syntax:

```
http://<IP_OR_DNS_ADDRESS>:<PORT_NB>/<WEB_APP_NAME>/
```

⁹ Uniform Resource Locator

or in a secure environment:

```
https://<IP_OR_DNS_ADDRESS>:<PORT_NB>/<WEB_APP_NAME>/
```

Where:

- `<IP_OR_DNS_ADDRESS>` corresponds to the IP address or DNS name of the Tomcat Server host
- `<PORT_NB>` corresponds to the dedicated communication port
- `<WEB_APP_NAME>` corresponds to the technical short name of the SAP CC Cockpit application (default: `cccocpit`)

It is the path to the web application in the Tomcat Server or the *Tomcat Context Path* of the Cockpit application. Contact your IT administrator for more information and support.

i Note

This URL depends on the installation in your SAP system landscape and data center. When deploying the web applications, the IT administrator has communicated about these URLs.

- A sign-in page appears in the browser.
- As an *SAP CC administrator* or a *support specialist*, log on to the user interface to access the administration tools. Cockpit transmits your operation requests to the target Core Server system.

Connecting and Logging On

The back-end component of SAP CC Cockpit communicates directly with the dispatcher instances of the target SAP CC Core Server system via the HTTP Communication Interface (HCI). The messages are always redirected in the background to the master dispatcher instance of the Core Server system.

Working with the User Interface

Once authenticated, you can start working with SAP CC Cockpit. Cockpit includes several [Cockpit Apps \[page 176\]](#). Click the tile that corresponds to your app.

Refer to the regular or exceptional [tasks \[page 170\]](#) that you can perform.

i Note

Be familiar with the SAP UI5 concepts which this user interface is based on navigation, filters, trees, input fields.

2.3.3.2 Tasks for Pricing Specialists

As an SAP CC pricing specialist, you use the Convergent Charging Cockpit launchpad to configure the pricing for the subscription- and usage-based services to monetize.

Service Pricing Configuration

As a *pricing specialist*, you regularly or exceptionally use Convergent Charging Cockpit to configure the pricing for the subscription- and usage-based services of the service provider company that you represent.

Activity	Tasks	Tool
Use the launchpad	Launching Cockpit [page 170]	Cockpit [page 157]
Configure the chargeable item classes	• Creating a Chargeable Item Class [page 224] • Listing and Searching For Chargeable Item Classes [page 222] • Viewing a Chargeable Item Class [page 223] • Editing a Chargeable Item Class [page 226] • Deleting a Chargeable Item Class [page 226]	Manage Chargeable Item Classes [page 219]
Configure the charged item classes	• Creating or Copying Your Charged Item Classes [page 233] • Creating a Charged Item Class from a Billable Item Class [page 236] • Creating a Pricing Catalog [page 238] • Listing and Searching For Charged Item Classes [page 239] • Viewing a Charged Item Class [page 240] • Refreshing the Billable Item Mapping [page 241] • Associating a Charged Item Class with a Billable Item Class [page 242] • Editing a Charged Item Class [page 242] • Deleting a Charged Item Class [page 243]	Manage Charged Item Classes [page 228]

Activity	Tasks	Tool
Configure the pricing data tables	• Creating or Copying a Mapping Table Class [page 256] • Creating a Pricing Catalog [page 259] • Listing and Searching For Mapping Table Classes [page 260] • Viewing and Reviewing a Mapping Table Class [page 260] • Editing a Mapping Table Class [page 261] • Deleting a Mapping Table Class [page 263]	Manage Mapping Table Classes [page 245]
	• Listing and Searching For Mapping Tables [page 272] • Viewing a Mapping Table [page 274] • Creating a Mapping Table [page 275] • Editing a Mapping Table and its Rows [page 277] • Importing Rows into a Mapping Table [page 277] • Exporting Mapping Table Rows to a File [page 278] • Deleting a Mapping Table [page 279]	Manage Mapping Tables [page 268]
	• Creating or Copying a Range Table Class [page 287] • Creating a Pricing Catalog [page 290] • Listing and Searching For Range Table Classes [page 291] • Viewing and Reviewing a Range Table Class [page 292] • Editing a Range Table Class [page 292] • Deleting a Range Table Class [page 294]	Manage Range Table Classes [page 281]
	• Listing and Searching For Range Tables [page 299] • Viewing a Range Table [page 300] • Creating a Range Table [page 305] • Editing a Range Table [page 309] • Importing a Range Table [page 312] • Exporting a Range Table [page 312] • Deleting a Range Table [page 313]	Manage Range Tables [page 296]

Activity	Tasks	Tool
	• Editing and Processing a Chargeable Item [page 333] • Analyzing the Processing Result [page 335] • Loading a Chargeable Item from a File [page 337] • Saving a Chargeable Item to a File [page 337]	Process a Chargeable Item [page 331]

[Pricing Specialist \(Convergent Charging\) \[page 174\]](#)

2.3.3.2.1 Pricing Specialist (Convergent Charging)

A pricing specialist for SAP Convergent Charging is a typical individual user of SAP Convergent Charging who is responsible for designing and configuring the pricing settings for the subscription- and usage-based services to monetize.

As an SAP CC pricing specialist, you complete the following tasks:

- Consider the business needs: in collaboration with the marketing team you take into account the pricing policy for the services to monetize.
- Translate the pricing needs (pricing models and offers) to functional and non-functional requirements.
- Map these requirements to SAP Convergent Charging capabilities and features.
- Model and design charge plans in collaboration with an SAP CC pricing manager
- Cooperate with the application administrator for SAP CC to ask for some system configuration:
 - System settings for implemented business features (charging, precision, tax)
 - Business and custom data such as currencies, value added taxes (VAT)
- Configure and maintain the pricing logic based on charge plans and pricing data tables
- Test and debug charge plans and pricing data tables
- Notify other stakeholders when charge plans are ready for validation
- Investigate and fix charge plan and table issues

2.3.3.3 Tasks for System Administrators

As an SAP CC system administrator, you regularly or exceptionally use Convergent Charging Cockpit to inspect or configure the SAP CC Core Server system.

This section shows your tasks.

System Information and Maintenance

- [Viewing and Inspecting the System Status \[page 190\]](#)
- [Managing the System Maintenance Mode \[page 192\]](#)
- [Standing by Instances \[page 193\]](#)

System Configuration (Technical Features and Business Features)

- [Viewing Parameter Values \[page 318\]](#)
- [Filtering Parameter Values \[page 320\]](#)
- [Configuring Parameter Values \[page 322\]](#)
- [Exporting Values to a File \[page 323\]](#)
- [Preparing Custom Files \[page 325\]](#)
- [Importing Values from a File \[page 327\]](#)

Technical Monitoring

- [Filtering the Item Files \[page 179\]](#)
- [Viewing and Analyzing the File Metadata \[page 182\]](#)
- [Exporting some File Metadata to a Spreadsheet File \[page 182\]](#)

Audit

- [Viewing and Inspecting the System Status \[page 190\]](#)
- [Viewing Parameter Values \[page 318\]](#)
- [Filtering User Operations \[page 214\]](#)
- [Viewing and Auditing Some User Operations \[page 215\]](#)
- [Exporting User Operations and Objects Values \[page 216\]](#)
- [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)
 - [Working with the Metric Chart \[page 202\]](#)
 - [Working with the Metric Table \[page 203\]](#)
 - [Filtering Usage Metrics \[page 204\]](#)
 - [Using Variants \[page 205\]](#)
- [Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)
- [Verifying System Usage and Licenses \[page 207\]](#)
- [Downloading a License Auditing Report \[page 208\]](#)

Additional Information

In case of an issue with your user interface, see the [Troubleshooting with Cockpit \[page 342\]](#) section in this primary help.

→ Tip

To enrich your user experience, view the [FAQs and Tips About Cockpit \[page 339\]](#).

2.3.4 Cockpit Apps

With the **Cockpit** user interface, you quickly and efficiently perform your administrative or business configuration tasks. In the launchpad, click the corresponding tile to open an app. Which tiles are displayed depends on the user's role.

Pricing Data Structure

- [Manage Chargeable Item Classes \[page 219\]](#)
- [Manage Charged Item Classes \[page 228\]](#)
- [Manage Mapping Table Classes \[page 245\]](#)
- [Manage Range Table Classes \[page 281\]](#)

Pricing Definition

- [Manage Mapping Tables \[page 268\]](#)
- [Manage Range Tables \[page 296\]](#)

Pricing Administration

- [Process a Chargeable Item \[page 331\]](#)

System Information

- [Analyze Item Files \[page 177\]](#)
- [Display System Status \[page 185\]](#)

- [Display Usage Metrics \[page 196\]](#)
- [Display User Operations \[page 211\]](#)

System Configuration

- [Manage SAP CC System Parameters \[page 316\]](#)

2.3.4.1 Analyze Item Files

With the app **Analyze Item Files**, you can visualize and analyze the high-volume item files that are generated by the SAP CC Core Server system. To facilitate your technical operations, you quickly and efficiently inspect the selected item files.

[What's New? \[page 177\]](#)

[About This App \[page 178\]](#)

[Important Concepts \[page 178\]](#)

[Tasks \[page 179\]](#)

[FAQs and Tips \[page 183\]](#)

[Troubleshooting \[page 185\]](#)

2.3.4.1.1 What's New?

This section highlights the **main changes in the app** Analyze Item Files that relate to new or changed features.

What's New in SP 1

Cockpit Enhancement

A new app named **Analyze Item Files** is available in the SAP CC Cockpit application. This app enables the SAP CC administrators and operations team to monitor the high-volume item files generated by the SAP CC Core Server systems.

You can use the app Analyze Item Files to visualize and analyze the metadata related to the item files (also known as output data files in the SAP documentation) that result from the business operations (charging, refilling, activation).

2.3.4.1.2 About This App

Target Audience

The app Analyze Item Files is intended for the following audiences:

- IT Administrator (system, application, business)
- Operations Team Expert
- Support Specialist (SAP SE, Local Support Team)

App Summary

The app Analyze Item Files provides you with the following capabilities to monitor and operate with the connected Core Server system:

- [Filter \[page 179\]](#) the list of item files generated by the rater and bulkloader instances during the processing execution of the *Chargeable Items Charging* and *Data Files Bulk Loading* operations.
- [View \[page 182\]](#) the metadata related to the filtered item files, for monitoring purpose.
- [Export \[page 182\]](#) the displayed metadata to spreadsheet files.

See the [Important Concepts \[page 178\]](#) topic for more information about the business processes.

2.3.4.1.3 Important Concepts

As an SAP CC administrator or operations team expert, you are aware of the following concepts to use the app Analyze Item Files in your SAP system landscape:

- The *technical operations* to administer the Core Server systems that are running in your SAP system landscapes.
- The *item files* that result from the business operations (charging, refilling, activation) and that are generated by the connected Core Server system.
- The following *business processes* of SAP Convergent Charging:
 - [Chargeable Items Charging Process](#)
 - [Data Files Bulk Loading Process](#)
- The corresponding *system configuration settings*:
 - The notification policy, CIF¹⁰ configuration, and the RIF¹¹ configuration of your Core Server system
 - The JCo¹² destination definitions - in an integrated [SAP Solution](#) with SAP Convergent Invoicing in SAP S/4HANA or SAP Business Suite

¹⁰ Charging output Integration Framework

¹¹ Rating Integration Framework

¹² Java Connector

For more information and user assistance, refer to the [Processes and Functions](#) section in the [SAP CC 5.0 Application Help](#).

i Note

Your app displays some **date/time information** about the management and processing of these item files.

- It corresponds to the date and time of the SAP CC system instance that registered the information. It relates to neither the date/time of your computer nor your local time zone.
- It does not correspond to the date/time properties for the item files in the file system that is used as storage.

In Cockpit, your app does not display the **time zone information** of the SAP CC system instances. This time zone may differ from your time zone.

2.3.4.1.4 Tasks

With the app Analyze Item Files, you complete the following administrative tasks:

- [Filtering the Item Files \[page 179\]](#)
- [Viewing and Analyzing the File Metadata \[page 182\]](#)
- [Exporting some File Metadata to a Spreadsheet File \[page 182\]](#)

2.3.4.1.4.1 Filtering the Item Files

The **Analyze Item Files** app contains a filter bar located on the upper part of the screen. This filter bar gives the possibility to filter the file metadata that are stored within the SAP CC Core Database, using either:

- [Visual filters \[page 179\]](#), which represent a pre-defined graphical representation of filters
- [Compact filters \[page 180\]](#), which represent a textual version of filters

Whatever the combined criteria are, the filtering scope determines a subset of item files whose metadata have been recorded within the Core Database.

→ Tip

You can save your filtering criteria for a future use by creating a new variant (or modifying an existing one). For further information and concrete examples of possible dashboards you can create, refer to the [Monitoring the File Metadata](#) section of the [SAP CC 5.0 Tuning Guide](#) documentation.

Visual Filters

To build your filtering condition, you can use the following visual filters:

- *Items By Status*, that gives the possibility to filter the items files according to their status
- *Unprocessed Items by Creation Event*, that gives the possibility to define a filter related to the unprocessed items according to the event that lead to the creation of the item file
- *Written Items (Rater) by Creation Date*, that gives the possibility to set a filter related to the items written by a rater instance, according to the creation date of the item file. This visual filter can be modified by clicking the *Measure By* button in order to change the type of concerned items
- *Written Items (Rater) by Class Name*, an adapted visual filter that gives the possibility to set a filter related to the items written by a rater instance, according to the name of the concerned item class. This visual filter:
 - Is available in the *Additional Filters* of the *Adapt Filters* dialog window
 - Can be modified by clicking the *Measure By* button in order to change the type of concerned item

Compact Filters

In case the visual filters do not fit your needs, you can use the following compact filters:

- *Written Items (Rater)*, that corresponds to the number of items written by the rater instance in the data file
- *Written Items (Bulkloader)*, that corresponds to the number of items written by the bulkloader instance in the data file
- *Unprocessed Items*, that corresponds to the number of items which have not been processed yet
- *Successful Items*, that corresponds to the number of items which were successfully processed
- *Lost Items*, that corresponds to the number of items which could not be processed from the data file, because:
 - The items could not be read during cleaning
 - The items were written by the rater but not found by the bulkloader
 - The items statuses could not be determined after a bulkloader restart when resuming the processing of the data file
- *Erroneous Items*, that corresponds to the number of items which could not be sent to SAP CI while processing the data file and were written to error data files
- *Pending Erroneous Items*, that corresponds to the number of items which still need to be sent to SAP CI by processing the related error data files
- *Creation Event*, that corresponds to the type of event which triggered the creation of the data file, which can be:
 - A data file created to store items generated during the charging process
 - A data file created to store items which could not be sent to SAP CI because they were invalid
 - A data file created to store items which could not be sent to SAP CI because of a communication error
 - A date file created for another unknown reason
- *Creation Date*, that corresponds to the date and time when the data file was created by an SAP CC system instance
- *Class Name*, an adapted compact filter that corresponds to the name of the item class related to the items contained in the data file
- *Name*, an adapted compact filter that corresponds to the name of the data file
- *Root Name*, an adapted compact filter that corresponds to the name of the root data file (without any extension), which can be:
 - The name of the data file itself for data files generated during the charging process

- The name of the data file initially containing the items for data files related to erroneous items
- *Parent Name*, an adapted compact filter that corresponds to the name of the parent data file (without any extension), which can be:
 - Empty for data files generated during the charging process
 - The name of the produced data file for data files related to erroneous items
- *Producer*, an adapted compact filter that corresponds to the identifier of the instance which produced the data file, or "unknown" if the producer cannot be determined
- *Consumer*, an adapted compact filter that corresponds to the identifier of the instance which consumed the data file
- *Writing End Date*, an adapted compact filter that corresponds to the date and time when the writing of the data file ended
- *Processing Start Date*, an adapted compact filter that corresponds to the date and time when the processing of the data file started
- *Processing End Date*, an adapted compact filter that corresponds to the date and time when the processing of the data file ended
- *Path Producer*, an adapted compact filter that corresponds to the file system path where the data file was located when it was produced
- *Path Consumer*, an adapted compact filter that corresponds to the file system path where the data file was located when it was consumed
- *Destination*, an adapted compact filter that corresponds to the JCo or WS destination associated to the items contained in the data file
- *Status*, an adapted compact filter that corresponds to the current status of the data file, which can inform that:
 - The data file was created
 - The file is being written
 - The file was archived and is ready for being processed by a bulkloader
 - The file is being cleaned
 - The file is being read and processed by a bulkloader
 - The file was entirely processed by a bulkloader and renamed
 - The file was entirely processed by a bulkloader and deleted
 - The file could not be entirely read by a bulkloader
- *Item Type*, an adapted compact filter that corresponds to the type of items contained in the data file, which can be:
 - Postpaid charged items
 - Prepaid charged items
 - Refill records
 - Charged chargeable items
 - Acquired chargeable items
 - Notifications
 - Rerating notifications
 - Unknown items
- *Checksum Status*, an adapted compact filter that corresponds to the status of the computation and verification of the checksum of the data file

2.3.4.1.4.2 Viewing and Analyzing the File Metadata

The lower part of the [Analyze Item Files](#) app gives the possibility to visualize the metadata related to the set of item files previously filtered. According to your needs, you can visualize and analyze this metadata using a [smart chart](#) and/or a [table](#) that you can both configure to build your own dashboard.

Smart Charts

As far as the smart chart is concerned, you can:

- Modify the chart type, by clicking the [Selected Chart Type](#) button
- Modify the structure of the chart (axis, data series), by clicking the [Settings](#) button
- Investigate within the displayed data, by clicking the [Drill Down](#) button
- Display textual values of a set of selected data (or a whole data series), by clicking the [Details](#) button
- Modify the display of the chart legend, by clicking the [Toggle Legend Visibility](#) button
- Modify the chart display mode (zoom in/out, full screen mode, display with table)

Tables

As far as the table is concerned, you can:

- Modify the type of displayed content, by clicking:
 - The [Show all Items](#) button to display the whole set of filtered item files
 - The [Only Show Items Selected](#) on the Chart button to only display the data selected in the smart chart
- Modify the structure of the table (displayed columns, sorting and grouping conditions), by clicking the [Settings](#) button
- Modify the table display mode (full screen mode, display with smart chart)
- Modify the display scope, by clicking the [Display Related Records](#) button that is only available when an element is selected in the table. When this button is clicked, only linked item files are displayed (i.e. items files concerned by the root or parent hierarchy).
- Export the content of the table in a spreadsheet file, by clicking the [Export to Spreadsheet](#) button

2.3.4.1.4.3 Exporting some File Metadata to a Spreadsheet File

i Note

Export operation is only executed by the system when the number of filtered item files does not exceed the value of the `query.limit.fetchSize` parameter that is set in the configuration file of the deployed SAP CC Cockpit application. If the filtered content exceeds this number (10,000 by default), no data is exported.

When such a situation occurs, [adapt your filters \[page 179\]](#) to decrease this number of item files and request the export again.

Procedure

To export some file metadata to a file:

1. Open the Analyze Item Files app
2. [Filter \[page 179\]](#) some item files whose metadata you want to export
3. Click [Export to Spreadsheet](#) and select the folder you want to save your spreadsheet file in
4. Specify a name for the export spreadsheet
5. Click [Save](#)

The app starts exporting and storing the information available in the table within your export spreadsheet.

2.3.4.1.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 183\]](#)

[Tips and Tricks \[page 184\]](#)

2.3.4.1.5.1 Frequently Asked Questions (FAQs)



Why do filtered metadata not correspond to my filtering set?

[Filters](#) can be defined either using [visual filters \[page 179\]](#) or [compact filters \[page 180\]](#). Verify that you did not set filtering criteria without displaying them on the filter bar. For further information, refer to the [Filtering the Item Files \[page 179\]](#) section.



Where are my variants?

The location of the variants depends on the configuration of **Cockpit**. It depends whether **Cockpit** uses a local storage or an embedded database. In case of a local storage, you might not be able to reuse a variant if you used another browser or another computer.

2.3.4.1.5.2 Tips and Tricks



Monitoring the unprocessed items

- Filtering the items:

To create the relevant filter, execute the following operations:

1. Click the [Unprocessed Items](#) element of the [Items By Status](#) visual filter, that corresponds to item files containing unprocessed items (whatever their creation reason is)
2. Click the [Communication error](#) element of the [Unprocessed Items By Creation Event](#) visual filter to determine a subset of all the unprocessed items
3. Click the [Measure By](#) button and select the [Unprocessed Items](#) element to modify the behavior of the third visual filter and thus display the daily repartition of the unprocessed items created because of a communication error
4. Click the [Adapt Filters](#) button and browse the list of additional filters using the [More Filter](#) button
5. Select the [Written Items \(Rater\) by Class Name](#) element, that appears in the [Additional Filters](#) section
6. Click the [Measure By](#) button and select the [Unprocessed Items](#) element to modify the behavior of this additional visual filter used to display the repartition of the unprocessed items according to the name of the associated item class
7. Select the [Show on Filter Bar](#) option
8. Click the [Go](#) button to update the filter bar that now contains four visual filters dedicated to the unprocessed items

- Modifying the smart chart:

To display a more suitable smart chart, execute the following operations:

1. Click the [Selected Chart Type](#) button and select the [Pie Chart](#) element
2. Click the [Settings](#) button and only select the [Unprocessed Items](#) and [Class Name](#) elements to modify the content of the smart chart and thus build a pie chart displaying the repartition of the unprocessed items according to the name of the associated item class
3. Click the [OK](#) button

- Modifying the table:

To display a more suitable smart chart, execute the following operations:

1. Click the header of the [Unprocessed Items](#) column, and click the [Sort Descending](#) element
2. Click the header of the [Class Name](#) column, and click the [Group](#) element
3. Click the [Settings](#) button and only select the [Name](#), [Status](#), [Class Name](#), [Unprocessed Items](#), [Progress](#) and [Creation Date](#) elements to modify the content of the table and display the relevant information
4. Click the [OK](#) button

- Creating a variant:

To create a variant that will be available for future connections to the Analyze Item Files application, execute the following operations:

1. Click the [Select Variant](#) button to open the window dedicated to the management of variants
2. Click the [Save As](#) button
3. Fill the [Name](#) field with a relevant name for your dashboard, such as [Unprocessed items per item class](#)
4. In case you want this dashboard to be loaded on startup, select the [Set as Default](#) option
5. Click the [OK](#) button to create this dashboard



Use variants to save your environment.

In the **Analyze Item Files** app, you can save your filtering criteria and display settings by creating a new variant in your working environment.

2.3.4.1.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



I experience slowdowns when working with the app.

This situation may be due to the number of metadata stored in the Core Database, that can become too important. SAP SE recommends that you contact your [system administrator](#). It might be necessary to execute purge operations in order to decrease the number of stored metadata.

i Note

For security reasons, SAP SE recommends that you create a service user dedicated to connections between SAP CC Cockpit and the Core Database. This user shall be granted a read access to database views pointing on the `OBJECT_CHANGE_LOG`, `FILE_METADATA` and `FILE_METADATA_PATH` tables.

→ Recommendation

SAP SE recommends to activate the recording of file metadata, to monitor the generation of data files. Refer to the [Enabling the Recording of File Metadata](#) chapter of the SAP CC 5.0 Tuning Guide documentation for more information.

2.3.4.2 Display System Status

With the app **Display System Status**, you have a clear overview of the status and availability of an SAP CC Core Server system in your SAP Convergent Charging landscape. You quickly and efficiently visualize and analyze the instances that compose your connected system.

[What's New? \[page 186\]](#)

[About This App \[page 186\]](#)

[Important Concepts \[page 187\]](#)

[Tasks \[page 189\]](#)

[FAQs and Tips \[page 194\]](#)

[Troubleshooting \[page 195\]](#)

2.3.4.2.1 What's New?

This section highlights the **main changes in the app** Display System Status that relate to new or changed features.

What's New in SP 4

As of SP 4 for release 5.0, SAP Convergent Charging provides you with a new feature named "System Maintenance Mode". This feature adds new buttons within the **Display System Status** app that give you the possibility to switch your Core Server system to a specific running mode within which raters and/or guiders can be switched to a standby mode that:

- Modifies the behavior of the partitions' distribution operations performed by the master dispatcher
- Optimizes the warmup operations performed by the raters and guiders during these partitions' distribution operations, and by extension optimizes the overall performance of the system

For more information, refer to the [Managing the System Maintenance Mode \[page 192\]](#) and [Standing by Instances \[page 193\]](#) tasks.

What's New in SP 2

As of SP 2 for release 5.0, SAP CC Cockpit provides you with a new app named **Display System Status**, that is dedicated to IT Administrator and Operations Team Expert. This app provides a clear overview of the overall status and availability of an SAP CC Core Server system, by presenting a clear view of the deployed instances.

To use **Display System Status** quickly and efficiency, first discover the app to become familiar with the different associated concepts. Then, view and inspect the relevant information related to your Core Server system.

2.3.4.2.2 About This App

Target Audience

The app Display System Status is intended for the following audiences:

- IT Administrator (system, application, business)
- Operations Team Expert
- IT Consultant
- Support Specialist (SAP SE, Local Support Team)

App Summary

The app Display System Status provides you with the following capabilities:

- [Viewing and Inspecting \[page 190\]](#) information such as:
 - The availability of all the instances that compose your SAP CC Core Server system, that gives you the possibility to briefly observe the restart of your system after a maintenance operation (such as shutdown or startup sequences)
 - The important Information that facilitate your technical operations (such as software version, partitions distribution and reallocation)
- Managing variants, to define custom views that facilitate your administrative tasks
- [Managing the System Maintenance Mode \[page 192\]](#), to enable or disable the maintenance mode for your SAP CC Core Server system
- [Standing by Instances \[page 193\]](#), to switch a rater or guider to the standby mode, or resume it

i Note

To monitor the performance and health of your SAP CC systems in real time, you can also configure your SAP CC Core Server system in order to communicate with CA Application Performance Management (APM). For further information, refer to the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation.

2.3.4.2.3 Important Concepts

As an IT Administrator or Operations Team Expert, you are aware of the following concepts to use the app Display System Status in your SAP system landscape.

SAP CC multi-hosts and multi-instances landscapes

For high availability and scalability purposes, you can extend your landscape by installing additional instances that can be deployed on different physical hosts. For further information about such landscapes, refer to the following documentations:

- [Architecture](#) section of the [SAP CC 5.0 Application Help](#) documentation.
- [Installing a Multi-Hosts Landscape](#) section of the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation.

Communication channels used within SAP CC landscapes

The communications between client applications/systems and instances in your SAP Convergent Charging landscape rely on different communication protocols:

- HTTP¹³, used to transport:

- SOAP¹⁴ messages (Web Services technical interface)
 - Proprietary XML¹⁵ messages (HTTP Communication Interface, HCI)
 - JSON messages between the SAP Fiori user interfaces and the Cockpit element
- TCP/IP¹⁶, used to transport proprietary TCP Packets, either internally between server instances or externally between the deployed components
- UDP¹⁷, used to transport messages dedicated to network discovery purposes
- JDBC¹⁸, used to communicate with running RDBMS¹⁹

For further information, refer to the [SAP CC 5.0 Security Guide](#) documentation.

Note

- The communication between the deployed components of SAP CC can be secured in order to fit the security policy of your landscape. For further information, refer to the [Securing a Landscape](#) section of the [SAP CC 5.0 Installation and Upgrade Guide](#) documentation.
- Secured connections and encrypted communications are based on the Secure Socket Layer/Transport Layer Security (SSL/TLS) protocols. To check the protocols that are declared in your deployed Core Server system, you can use the [Manage SAP CC System Parameters \[page 316\]](#) app to check the value of the TLS_PROTOCOLS system parameter

Instance possible statuses

In your SAP CC Core Server system, each instance has some particular statuses that are orchestrated by the master dispatcher instance. These possible instance statuses are:

- **Starting**, which means that the instance is executing its startup sequence
- **Waiting**, which represents an intermediate status only used for updater instances to inform that it is registering on the dispatcher instance and is thus waiting for the permission to continue the starting sequence of its services
- **Started**, which means that the instance services are started and ready for processing operation requests
- **Stopping**, which means that the instance started its shutdown sequence
- **Stopped**, which means that the instance is completely stopped and cannot process any operation
- **Going into Standby**, which represents a status only used for rater and guider instances to inform that the instance is still performing charging operations, while its handled partitions are being transferred to the other started raters or guiders
- **Standby**, which represents a status only used for rater and guider instances to inform that the instance is excluded from the scope of the charging operations, and that its handled partitions have been transferred to the other started raters or guiders

¹³ HyperText Transfer Protocol

¹⁴ Simple Object Access Protocol

¹⁵ eXtended Markup Language

¹⁶ Transmission Control Protocol / Internet Protocol

¹⁷ User Datagram Protocol

¹⁸ Java Database Connectivity

¹⁹ Relational Database Management System

i Note

For each instance of the Core Server system, the starting and shutdown sequences depend on the instance type, special conditions (processes) and some particular roles (master dispatcher instance, active updater instance).

Partitions warm-up and distribution

SAP Convergent Charging data have been partitioned within the databases in order to isolate them and ensure performances and stability towards concurrent accesses. Most of the instances of the SAP CC Core Server system handle this partitioned data within structures that are:

- Stored in the memory of the concerned instances
- Managed by instances as cached structures
- Related to a given isolated partition

For optimization purpose, SAP CC uses a warm-up mechanism for the cached structures that must be loaded by raters and guiders. This mechanism consists in:

- Retrieving the necessary partitioned data either from database or from another instance, according to the configuration
- Loading this data into the memory of the concerned instance

When a rater or guider is added or removed from the list of running instances, the master dispatcher must reorganize the Partition Map and reallocate the list of partitions to the running instances in order to re-distribute the overall data. When such a situation occurs, the content of every transferred partition must be warmed-up by the destination instance, a situation which can impact the overall performance of the system. For further information, refer to the [Partitioning Routing](#) section of the [SAP CC 5.0 Application Help](#) documentation

2.3.4.2.4 Tasks

With the app Display System Status, you complete the following administrative tasks:

- [Viewing and Inspecting the System Status \[page 190\]](#)
- [Managing the System Maintenance Mode \[page 192\]](#)
- [Standing by Instances \[page 193\]](#)

i Note

Inherited from SAP CC **Cockpit**, you can also manage variants to define custom views that facilitate your administrative tasks. By default, a "Standard" variant is available and displays basic information about the SAP CC system instances (instance statuses, instance IDs, Java process IDs, instance start dates/times, instance versions). You cannot customize this variant, but you can create additional ones such as:

- A "CC maintenance operations" variant, to display information such as the instance version, identifier and status, and the subset of partitions handled by the instance

- A "CC communications" variant, to display the configured URLs and secured modes

2.3.4.2.4.1 Viewing and Inspecting the System Status

The workspace of the **Display System Status** app is made up with two main areas:

- An upper area, that provides you with a global system status rendered as:
 - A donut chart summarizing the available instances
 - The detailed list of available instances, grouped by instance types and statuses
- A lower area, that contains a table whose content can be customized to fit specific needs. To modify the content of the table, execute the following procedure:
 1. Click the  button
 2. Select the columns you want to display. For further information about the available information, refer afterwards
 3. Define the column sequence using the up and the down buttons
 4. Click the *Sort* tab to configure your sorting policy
 5. Click the *Filter* tab to specify some filtering conditions based on information inclusion or exclusion
 6. Click the "OK" button to apply your changes

i Note

- If necessary, you can create a new variant to store this presentation and quickly retrieve this information in the future
- To track in real time the evolution of the displayed information, you can refresh the table manually or automatically, using the dedicated buttons

Available information

The following table contains the list of available information that can be displayed:

Element	Description
Instance information	
Status	The operational status of the instance, as described in the Important Concepts [page 187] section.
Started On	The date and time information when the instance was started. The reference is the current date/time for the operating system of the machine that hosts this instance.
Instance Date/Time	This information represents the current date/time for the operating system of the SAP CC host on which the instance is installed. The app does not display the time zone of this operating system. SAP SE recommends that you synchronize the clocks of the hosts that compose your SAP Convergent Charging landscape.
Instance Type	The type of the instance in the Core Server system: updater, dispatcher, guider, rater, taxer or bulkloader.

Element	Description
Host	The name or IP address (IPv4 or IPv6) of the host where the instance is deployed. For further information, refer to the description of the HOSTNAME indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Memory information	
Free Memory	The size of the memory remaining in a running instance. The runtime value in bytes is rounded to two decimal places by using the best unit (TB, GB, MB, or KB for example). This information relates to the remaining space in the heap of the Java Virtual Machine (JVM) that executes the instance. For further information, refer to the description of the FREE_MEMORY indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Total Memory	The total size of the host memory where the instance is deployed. The runtime value in bytes is rounded to two decimal places by using the best unit (TB, GB, MB, or KB for example). This information represents the total amount of memory in the heap of the Java Virtual Machine (JVM) that executes the instance. For further information, refer to the description of the TOTAL_MEMORY indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Application information	
Partitions	The list of handled partitions, that are displayed as multiple ranges. If necessary, you can focus on a given data partition by defining a relevant filter.
Version	The technical version number of the instance, that corresponds to the deployed binaries. For further information, refer to the description of the VERSION indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Identification information	
Instance ID	The unique identifier of the instance in the Core Server system. In your app, this information element is enriched with the current master dispatcher and active updater instances. For further information, refer to the description of the INSTANCE_ID indicator available in the SAP CC 5.0 System Parameter Reference documentation.
SAP Instance Number	The SAP Instance Number to know when working with SAP Management Console (SAP MC) or SAP Microsoft Management Console (SAP MMC) to start or stop the instance. This technical number (00-97) depends on the host on which this instance is deployed. For further information, refer to the description of the SAP_INSTANCE_NUMBER indicator available in the SAP CC 5.0 System Parameter Reference documentation.
SAP Instance Name	The SAP Instance Name to know when managing a given instance with the startup framework. This information is based on a three-letter prefix dedicated to SAP Convergent Charging, combined with the two digits of the SAP Instance Number. For further information, refer to the description of the SAP_INSTANCE_NAME indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Process	The identifier of the operating system Java process (aka PID) that executes the instance. For further information, refer to the description of the PROCESS_IDENTIFIER indicator available in the SAP CC 5.0 System Parameter Reference documentation.
Communication information	
Message TCP - URL	The main address of the Message TCP technical interface provided by the Core Server system, that includes: • The schema name (tcp or tcps) • A hostname or IP address (IPv4 or IPv6) • The dedicated communication port number

Element	Description
Message TCP - Server Authentication	The authentication method that is currently configured for encrypted communications via the Message TCP technical interface of SAP CC.
WS - URL	The main address of the Web Services (WS) technical interface provided by the Core Server, that includes: • The schema name (http or https) • A hostname or IP address (IPv4 or IPv6) • The dedicated communication port number
WS - Server Authentication	The authentication method that is currently configured for encrypted communications via the Web Services technical interface of SAP CC.
HCI - URL	The main address of the HTTP Communication Interface (HCI) technical interface provided by the Core Server, that includes: • The schema name (http or https) • A hostname or IP address (IPv4 or IPv6) • The dedicated communication port number
HCI - Server Authentication	The authentication method that is currently configured for encrypted communications via the HCI technical interface of SAP CC.
Internal - URL	The main address for all the interinstance communications based on TCP, that includes: • The schema name (tcp or tcps) • A hostname or IP address (IPv4 or IPv6) • The dedicated communication port number
Internal - Server Authentication	The authentication method that is currently configured for the interinstance communications orchestrated by the master dispatcher.

→ Tip

To display the value of a given indicator, you can either use Admin+ or the [Manage SAP CC System Parameters \[page 316\]](#) app.

2.3.4.2.4.2 Managing the System Maintenance Mode

To optimize the partitions distribution operations that are performed by the master dispatcher during raters and guiders restarting operations, SAP Convergent Charging provides you with a feature named "System Maintenance Mode". This feature gives the possibility to switch your Core Server system to a specific running mode within which raters and guiders can be switched to a standby mode, that you can use during maintenance operations such as upgrades and/or updates in order to:

- Optimize the usage of the available network resources by decreasing:
 - The number of transferred partitions
 - The solicitation of the databases
Which both decrease the probability of latency peaks
- Decrease the duration of warm-up operations of the cached structures handled by these instances in case of partitions redistribution

Enabling the maintenance mode

To enable the maintenance mode using the **Cockpit** web application, execute the following procedure:

1. Click the [Switch to Maintenance Mode](#) button available in the upper area of the workspace
2. Read the warning message and confirm the action if you agree with the terms and conditions

Once in maintenance mode, you can select raters and/or guiders and switch them to standby mode.

Disabling the maintenance mode

To disable the maintenance mode using the **Cockpit** web application, execute the following procedure:

1. Click the [Exit Maintenance Mode](#) button
2. Confirm the action to disable the maintenance mode and return to the standard running mode

i Note

To enable or disable the maintenance mode, you can also use the Admin+ user interface. For further information, refer to the description of the "maintenance" command of the Admin+ user interface available in the [SAP CC 5.0 Primary Help for Admin+ \[page 1002\]](#) documentation.

2.3.4.2.4.3 Standing by Instances

When the maintenance mode is enabled for your SAP CC Core Server, it is possible to switch raters and/or guiders to a standby mode, taking into consideration the fact that:

- Every running rater or guider can be switched to a standby mode
- Every starting rater or guider starts in a standby mode
- Every standby rater or guider:
 - Is alive but does not perform any business operation
 - Does not handle any partition but is available for receiving partitions from the master dispatcher
 - Can be manually resumed by the administrator
 - Is automatically resumed when the Core Server system exits the maintenance mode
 - Is automatically resumed when another instance stops (and receives the partitions previously handled by this stopped instance)
 - Is not automatically resumed in case of another instance failure (which means that the remaining started instances will handle the partitions previously handled by the crashed instance)
- Every stopping rater or guider preferably transfers its partitions to a standby instance, which is automatically resumed (except when the number of stopped instances exceeds the number of available standby instances, in which case the regular smart warmup mechanism applies)

Switching a rater or guider to standby mode

To standby raters and/or guiders using the **Cockpit** web application, execute the following procedure:

1. In the table, select the raters and/or guiders you want to switch to standby mode
2. Click the [Put on Standby](#) button available in the toolbar above the table
3. Read the warning message and confirm the action by clicking the [Stand By](#) button. You can observe the evolution of the instance status, from [Going into Standby](#) to [Standby](#)

Resuming a standby rater or guider

To resume raters and/or guiders using the **Cockpit** web application, execute the following procedure:

1. In the table, select the raters and/or guiders you want to resume
2. Click the [Resume](#) button available in the toolbar above the table
3. Read the warning message and confirm the action by clicking the [Resume](#) button. You can observe the evolution of the instance status, that is set to "Started"

i Note

To standby or resume raters and/or guiders, you can also use the Admin+ user interface. For further information, refer to the description of the "standby" command of the Admin+ user interface available in the [SAP CC 5.0 Primary Help for Admin+ \[page 1002\]](#) documentation.

2.3.4.2.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 195\]](#)

[Tips and Tricks \[page 195\]](#)

2.3.4.2.5.1 Frequently Asked Questions (FAQs)



Why may the displayed information differ from my SAP CC system?

The information may be cached, so it might be necessary to refresh the **Display System Status** app, either by re-loading the web browser, or by refreshing (manually or using the auto-refresh button) the content of the table.

i Note

When you adjust the visualization table settings or use another personalized variant, the app does not automatically refresh the data in the table.



Where are my variants?

The location of the variants depends on the configuration of **Cockpit**. It depends whether **Cockpit** uses a local storage or an embedded database. In case of a local storage, you might not be able to reuse a variant if you used another browser or another computer.

2.3.4.2.5.2 Tips and Tricks



How to observe a partition?

You can focus on a given data partition that is assigned to an instance sequentially. With the **Display System Status** app, you see the partition allocation and reallocation easily. Adjust the visualization table by filtering the [Partitions](#) column:

1. Click the  button
2. Click the [Filter](#) tab
3. Define a filter by using the contains filter operator, and entering a unique numeric value that represents the partition ID
4. Click the [OK](#) button to apply your changes
5. Refresh the table



Use variants to save your environment.

In the **Display System Status** app, you can save your filtering criteria and display settings by creating a new variant in your working environment.

2.3.4.2.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Unable to switch a rater or guider to standby mode

To switch a rater or guider to standby mode, you need to ensure that:

- The system is currently switched to maintenance mode. For further information, refer to the [Managing the System Maintenance Mode \[page 192\]](#) section
 - You did not create any filter that excludes raters and guiders from the list of displayed (and thus selectable) instances. In case no filter exists, ensure that raters and guider instances have been deployed for your Core Server system
-

2.3.4.3 Display Usage Metrics

With the app **Display Usage Metrics**, you quickly visualize and analyze the system usage measurement of your SAP CC Core Server system. You audit the daily business traffic and the master data growth by comparing the recorded usage metrics. You verify the metrics that are incorporated in the SAP license reporting and auditing programs and you prepare your license auditing reports yearly.

[What's New? \[page 196\]](#)

[About This App \[page 197\]](#)

[Important Concepts \[page 198\]](#)

[Tasks \[page 198\]](#)

[FAQs and Tips \[page 209\]](#)

[Troubleshooting \[page 210\]](#)

2.3.4.3.1 What's New?

This section highlights the **main changes in the app** Display Usage Metrics that relate to new or changed features.

What's New in SP 2

As of SP 2 for release 5.0, SAP Convergent Charging provides SAP CC administrators with a **new administration tool** to facilitate your technical operations with the item files (aka output data files) that are generated by the Core Server system: *Display Usage Metrics* is available in your Convergent Charging Cockpit launchpad.

Discover this new app on your own or get some main concepts if you are not familiar with usage metrics and GLAS files as an SAP system measurement.

With this app you complete the following tasks:

- [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)

- [Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)
- [Verifying System Usage and Licenses \[page 207\]](#)
- [Downloading a License Auditing Report \[page 208\]](#)

2.3.4.3.2 About This App

Target Audience

The app Display Usage Metrics is mainly intended for the following audiences:

- IT Administrator (application, system)
- Operations Team Expert
- Support Specialist (SAP SE, Local Support Team)

App Summary

The app Display Usage Metrics provides you with the following capabilities:

- [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)
- [Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)
- [Verifying System Usage and Licenses \[page 207\]](#)
- [Downloading a License Auditing Report \[page 208\]](#)

App Workspace

The workspace of the app Display Usage Metrics is made up with two main areas:

- An **upper area** provides you with a table containing a list of recorded usage metrics whose content can be customized to fit specific needs. For further information about the available information and the customizing capabilities, refer to the [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#) task
- A **lower area** provides you with the detailed information related to a given recorded usage metrics. This area is only visible when a usage metrics is selected in the upper area. For further information about this area, refer to the [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#) task.

2.3.4.3.3 Important Concepts

As an application administrator or a system administrator for SAP Convergent Charging, you are aware of the following important concepts to use the app Display Usage Metrics in your SAP system landscape.

Usage Metrics

You know:

- The *usage metrics* that are recorded by your Core Server system on a daily basis: [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)
- The *technical operations* to administer the Core Server systems that are running in your SAP system landscapes
- The *item files* that result from the mass processing of the requested business operations (charging, refilling, activation) and that are generated by a Core Server system
- The *System and Data Auditing* features and functions of SAP Convergent Charging
- The *SAP License Management* features of SAP Convergent Charging

For more information and user assistance, refer to the Features section in the [SAP CC 5.0 Application Help](#).

Related Information

[License Management](#)
[System and Data Auditing](#)

2.3.4.3.4 Tasks

With the app Display Usage Metrics, you administer your Core Server system efficiently and you perform your technical operations quickly.

You successfully complete the following occasional administrative tasks:

- [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)
 - [Working with the Metric Chart \[page 202\]](#)
 - [Working with the Metric Table \[page 203\]](#)
 - [Filtering Usage Metrics \[page 204\]](#)
 - [Using Variants \[page 205\]](#)
- [Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)
- [Verifying System Usage and Licenses \[page 207\]](#)
- [Downloading a License Auditing Report \[page 208\]](#)

→ Tip

To enrich your SAP user experience, view and share our FAQs, tips, and tricks about Cockpit and your app. See [FAQs and Tips \[page 209\]](#).

2.3.4.3.4.1 Viewing and Analyzing Some Usage Metrics of the System

View and analyze your usage metrics to get an overview of the global usage for your SAP CC system and SAP CC software product.

1. Launch the Web application in your browser. ([Launching Cockpit \[page 170\]](#))
2. In *Cockpit*, open the app *Display Usage Metrics* by clicking the tile.
The app displays all the recorded usage metrics that are available for your measured Core Server system. This data set represents the usage measurement of your system. It includes statistics about business traffic loads (daily numbers of items generated for accounting operations with back-end systems) and daily total numbers of subscriber accounts in master data.
3. According to your needs, you can:
 - *Visualize and analyze* this information by working with a chart ([Working with the Metric Chart \[page 202\]](#)) or with a data table ([Working with the Metric Table \[page 203\]](#)) that you can both configure to build your own personalized views.
 - *Manipulate* the metric chart or the metric table to focus on particular information or view the data history. You compare the system usage with its current sizing, the regular data volume growth, and the business traffic increase.
You can verify the adequacy of your system usage with respect to your license.
 - *Filter* some useless information. ([Filtering Usage Metrics \[page 204\]](#))
 - *Refresh* your browser to display the latest values in real time.
 - *Export* some measured data to a file ([Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)) or *download* a license auditing report.

i Note

The possible information is:

DATE AND STATUS	TRAFFIC LOAD MEASUREMENT	MASTER DATA VOLUME MEASUREMENT
• Date • Year • Month • Status	• Total Items • Postpaid Items • Prepaid Items • Total Items (Max.) • Postpaid Items (Max.) • Prepaid Items (Max.)	• Subscriber Accounts (Max.)

See here:

- [Working with the Metric Chart \[page 202\]](#)
- [Working with the Metric Table \[page 203\]](#)
- [Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#)
- [Verifying System Usage and Licenses \[page 207\]](#)
- [Downloading a License Auditing Report \[page 208\]](#)

Recorded Usage Metrics

Your app works with all the usage metrics that have been recorded by the system. It completes the information by calculating useful sums of item numbers and by identifying the maximum values observed for different periods.

Few peak values are incorporated in the SAP license reporting and auditing programs ([Verifying System Usage and Licenses \[page 207\]](#)).

The alphabetical list of possible information elements is:

ELEMENT	USAGE METRIC FOR THE LICENSING	DESCRIPTION
Date	N/A	The date when the SAP CC system recorded the corresponding usage metric.
Month	N/A	The recording month for a set of metric values when the SAP CC system measured its usage.
Postpaid Items	No	The cumulated number of postpaid items (such as postpaid charged items). The app calculates this value depending on the observed period.
Postpaid Items (Max.)	Yes	The maximum number of postpaid items (such as postpaid charged items) that was registered for a day.

ELEMENT	USAGE METRIC FOR THE LICENSING	DESCRIPTION
<i>Prepaid Items</i>	No	The cumulated number of prepaid items (such as prepaid charged items or refill records). The app calculates this value depending on the observed period.
<i>Prepaid Items (Max.)</i>	Yes	The maximum number of postpaid items (such as prepaid charged items or refill records) that was registered for a day. The app displays the value that relates to the observed period (year, month, day). It represents a load peak of business operations (charging, refilling, activation) processed by SAP Convergent Charging.
<i>Status</i>	No	The processing status (complete or partial) of the usage metric recording. When enabled, the daily recording of usage metrics may fail when no updater instance is available or when some rater instances are not available in the SAP CC system (see System Parameter Reference).
<i>Subscriber Accounts (Max.)</i>	Yes: Use the history of the recorded values to verify your license adequacy and future usage.	The maximum number of existing subscribed accounts that was observed during the considered period. The app displays the value that relates to the observed period (year, month, day). It represents a volume peak of master data managed by SAP Convergent Charging.
<i>Total Items</i>	No	The cumulated number of items generated by the SAP CC system when executing the convergent charging processes. The app calculates this value depending on the observed period.
<i>Total Items (Max.)</i>	Yes: Use the history of the recorded values to verify your license adequacy and future usage.	The maximum number of generated items that was registered for a day (continued 24 hours). The app displays the value that relates to the observed period (year, month, day).
<i>Year</i>	No	The calendar year when the SAP CC system recorded the corresponding usage metric.

i Note

The usage metric recording may be partial when the system failed to collect the complete statistical data. When viewing and analyzing the recorded data, pay attention to the recording status values that are available in your usage metrics.

When there is no available updater instance at the time of the daily recording, the recorded usage metrics are also set to the *Partial* status. Verify the value of the `METRIC_RECORDING_SCHEDULER_LAST_TRIGGER` indicator in your running system ([System Parameter Reference](#)).

2.3.4.3.4.1.1 Working with the Metric Chart

Working with the Metric Chart

The most up-to-date measurement is at the left of the chart. [Organize your chart](#) and create variants ([Using Variants \[page 205\]](#)) to save your dashboards.

⚠ Caution

First identify the type of the chart that you want to work with.
Then configure it and manipulate it.
By default, the app uses a chart type that shows all the most important metrics.

Actions

Use the interactive chart to view and analyze the recorded usage metrics graphically:

FOR...	JUST DO...
Changing the chart type.	Click the  Selected Chart Type button and select the most relevant type such as: • stacked column chart with two Y-axes (default in this app) • column chart • column chart with two Y-axes
Changing the structure of the chart (axis, data series).	Click the  Settings button and set up your options. Make sure that your chart definition is compliant with its type. Do not select a 2 Y-axes chart if you want to display a chart with a single axis.
Displaying values and recording dates of a data subset.	In the chart or in the legend, select a data bar, a dot, or a data series and click the Details button.
Observing the daily, monthly, or yearly details.	Click the Drill Down button and add all items (such as Date or Month) repeatedly.

FOR...	JUST DO...
Changing the chart display modes.	Click the relevant button:  to maximize (full screen)  to zoom in  to zoom out  to display both the chart and the table  to display the chart
Hiding the chart legend.	Click the  Toggle Legend Visibility button.
Saving a personalized variant as new dashboard.	Click the  Select Variant button or click the  Settings button in the chart bar. Complete the corresponding task successfully (Using Variants [page 205]).

→ Tip

In the chart bar, click the [Drill Down](#) button and select the [Date](#) item to show the daily values of the usage metrics.

2.3.4.3.4.1.2 Working with the Metric Table

Working with the Data Table

The most up-to-date measurement is at the top of the table.

[Organize your data table](#) and create variants to save your dashboards.

→ Tip

Group your usage metrics by years to display the sums of the daily business traffics. The app recalculates the cumulated numbers (such as [Total Items](#)) and identify the maximum numbers observed for each year.

Actions

Use the interactive table to view and analyze the recorded usage metrics:

FOR...	JUST DO...
Organizing the data columns (horizontal size, sorting, filtering, grouping).	Click or right-click the column headers.
Changing the structure of the table (displayed columns, column sorting, and grouping conditions).	Click the  Settings button and set up your options.
Changing the table display modes.	Click the relevant button:  to maximize (full screen)  to display both the table and the chart  to display the table
Exporting the content of the table to a Spreadsheet file.	Click the  Export to Spreadsheet button and complete the corresponding task successfully (Exporting Usage Metrics to a Spreadsheet File [page 206]).

2.3.4.3.4.1.3 Filtering Usage Metrics

Configure some filtering conditions that are based on information inclusion or exclusion.

Context

To facilitate your technical operations, the app allows you to define some filters during your working session:

- [Date](#)
- [Total Items](#)
- [Postpaid Items](#)
- [Prepaid Items](#)
- [Subscriber Accounts \(Max.\)](#)

Some additional filters are available such as the recording year, recording month, and the recording status.

Your app uses these filter definitions when you view and analyze the metric chart ([Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)) or the visualization table and when you export some usage metrics to a Spreadsheet file ([Exporting Usage Metrics to a Spreadsheet File \[page 206\]](#).)

By default, there is no filtering.

Procedure

You adapt your filters:

- In the SAP UI5 user interface, enter a filter condition in the input fields directly.
- Click  or  to define some filtering items or conditions carefully.
- Some user guidance is available, such as calendar, predefined value list, and auto-completion.

→ Tip

Enrich your user experience by learning how the app defines tokens when you set up filter conditions.
Look at the tokens in the filter fields.

- The app applies the filtering immediately.
- Click [Adapt Filters](#) to:
 - select the filters to show on the filter bar
 - save the filtering settings to a variant ([Using Variants \[page 205\]](#))
 - define new filtering conditions
 - restore the filtering settings
- If you quit the app, the filter definitions are lost.

2.3.4.3.4.1.4 Using Variants

Create and manage some useful variants to personalize your SAP user experience by defining your own working views (charts, tables).

Context

Variants provide a means to use the same selection criteria repeatedly. When you define a variant, you can save it using a variant name and there is no need to reenter the same selection criteria each time you open this app in Cockpit.

As an SAP CC administrator, *you define your useful variants and select the default one.*

Arrange your user interface and create a variant in your working environment.

Procedures

In your app, you perform the following procedures to create, load, and manage your personalized variants.

i Note

Variants depend on the web browser and the computer you work with. They are stored locally for later use.

To create a variant:

1. Arrange your user interface to display the expected level of information.
2. Click the  [Select Variant](#) button to open the window dedicated to the management of variants.
3. The new window appears. Click the [Save As](#) button.
4. Type the variant name that is relevant for you and your activity or task.
5. When you want that this personalized view to be loaded on startup, select the [Set as Default](#) option.
6. Click the [OK](#) button to create this variant.

To use a variant:

1. Click the  [Select Variant](#) button to open the window dedicated to the management of variants.
2. The new window appears. Click the row that relates to your variant.
3. Click the [Refresh](#) button to update your displayed information.

To manage your variants:

1. Click the  [Select Variant](#) button to open the window dedicated to the management of variants.
2. Click the [Manage](#) button.
3. Depending on your needs, configure the existing variants.
4. Click the [OK](#) button to save your changes.

2.3.4.3.4.2 Exporting Usage Metrics to a Spreadsheet File

Export a subset of usage metrics to a Spreadsheet file that you can use as a report of a system measurement, an archive, or a new document for further investigations.

Prerequisites

The data table must contain some usage metrics recorded by your Core Server system.

Context

For your administrative tasks, you want to retrieve some usage metrics of SAP CC for reporting or archiving a system measurement. You may want to rework the report before storing it or sharing it.

With the app, you can export the system measures to a Spreadsheet file easily. In your Spreadsheet application, you can edit or consolidate the data (master data growth, daily business traffic).

Procedure

In the app *Display Usage Metrics*:

- View the usage metrics recorded by your system ([Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#).)
- Filter some useless values [Filtering Usage Metrics \[page 204\]](#)).
- Click  to display the data table when necessary.
- Click  to export the data to a Spreadsheet file.

The app starts exporting and storing the information to a new file.

Depending on your local environment (Web browser, user settings, and operating system) the new file is in the [Download](#) folder for example

- Store the file in another location or open your Spreadsheet application to edit the report.
- Define your own charts and data tables.
- Save the new file.

2.3.4.3.4.3 Verifying System Usage and Licenses

Compare your SAP system usage measurement with your licenses and plan some extension.

Prerequisites

The usage metric recording is enabled in your system (`METRIC_RECORDING_SCHEDULER_ENABLED` in [System Parameter Reference](#)).

Context

SAP CC system measurement is based on usage metrics that are recorded daily. Only the yearly peak values are incorporated in the licensing:

- Daily business traffic: maximum numbers of charged items generated per day
- Master Data volume: maximum number of subscriber accounts stored in the system

Note that the measurement does not count neither the incoming traffic nor the SAP CC users.

Each productive SAP CC system counts the generated items in prepaid and postpaid payment environments. The output items reflect the business accounting operations that are received by a back-end billing system.

Procedure

In the app *Display Usage Metrics*:

- View the usage metrics recorded by your Core Server system [Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#).
- Click [View License Auditing Reports](#).
- View the current and past years in the preview.
- For each year, note the peak values and the event dates that are incorporated in the licensing.
- Verify that the measured values are compliant with the system sizing and the estimated data growth and traffic load increase.
- Ensure that you have adequate licensing for your installation and plan some extension.
- Complete your internal audit by viewing and analyzing the usage metrics more precisely ([Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)).

You can inspect the:

- history of the total numbers of subscriber accounts available in master data at the end of the day.
- evolution of the maximum numbers of output items (such as [Postpaid Items \(Max.\)](#)).

You can observe the numbers for different periods and time divisions.

Use a chart type of [Vertical Columns](#) to show the information.

2.3.4.3.4.4 Downloading a License Auditing Report

Download a license auditing file as a yearly report that you can declare or share with the SAP Global License Auditing Services (GLAS).

Prerequisites

Your measured system runs with a permanent SAP license.

Context

License auditing of SAP Convergent Charging is based on a yearly report for each productive Core Server system. You declare the results or send the reports to your SAP license auditor.

The XML files are in the format of the Global License Auditing Services (GLAS) reports. They include short statistics about peak numbers of business accounting operations and of subscriber accounts in master data.

A report includes information about your license and production system:

- SAP Installation Number (`INSTALLATION_NO` indicator in [System Parameter Reference](#)) and SAP System Number (`SYSTEM_NO` indicator in [System Parameter Reference](#)) that were received with the permanent license)

- SAP System ID (SID) (`SYSTEM_ID` parameter in [System Parameter Reference](#)) set at the time of the initial installation
- hardware keys of the hosts that compose your system (`HARDWARE_KEY` indicator in [System Parameter Reference](#))
- peak values tracked in usage metrics ([Verifying System Usage and Licenses \[page 207\]](#))

Procedure

In the app *Display Usage Metrics*:

- View the usage metrics recorded by your Core Server system ([Viewing and Analyzing Some Usage Metrics of the System \[page 199\]](#)).
- Click [View License Auditing Reports](#).
- Choose the reference year of the license audit report.
- Verify the usage metrics that are tracked in the report.
- Click  to download the report as an XML file.
The app starts exporting and storing the information to a new file. By default, the file name contains the SID of the Core Server system and the calendar year of the license audit report. Depending on your local environment (Web browser, user settings, and operating system) the new XML file is available in the [Download](#) folder for example.
- When you are ready to share the auditing results, send the report file to your SAP license auditor or consider the self-declaration on SAP Support Portal.

Note

For more information about performing an SAP system measurement or uploading the GLAS report to the SAP Global Auditing License Services team, see:

[SAP System Measurement](#) .

To determine and share the usage of your SAP CC systems, SAP Convergent Charging is part of the [SAP Self-Declaration Product Measurement](#) program.

2.3.4.3.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 210\]](#)

2.3.4.3.5.1 Frequently Asked Questions (FAQs)



What does partial status mean?

The recording of usage metrics may fail when the active updater instance or a rater instance is down in the Core Server system.

2.3.4.3.5.2 Tips and Tricks



How to view the usage metrics for a given day?

In the **Display Usage Metrics** app, you can [filter \[page 204\]](#) the system measurements by recording date. Just use the *Date* filter and set up the relevant condition to include the expected day.



Use variants to save your environment.

In the **Display Usage Metrics** app, you can save your filtering criteria and display settings by creating a new variant in your working environment.

2.3.4.3.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Error message: 'Sorry, the app can't load the license auditing reports. Please try again later. If this happens again, check the status of the updater and dispatcher instances in the Core Server system and contact the IT administrator of the intermediate Java Web Server system.'

This error message means that the **Display Usage Metrics** app cannot receive any reports from the **Cockpit** back-end or from the target Core Server system. SAP SE suggests you to:

- Wait for few seconds, refresh the page, and view the reports again
- As an [SAP CC administrator](#), ensure that the **primary** dispatcher is neither down nor overloaded, using the system logs or a monitoring system (such as [CA Introscope](#) or [SAP Solution Manager](#))
- As the **active** updater is in charge of processing the license auditing reports, ensure that this instance is neither down nor overloaded
- Verify the performance and health of the communication networks between your browser, the Java Web Server, and the Core Server system
- Verify the logs and traces of the Core Server system
- Verify the logs and traces of the Java Web Server where **Cockpit** is deployed on. Search for some entries recorded by the **Cockpit** back-end application.

i Note

For security reasons, SAP SE recommends that you create a service user dedicated to connections between SAP CC Cockpit and the Core Database. This user shall be granted a read access to database views pointing on the `METRIC_RECORD`, `FILE_METADATA` and `FILE_METADATA_PATH` tables.

2.3.4.4 Display User Operations

With the app **Display User Operations**, you view and inspect the audited operations and continue your investigations. You can also view the related object change log when the audited operation modified the data object (creation, modification, deletion). Only an SAP CC user granted the “Administration” or “Remote Support” role can view this information.

[What's New? \[page 211\]](#)

[About This App \[page 212\]](#)

[Important Concepts \[page 213\]](#)

[Tasks \[page 213\]](#)

[FAQs and Tips \[page 218\]](#)

[Troubleshooting \[page 219\]](#)

2.3.4.4.1 What's New?

This section highlights the **main changes in the app** Display User Operations that relate to new or changed features.

What's New in SP 5

As of SP 5 for release 5.0, the **Display User Operations** app provides SAP CC administrators the possibility to export the values of a mapping table or range table snapshot from an audit log to a csv file.

What's New in SP 2

As of SP 2 for release 5.0 (see SAP Note [2556486](#) ) , SAP Convergent Charging provides SAP CC administrators with a **new administration tool** to facilitate your technical tasks with user operations: **Display User Operations** is available in your launchpad.

Discover this new app and get some main concepts if you are not familiar with user operations.

With this app you complete the following tasks quickly:

- [Filtering User Operations \[page 214\]](#)
- [Viewing and Auditing Some User Operations \[page 215\]](#)
- [Exporting User Operations and Objects Values \[page 216\]](#)

2.3.4.4.2 About This App

Target Audience

The app Display User Operations is mainly intended for the IT Administrator, Operations Team Expert and Support Specialist (SAP SE, Local Support Team).

App Summary

The app Display User Operations provides you with the following capabilities:

- [Filtering User Operations \[page 214\]](#)
- [Viewing and Auditing Some User Operations \[page 215\]](#)
- [Exporting User Operations and Objects Values \[page 216\]](#)

App Layout

The layout of the app Display User Operations is split into two areas:

- The *Header* area provides you with different fields whose content can be customized to fit specific needs. For further information about this area, refer to the [Filtering User Operations \[page 214\]](#) task.
- The *Operations* area provides you with the list of all the recorded user operations. For further information about this view, refer to the [Viewing and Auditing Some User Operations \[page 215\]](#) topics.

2.3.4.4.3 Important Concepts

As an SAP CC administrator, you are aware of the following important concepts to use the app Display User Operations in your SAP system landscape.

User Operations

SAP Convergent Charging gives the possibility to track the user operations requested by the SAP CC users (individual users and service users), whatever the used user interface or technical interface (Web Services or HCI²⁰) is.

The SAP CC Core Server system audits all the requested operations by recording their execution and result (success, failure) automatically within the Core Database system.

The SAP CC Display User Operations user interface gives the possibility to view and inspect the audited operations and to continue your investigations. You can also view the related object change log when the audited operation modified the data object (creation, modification, deletion). Only an SAP CC user granted the "Administration" or "Remote Support" role can view this information.

You can audit:

- The successful operations that modified the persistent configuration data in the Core Database
- The successful operations that modified state of the the SAP CC Core Server system
- All the failed operations

For security reason, you can audit the successful search operations that retrieve lists of audited user operations.

For more information , refer to the [Recording of User Operations](#) section of the [SAP CC 5.0 Application Help](#) documentation.

2.3.4.4.4 Tasks

With the app Display User Operations, you complete the following administrative tasks:

- [Filtering User Operations \[page 214\]](#)
- [Viewing and Auditing Some User Operations \[page 215\]](#)

²⁰ Http Communication Interface

- [Exporting User Operations and Objects Values \[page 216\]](#)

→ Tip

To enrich your SAP user experience, view and share our FAQs, tips, and tricks about Cockpit and your app. See [FAQs and Tips \[page 218\]](#).

2.3.4.4.1 Filtering User Operations

To Filter user operations

In the app *Display User Operations*:

- Select a variant
- Adapt filters
- Click [Go](#)

Variants

You can manage variants to:

- Search for variants
- Add or remove variants
- Select a variant as the default variant

You can create variants or change existing variants to save filters that meet specific needs.

To create a variant or change an existing variant, adapt filters, and then save your changes to a new or existing variant.

→ Tip

You can start a search of user operations by just selecting a variant without clicking [Go](#) if you have set up the variant accordingly (*Execute* on *Select*).

Adapt Filters

To adapt filters, you can:

- Search for filters
- Add or remove filter criteria
- Restore criteria that you have just changed
- Define the conditions of each filter by including or excluding criteria values

i Note

Filter criteria are described in the [Viewing and Auditing Some User Operations \[page 215\]](#) section.

2.3.4.4.2 Viewing and Auditing Some User Operations

To view user operations

in the app *Display User Operations*:

- Filter user operations ([Filtering User Operations \[page 214\]](#))
- Click [Go](#)

i Note

A user operation that is highlighted in red means that an error has occurred when the user operation has been executed. You can consult the error in the [Error Message](#) Column.

Settings

You can set up the display of user operations by clicking [Settings](#) to:

- Add or remove columns
- Sort any column in ascending or descending order
- Group one or more columns to display user operations according to the order of the chosen columns

i Note

When grouping columns, make sure that the chosen columns are part of the table.

The following table describes the columns that display audited user operations and information details:

COLUMN	DESCRIPTION	COMMENT
Date/Time	The date and time of the operation execution.	
Object ID	The identifier of the object changed by the operation.	
Operation	The name of the executed operation.	For example, import, user deletion, or creation of a subscriber mapping table.
User	The name of the SAP CC user who has initiated the audited operation.	
Object Snapshot Before Modification	This column contains a checkmark if an object snapshot was created before the operation execution time.	
Object Snapshot After Modification	This column contains a checkmark if an object snapshot was created after the operation execution time.	
Status	The result of the operation (Successful or Failed).	
Action	The type of the operation such as creation, modification, or deletion.	
Date	The date of the operation execution.	

COLUMN	DESCRIPTION	COMMENT
<i>Error Message</i>	The displayed message when the operation has failed.	Messages are displayed only if the <i>Status</i> column is <i>Failed</i> .
<i>Instance ID</i>	The identifier of the SAP CC system instance that has executed the operation.	
<i>Object ID Part 2</i>	An additional identifier of an object.	
<i>Object ID Part 3</i>	An additional identifier of an object.	
<i>Object Reference</i>	The internal identifier of the object.	
<i>Object Type</i>	The type of an object.	For example, a mapping table, a charge plan, or a user.
<i>Operand</i>	The arguments of the operation.	For example, an object identifier.
<i>Operation Reference</i>	The internal identifier of the operation execution.	
<i>Success</i>	The column contains <i>Yes</i> if the operation was successful; otherwise, <i>No</i> .	

2.3.4.4.3 Exporting User Operations and Objects Values

To export user operations

In the app *Display User Operations*:

- [Filter \[page 214\]](#) user operations
- Click *Export to Spreadsheet*

i Note

Microsoft Excel files of user operations are saved according to the download settings of your browser.

The export of user operations is only executed if the number of user operations does not exceed the value of the `query.limit.fetchSize` parameter that is defined in the configuration file of the deployed SAP CC *Cockpit*.

If the number of user operations exceeds the default value of 10,000, no data is exported. Adapt your filters to adjust the number of user operations to export.

To export object values

In the app *Display User Operations*:

- [Filter \[page 214\]](#) user operations
- Select the objects to export the values from
- Click the button  *Before Modification* (or  *After Modification*) to export the values of mapping tables or range tables²¹ snapshots in a ZIP file named: `export_cc_objects_<current date>.zip` where `<current date>` is the date when the download has been effective in the time zone of the user and

comply with the following format: yyyyMMddHHmmss (the file name is not customizable). This ZIP archive contains:

- a CSV file containing the values of the mapping tables or range table
- an XML file containing data from the mapping table or range table header (as such as its name, class, and so on...)

Note

- If the class of the mapping table or the range table has been modified so that it is no longer compatible with the mapping table or the range table to be exported, the values of the mapping table or the range table snapshot will be exported in XML
- For mapping tables, a row of the CSV file will have the following format: `<row id>, <input values>, <version start date>, <version end date>, <output values>` where:
 - `<row id>` is the identifier of the row
 - `<input values>` are all the values for the input columns
 - `<version start date>` is the effective date of the version complying with the default date format
 - `<version end date>` is the expiration date of the version complying with the default date format
 - `<output values>` are all the values for the output columns. Number typed values comply with the default number format
- For range tables, a row of the CSV file will have the following format: `<version start date>, <version end date>, <input values>22, <upper bound>, <output values>` where:
 - `<version start date>` is the effective date of the version complying with the default date format
 - `<version end date>` is the expiration date of the version complying with the default date format
 - `<input values>` are all the input values of a range set
 - `<upper bound>` is the upper bound of a range
 - `<output values>` are the output values of the range. Number typed values comply with the default number format
- This process is also valid for **subscriber mapping tables** and **subscriber range tables**

→ Remember

To facilitate the search of object snapshots, you can use the columns *Object Value After Modification*, *Object Value Before Modification*, *Action*, and *Status* by clicking , and then selecting these columns.

Downloaded files are saved according to the download settings of your browser.

Object values can be retrieved by using the  *Before Modification* (or  *After Modification*) button.

Operations related to administration such as parameter modification or user authorization have no object snapshots.

²¹ or subscriber mapping tables or subscriber range tables

²² if any

You can only export object snapshots that are related to actions (creation, modification, or deletion) and meet the following combinations:

ACTION	BEFORE MODIFICATION	AFTER MODIFICATION
Creation	No	Yes
Modification	Yes	Yes
Deletion	Yes	No

2.3.4.4.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 218\]](#)

[Tips and Tricks \[page 218\]](#)

2.3.4.4.5.1 Frequently Asked Questions (FAQs)



Where are my variants?

The location of the variants depends on the configuration of **Cockpit**. It depends whether **Cockpit** uses a local storage or an embedded database. In case of a local storage, you might not be able to reuse a variant if you used another browser or another computer.

2.3.4.4.5.2 Tips and Tricks



Use variants to save your environment.

In the **Display User Operations** app, you can save your filtering criteria and display settings by creating a new variant in your working environment.

2.3.4.4.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



I cannot export my filtered user operations.

The number of user operations to export is limited and cannot exceed the value defined in the configuration file of **Cockpit**. This value is set by default to 10,000. SAP SE recommends that you contact your [SAP CC administrator](#) to decide whether it can be pertinent to modify this value, or not. In case this value cannot be modified, SAP SE recommends that you adapt your filters in order to decrease the number of user operations to export.

i Note

For security reasons, SAP SE recommends that you create a service user dedicated to connections between SAP CC Cockpit and the Core Database. This user shall be granted a read access to database views pointing on the `OBJECT_CHANGE_LOG`, `USER_OPERATION`, `FILE_METADATA` and `FILE_METADATA_PATH` tables.

2.3.4.5 Manage Chargeable Item Classes

In SAP Convergent Charging, chargeable item classes represent the description of the chargeable items that have the same data structure. A chargeable item class contains a list of properties that characterize each usage event used inside price plans or charging plans for charging purposes. With the app **Manage Chargeable Item Classes**, you create, search for, view, and maintain these objects.

These properties can be:

- Default properties, used to provide basic information about the consumption (aka usage) of the service to monetize, and whose definition cannot be modified
- User-defined properties, created and modified by SAP CC users according to their business or technical needs

[What's New? \[page 220\]](#)

[About This App \[page 220\]](#)

[Important Concepts \[page 221\]](#)

[Tasks \[page 221\]](#)

[FAQs and Tips \[page 227\]](#)

[Troubleshooting \[page 228\]](#)

2.3.4.5.1 What's New?

This section highlights the **main changes in the app Manage Chargeable Item Classes** that both relate to new or changed features.

What's New in SP 6

Three buttons ( [Sort](#) ,  [Filter](#) , and  [Group](#)) replace the  unique button to enhance your user experience and facilitate the result list organization and display.

What's New in SP 5

As of SP 5 for release 5.0, **Manage Chargeable Item Classes** is a **new app** in your Convergent Charging Cockpit user interface. The app enables the pricing specialists to configure and maintain chargeable item classes in the pricing catalog for a service provider company that wants to monetize its subscription- and usage-based services.

2.3.4.5.2 About This App

Target Audience

The app Manage Chargeable Item Classes is mainly intended for the Pricing Specialist (Convergent Charging).

App Summary

The app Manage Chargeable Item Classes provides you with the following capabilities:

- Easier configuration of your chargeable item classes, by [creating \[page 224\]](#) new ones or [copying \[page 224\]](#) existing chargeable item classes
- [Searching for \[page 222\]](#) chargeable item classes within the list of existing ones and organize (sort, filter, and group) the result list according to your needs
- [Viewing or reviewing \[page 223\]](#) a given chargeable item class
- Maintaining your master data by [editing \[page 226\]](#) a released chargeable item class or [deleting \[page 226\]](#) it in case it is no longer needed

App Workspace

The workspace of the app Manage Chargeable Item Classes is made up with two main areas:

- A **left area** provides you with a result table containing a list of chargeable item classes whose content can be personalized to fit specific user needs. See [Listing and Searching For Chargeable Item Classes \[page 222\]](#).
- A **right area** provides you with the detailed information related to a given chargeable item class. This area is only visible when a chargeable item class is selected in the left area, or during the creation of a new chargeable item class. See [Viewing a Chargeable Item Class \[page 223\]](#) and [Creating a Chargeable Item Class \[page 224\]](#).

2.3.4.5.3 Important Concepts

As an Pricing Specialist (Convergent Charging), you are aware of the following concepts to use the app Manage Chargeable Item Classes.

Chargeable Item

In SAP Convergent Charging 5.0, a *chargeable item* is the technical result of an external action or usage (such as a mobile phone, telephone call or Internet service) that the consumer carries out in the framework of marketable services. Massively sent to SAP CC by external mediation systems for charging purposes, this technical transactional data record contains the properties and their associated values required by the different charging operations.

Chargeable Item Class

In SAP Convergent Charging 5.0, a *chargeable item class* is a custom data which defines a common structure (input and output value sets) that can be used for several chargeable items.

For further information about Chargeable Item Classes, refer to the dedicated [section](#) of the [SAP CC 5.0 Application Help](#) documentation.

2.3.4.5.4 Tasks

With the app Manage Chargeable Item Classes, you complete the following business configuration tasks to configure and maintain some master data quickly:

- [Creating a Chargeable Item Class \[page 224\]](#)

- [Listing and Searching For Chargeable Item Classes \[page 222\]](#)
- [Viewing a Chargeable Item Class \[page 223\]](#)
- [Editing a Chargeable Item Class \[page 226\]](#)
- [Deleting a Chargeable Item Class \[page 226\]](#)

i Note

As a prerequisite, a pricing catalog must exist for the marketable service or service bundle for which you design and set up the pricing configuration.

→ Tip

- In addition, you can use the Core Tool user interface to:
 - Save a chargeable item class to an XML file for troubleshooting purpose.
- To enrich your SAP user experience, you can also:
 - Browse the list of FAQs and tips.
 - Consult the [Troubleshooting \[page 228\]](#) section in case you encounter issues or difficulties when using the app.

2.3.4.5.4.1 Listing and Searching For Chargeable Item Classes

To list or search for some chargeable item classes, you use the left area of the **Manage Chargeable Item Classes** app. This area is the area of the workspace that is available when entering the app, and contains the following parts:

- An upper part, that contains:
 - A search field, that you can use to enter search criteria
 - A [Create](#) button that you can use to create a new chargeable item class. For further information, refer to the [Creating a Chargeable Item Class \[page 224\]](#) task.
 - Three buttons that you use to tune and organize the content of the result list and fit your specific needs:
 -  [Sort](#)
 -  [Filter](#)
 -  [Group](#)
- A table, that is located on the lower part of this area and that contains a list of chargeable item classes whose scope can be customized to fit specific needs using the following criteria:
 - The name of the chargeable item class
 - The name of the pricing catalogs you are assigned to
 - The description of the chargeable item class, if any

⚠ Caution

If you are assigned to a single pricing catalog, some restrictions apply to you and you can only work with the chargeable item classes that belong to this catalog. Verify with your user administrator if a catalog

restriction is set in your SAP CC user profile. For further information, refer to the [Setting Up a User \[page 766\]](#) section available in the [Core Tool \[page 348\]](#) documentation.

Available Information

The following table contains the list of displayed information:

Element	Description
<i>Name</i>	The name of the chargeable item class. If a description exists, it is displayed just beneath the name of the chargeable item class.
<i>Catalog</i>	The name of the pricing catalog containing the chargeable item class.

Search For Chargeable Item Classes

To search for some chargeable item classes, enter your search criteria in the search field, and click the  button. The content of the table is then updated according to the retrieved content.

i Note

Organize the content of the result table by:

- Sorting the results by class names or pricing catalogs
- Filtering the results by pricing catalogs
- Grouping the results by pricing catalogs

→ Tip

You can use the  button to reset your search criteria.

2.3.4.5.4.2 Viewing a Chargeable Item Class

The screen used to display a given chargeable item class contains the following parts:

- A title bar
- A header
- A main content

Title Bar

The title bar displays the name of the chargeable item class and contains the different buttons related to the actions you can perform on this chargeable item class according to your profile:

- [Edit](#), that you can use to modify the chargeable item class. For further information, refer to the [Editing a Chargeable Item Class \[page 226\]](#) task.
- [Delete](#), that you can use to delete the chargeable item class from the target system and its back-end database. For further information, refer to the [Deleting a Chargeable Item Class \[page 226\]](#) task.
- [Copy](#), that gives the possibility to create a new chargeable item class by duplicating the currently displayed chargeable item class.

i Note

In addition to the action buttons, you also have the following buttons to improve your user experience:

- , that you can use to hide the left area of the screen and focus on the chargeable item class itself
- , that you can use to quit the display of the chargeable item class and return to the search result list

Header

The header, that can be collapsed or expanded according to your needs, contains the following high-level information related to the chargeable item class:

- The name of the pricing catalog that the chargeable item class belongs to
- The optional description of the chargeable item class

Main Content

The main content part is split in two different tabs:

- [Default Properties](#), that contains the list of the three mandatory default properties:
 - [Consumption Date](#): This property describes the date and time when the service is consumed by the end customer
 - [User Identifier](#): This property describes the identifier of the end customer consuming the service
 - [Service Identifier](#): This property describes the identifier of the service consumed by the end customer
- [User Properties](#), that contains the list of the custom properties you may need to add to configure your price plan.

2.3.4.5.4.3 Creating a Chargeable Item Class

As an Pricing Specialist (Convergent Charging), you configure a new chargeable item class:

- By copying an existing chargeable item class, using the [Copy](#) button
- From scratch, using the [Create](#) button

When clicking the [Copy](#) button on a displayed chargeable item class, a draft version of this copied chargeable item class is created, containing the same information and rows. Only the name of this new chargeable item class differs, for unicity purpose.

When clicking the [Create](#) button, an empty chargeable item class is created, and you can use the recommendations afterwards to fill the different information. The newly created chargeable item class is recorded as a draft. This draft remains valid until you click the [Save](#) button, that definitively creates the chargeable item class in the target system and its back-end database.

→ Tip

For readability and productivity purposes, SAP recommends that you click the  button when editing the chargeable item class, in order to hide the left area of the screen and focus on the chargeable item class itself.

Header Tab

The following table contains the list of information you need to fill in the [Header](#) tab:

Element	Description and Recommendations	Type
Name	The name of the chargeable item class, that must be unique among the list of existing chargeable item classes	M
Catalog	The name of the pricing catalog this chargeable item class must belong to	M
Description	A description of the role of this chargeable item class (2,000 characters maximum)	O

Legend: M: Mandatory, O: Optional

Definition Tab

The [Definition](#) tab contains two tables representing respectively the:

- [Default Properties](#) which describe each usage event for rating purposes (not alterable)
- [User Properties](#) you set up in order to design your price plan:
 - Click the [Add](#) button to add a new user property and fill the different fields:
 - [Name](#): Provide a significant name for the property
 - [Type](#): Select [Date/Time](#), [String](#) or [Number](#) according to your needs
 - [Description](#): define the property shortly (optional)
 - Click the [Copy](#) button to copy a selection of properties.
 - Click the [Remove](#) button to delete a selection of properties.

- Click the  or the  button to move a selected property down or up.

Once you finish your edition, click:

- [Save](#) to save your chargeable item class in the database.
- [Cancel](#) to ignore this new chargeable item class. In this case, you are requested to confirm your choice and then, all your changes are lost.

2.3.4.5.4.4 Editing a Chargeable Item Class

When a chargeable item class is selected, you can click the [Edit](#) button to switch to the editing mode. The [Definition](#) tab is displayed in edit mode. In this tab, you can:

- Modify the user properties descriptions
- Add new user properties
- Clone a user property

To change the description of the chargeable item class, click on the [Header](#) tab and modify the [Description](#) field.

For further informations about the editing mode, refer to the [Creating a Chargeable Item Class \[page 224\]](#) section in this documentation.

The modified chargeable item class is recorded as a draft. This draft remains valid until you click the [Save](#) button, that definitively modifies the chargeable item class in the target final system and its back-end database.

i Note

If the chargeable item class is valid, it is saved and automatically released as unique version when clicking the [Save](#). Otherwise, a validation window is displayed to inform you what and where the errors are. Once the corrections are done, the validation window hides and you can save the chargeable item class.

2.3.4.5.4.5 Deleting a Chargeable Item Class

When a chargeable item class is selected in the search result list, you can click the [Delete](#) button located in the title bar to definitively remove this chargeable item class from the back-end database.

By clicking the [Delete](#) button, you are requested to confirm your choice in a confirmation window.

2.3.4.5.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 227\]](#)

[Tips and Tricks \[page 228\]](#)

2.3.4.5.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage Chargeable Item Classes** app indicates the total number of chargeable item classes that are currently released in SAP Convergent Charging 5.0. If your user profile is assigned to a single pricing catalog (catalog restriction), this number counts the released chargeable item classes for this catalog.

i Note

This number does not take drafts into consideration.



Searching for chargeable item classes does not return the expected results list.

For a better user experience, the search mechanism is **case-insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** application and the Core Server system. In case a user created a chargeable item class in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft chargeable item classes?

No. Only you can access and display your drafts, until they are unlocked. These interim versions are personal and available with your user session.

i Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.



Why can't I copy a draft chargeable item class?

The copy mechanism is only possible for released chargeable item classes.

2.3.4.5.2 Tips and Tricks



How to access a chargeable item class quickly?

Just use the browser bookmarks to access a given chargeable item class directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this chargeable item class.

2.3.4.5.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Error message: 'No matching chargeable item classes to display'

This error message means that the **Manage Chargeable Item Classes** app cannot display the requested chargeable item class. This situation may be due to:

- A parallel deletion of this chargeable item class by another individual user or service user (CRM²³ application, provisioning system). Try to click the  button to refresh the list of chargeable item class and check whether it still exists, or not. In case your chargeable item class is still present, ask your [system administrator](#) to audit the user operations.
 - Insufficient privileges associated to your user profile, or a catalog restriction. Contact your [user administrator](#) to verify your user profile (credentials, lock status, password expiration, assigned roles, pricing catalog restriction).
 - An incorrect bookmark or link. Try to use the search mechanism to retrieve your chargeable item class. In case you find your chargeable item class, update your bookmark and share the changes with your team members.
 - Other technical issues. Contact your local support team or your SAP Support Team.
-

2.3.4.6 Manage Charged Item Classes

With the app **Manage Charged Item Classes**, you configure and maintain the charged item classes and the associated billable item mapping that are necessary for the pricing configuration of your subscription- and usage-based services.

In SAP Convergent Charging, [charged item classes](#) define structures of output data named [charged items](#) and generated by the SAP CC system out of the charging operations for billing, invoicing, or revenue recognition purposes.

In an integrated [SAP Solution](#), the system uses these settings to convert charged items into billable items before transferring them to SAP Convergent Invoicing in SAP ERP, SAP S/4HANA, or SAP S/4HANA Cloud.

[What's New? \[page 229\]](#)

[About This App \[page 229\]](#)

²³ Customer Relationship Management

[Important Concepts \[page 230\]](#)

[Tasks \[page 233\]](#)

[FAQs and Tips \[page 243\]](#)

[Troubleshooting \[page 245\]](#)

2.3.4.6.1 What's New?

This section highlights the **main changes in the app** Manage Charged Item Classes that relate to new or changed features.

What's New in SP 6

As of SP 6 for release 5.0, **Manage Charged Item Classes** is a **new app** in your Convergent Charging Cockpit user interface. The app enables pricing specialists to configure and maintain charged item classes and associated billable item mapping in the pricing catalog for a service provider company that wants to monetize its subscription- and usage-based services.

Discover the app on your own or get started with this product documentation and user assistance.

2.3.4.6.2 About This App

Target Audience

The app Manage Charged Item Classes is intended for the SAP CC pricing specialists.

App Summary

The app Manage Charged Item Classes provides you with the following capabilities for you [charged item classes \[page 230\]](#):

- Easier configuration of your charged item classes, by [creating \[page 233\]](#) new ones or copying existing charged item classes (and their associated billable item mapping)
- [Guided configuration \[page 236\]](#) of the charged item class and its billable item mapping based on billable item classes managed in SAP Convergent Invoicing
- [Searching for \[page 239\]](#) charged item classes and organizing (sort, filter, and group) the result list according to your needs

- [Viewing and reviewing \[page 240\]](#) a given charged item class
- Maintaining your master data by [editing \[page 242\]](#) a released charged item class or [deleting \[page 243\]](#) it in case it is no longer needed
- [Refreshing \[page 241\]](#) the billable item mapping to synchronize a charged item class and its billable item class again

App Workspace

The workspace of the app Manage Charged Item Classes is made up with two main areas:

- A **left area** provides you with a result table containing a list of charged item classes whose content can be personalized to fit specific user needs. See [Listing and Searching For Charged Item Classes \[page 239\]](#).
- A **right area** provides you with the detailed information related to a given charged item class and its associated billable item mapping. This area is only visible when a charged item class is selected in the left area, or during the creation of a new charged item class. See:
 - [Creating or Copying Your Charged Item Classes \[page 233\]](#)
 - [Creating a Charged Item Class from a Billable Item Class \[page 236\]](#)
 - [Viewing a Charged Item Class \[page 240\]](#)

2.3.4.6.3 Important Concepts

As a pricing specialist for SAP CC, you are aware of the following **concepts** before using the app Manage Charged Item Classes.

See here:

[Charged Items and Classes \[page 230\]](#)

[Billable Items, Classes, and Billable Item Mapping \[page 231\]](#)

2.3.4.6.3.1 Charged Items and Classes

As an SAP CC pricing specialist, you are aware of the following concepts to use the app Manage Charged Item Classes.

Charged Items

In SAP Convergent Charging 5.0, a *charged item* is a transactional data for billing, invoicing, or revenue recognition operations. The SAP CC system generates a high volume of this output data as results of the charging operations. This outgoing data contains multiple custom data fields filled in by the system and

depending on the pricing configuration for the consumed service. In an integrated *SAP Solution*, SAP CC massively sends these charged items in the form of [billable items \[page 232\]](#) to SAP Convergent Invoicing.

The SAP CC pricing specialist designs and configures the generation of charged items by setting up a charged item class first, and a charge plan or an allowance plan second.

Charged Item Class

In SAP Convergent Charging 5.0, a *charged item class* is a master data for the service pricing configuration. This class typically defines both a common data structure based on output fields and initial settings for filling values of these fields in by the system (constant values, values set by the system at runtime, redefinitions in charge plans or allowance plans). In charge plans and allowance plans, the generation of charged items is customized by the pricing specialist for each chargeable service to monetize.

See: [Creating or Copying Your Charged Item Classes \[page 233\]](#)

In an integrated *SAP Solution*, the pricing specialist maps fields in a charged item class onto fields in a billable item class.

See: [Creating a Charged Item Class from a Billable Item Class \[page 236\]](#)

Related Information

For more information and user assistance **about the concepts**, refer to the Application Help documentation for SAP Convergent Charging and see:
[Charged Item Class](#)

2.3.4.6.3.2 Billable Items, Classes, and Billable Item Mapping

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP Convergent Invoicing. For more information and user assistance, see the integration guides at help.sap.com/brim.

As an SAP CC pricing specialist, you are aware of the following concepts to use the app Manage Charged Item Classes.

Billable Items

In an integrated [SAP Solution](#) scenario, SAP Convergent Charging 5.0 automatically converts charged items into billable items and bulkloads the data items to SAP Convergent Invoicing in SAP ERP, SAP S/4HANA) or SAP S/4HANA Cloud.

A [billable item](#) is a transactional data to be billed in SAP Convergent Invoicing. A billable item class defines a common data structure for billable items.

The SAP CC pricing specialist designs and configures the conversion of charged items into billable items by mapping the related charged item class onto the corresponding billable item class.

Billable Item Class

A [billable item class](#) defines a common data structure for corresponding billable items. The configuration of a billable item class specifies the technical characteristics (control rules) and properties (data fields) of billable items based on the class.

This class suits the business needs and requirements. It defines the necessary custom fields.

Billable Item Mapping

In SAP Convergent Charging 5.0, the [billable item mapping](#) is a master data for the service pricing configuration. It is a field-to-field mapping between the data fields of a charged item class (source) and target fields of a corresponding billable item class.

The SAP CC pricing specialist designs and configures the generation of billable items by setting up a charged item class and its associated billable item mapping. The specialist maps each source field onto a target field.

See:

- [Creating a Charged Item Class from a Billable Item Class \[page 236\]](#)
- [Refreshing the Billable Item Mapping \[page 241\]](#)

Related Information

For more information and user assistance **about the concepts**, refer to the Application Help documentation for SAP Convergent Charging and see:

[Billable Item Mapping](#)

2.3.4.6.4 Tasks

With the app Manage Charged Item Classes, you complete the following business configuration tasks to configure and maintain some master data quickly:

- [Creating or Copying Your Charged Item Classes \[page 233\]](#)
- [Creating a Charged Item Class from a Billable Item Class \[page 236\]](#)
- [Creating a Pricing Catalog \[page 238\]](#)
- [Listing and Searching For Charged Item Classes \[page 239\]](#)
- [Viewing a Charged Item Class \[page 240\]](#)
- [Refreshing the Billable Item Mapping \[page 241\]](#)
- [Associating a Charged Item Class with a Billable Item Class \[page 242\]](#)
- [Editing a Charged Item Class \[page 242\]](#)
- [Deleting a Charged Item Class \[page 243\]](#)

i Note

As a prerequisite, a pricing catalog must exist for the marketable service or service bundle for which you design and set up the pricing configuration.

2.3.4.6.4.1 Creating or Copying Your Charged Item Classes

Configure a new charged item class or copy an existing one to be able to define some pricing logic in your charge plans or allowance plans.

As an SAP CC pricing specialist, you design and configure the data fields that must be generated in charged items as output data. In an integrated [SAP Solution](#), you also set up the billable item mapping that configures the conversion of charged items into billable items at runtime. See [Creating a Charged Item Class from a Billable Item Class \[page 236\]](#).

You configure a new charged item class:

- By copying an existing charged item class, using the [Copy](#) button in the right area
- From scratch, using the [Create](#) button in the left area

Create a Charged Item Class

When clicking [Copy](#) on a displayed charged item class, a draft version of this copied class is created, containing the same information and content. Only the name of this new charged item class differs, for unicity purpose.

When clicking [Create](#), an empty charged item class is created, and you can use the recommendations afterwards to fill in the different information. The newly created charged item class is recorded as a draft. This draft remains available until you click the [Save](#) button, which definitively creates the charged item class in the target SAP CC system (and its back-end database system) as the released version.

→ Tip

For readability and productivity purposes, SAP recommends that you click  when editing the charged item class, in order to hide the left area of the screen and focus on the charged item class itself.

Fill in the following tabs:

- [Header \[page 234\]](#)
- [Definition \[page 234\]](#)

Check the signaled errors by clicking the button  on the footer toolbar.

Once you have finished, click:

- [Save](#) to save your charged item class to the Core Server system and its back-end database.
- [Cancel](#) to cancel the creation of this new class. In this case, you are requested to confirm your choice and then, all your interim changes are lost. The app deletes your personal draft.

2.3.4.6.4.1.1 Header (Tab)

In your app Manage Charged Item Classes, the following table contains the list of information you need to fill in the [Header](#) tab:

Element	Description and Recommendation	Required
Name	Type the identification name of the charged item class. The name must be unique among the list of existing charged item classes.	Yes
Catalog	Select the name of the pricing catalog this charged item class must belong to. If needed, create a new catalog [page 238] for your service pricing by clicking the New button.	Yes
Description	Type a multiline description about the scope of your charged item class (2,000 characters maximum).	No

2.3.4.6.4.1.2 Definition (Tab)

In your app Manage Charged Item Classes, the [Definition](#) tab contains the definitions of the data fields for your charged item class. When useful, you can quickly filter some fields by using the search  button.

In the [Fields](#) configuration table, set up the fields that suit your business or technical requirements:

Element	Description and Recommendation	Required
Name	Type the identification name of the data field in charged items generated by the system. The name must be unique among the list of already-defined fields.	Yes

Element	Description and Recommendation	Required
<i>Type</i>	Select the relevant type of values: • <i>String</i> • <i>Number</i> • <i>Date/Time</i> • <i>Boolean</i>	Yes
<i>Value</i>	Choose the appropriate option to define how the system generates the corresponding charged items at runtime: • <i>Undefined</i>: Use this option if you do not want to define a default value for this data field in charged items. Then you will have to define a value for this data field when configuring a charge plan or an allowance plan. By default, the data field will have no value in charged items generated by the system. • <i>Property</i>: Select (<i>Empty</i>) or choose a value from the rating, charging, or allowance contexts. ◦ If you select (<i>Empty</i>), the data field will have no value in charged items generated by the system. As the pricing specialist, you can force the redefinition when configuring a charge in a charge plan (or the allowance logic in an allowance plan). ◦ If you type or select an item in the list, the value of the data field in charged items will be determined at runtime based on the property selected. These are default properties. If you want to use a custom property from your customized pricing logic, you must redefine the charged item generation in the charge plans or allowance plans. → Tip In the app, start typing the property name or a word. The app automatically filters properties that include the name or word you typed. For example, type acc, allow, or cur. • <i>Constant</i>: Type or select any constant value for the data field in charged items generated by the system. → Tip A value is required. If you want to define an empty field, choose the <i>Property</i> option and select (<i>Empty</i>) in the list.	Yes
<i>Description</i>	Type a short description of the function for this data field. This information is visible when the pricing specialist configures the pricing logic in charge plans or allowance plans.	No

→ Tip

To work with the data fields more efficiently, use the search field and the 🔍 button, at the top of the *Fields* table.

The app searches for your criterion from:

- Field names
- Field values (incl. names of default properties from rating, charging, and allowance contexts)
- Field descriptions

For example, type **allowance**, **account**, or **external**.

2.3.4.6.4.2 Creating a Charged Item Class from a Billable Item Class

Based on an existing billable item class, configure a new charged item class and its associated billable item mapping.

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP Convergent Invoicing. For more information and user assistance, see the integration guides at help.sap.com/brim.

As an SAP CC pricing specialist, you design and configure the data fields that the system generates in charged items as output data. In an integrated *SAP Solution*, you also set up the billable item mapping that configures the conversion of charged items into billable items at runtime.

You configure a new charged item class and its billable item mapping:

- By copying an existing charged item class and associated billable item mapping, using the *Copy* button in the right area
- From an existing billable item class, using the *Create* button in the left area
- From scratch

Depending on your business requirements, you may need to configure a charged item class with no billable item mapping. See [Creating or Copying Your Charged Item Classes \[page 233\]](#).

Create a Charged Item Class from a Billable Item Class

When clicking *Copy* on a displayed charged item class, a draft version of this copied class is created, containing the same information and content. The billable item mapping is also copied. Only the name of this new charged item class differs, for unicity purpose.

When clicking *Create*, the app asks you to choose between a guided creation from an existing billable item class (default) and a basic creation.

- Select the *Create a charged item class from a billable item class* option Select the billable item class that suits your business need. Based on the selected billable item class, the app creates a prefilled charged item class and the associated billable item mapping. To facilitate your understanding, field names are the same in the new charged item class and in the existing billable item class. For example: SRCTATYPE, SRCTAID, SUBPROCESS, BITTYPE, or VKONT.
- Otherwise, select the *Create an empty charged item class* option. Note that you can define the billable item mapping as a second step. See [Associating a Charged Item Class with a Billable Item Class \[page 242\]](#).

The newly created charged item class and its billable item mapping are recorded as a draft. This draft remains available until you click the *Save* button, which definitively creates the charged item class and the mapping in the target SAP CC system (and its back-end database system) as the released version.

→ Tip

For readability and productivity purposes, SAP recommends that you click  when editing the charged item class, in order to hide the left area of the screen and focus on the charged item class itself.

Fill in the following tabs:

- If necessary, set up the class name, the pricing catalog, and a legible class description by filling the [Header \[page 234\]](#) tab.
- In the [Billable Item Mapping \[page 237\]](#) tab, quickly verify the suggested field mapping (fields in charged item class onto fields in billable item class).
- **Change a few field settings** for the new charged item class in the [Definition \[page 234\]](#) tab. As an example, you may configure default values for the SUBPROCESS and BITYPE fields.

→ Tip

You may also set up a charged item class first and [associate \[page 242\]](#) it to a billable item class (through configuration of the billable item mapping) as a second step.

Check the signaled errors by clicking the button  on the footer toolbar.

Once you have finished, click:

- [Save](#) to save your charged item class and its associated billable item mapping to the Core Server system and its back-end database.
- [Cancel](#) to cancel the creation of this new class and mapping. In this case, you are requested to confirm your choice and then, all your interim changes are lost. The app deletes your personal draft.

2.3.4.6.4.2.1 Billable Item Mapping (Tab)

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated [SAP Solution](#) scenario with SAP Convergent Invoicing. For more information and user assistance, see the integration guides at help.sap.com/brim.

In your app Manage Charged Item Classes, the [Billable Item Mapping](#) tab contains the mapping between the fields of the billable item class onto the fields of the charged item class. When useful, you can quickly filter some data fields by using the search  button.

The first column includes the **target fields** that must be present in the billable items computed by SAP Convergent Charging when converting charged items into valid billable items.

Element	Description and Recommendation	Required
Billable Item Class Field	The identification name of the data field computed by the SAP Convergent Charging system and transferred in billable items to SAP Convergent Invoicing. This information is set in the billable item class.	Yes

Element	Description and Recommendation	Required
Description	The description of the field in the billable item class.	No
Charged Item Class Field	The name of the source data field in the charged item class to use for the field mapping. Select the relevant source.	Yes

→ Tip

The list content depends on the type of the target field in the billable item class and the types of the source fields in the charged item class.

In the [Fields](#) configuration table,

1. Select or start typing the name of the billable item class that you want to work with. Note that you can delete the billable
2. You can also enter some information about the class description.
3. The app automatically retrieves and displays the field definitions of the selected billable item class.
4. At this step, you can:
 - Change the billable item class again.
 - Delete the billable item mapping by clearing the combo box (use the DEL key for example).
5. Set up the necessary field mapping: map a field in the billable item class (target) onto a field in the charged item class (source).
6. For more information:
 - Click the field links for information such as the type, field type, length, decimal length, or size (in bytes).
 - View in the [Definition \[page 234\]](#) tab to know how this field is generated by the SAP CC system.

2.3.4.6.4.3 Creating a Pricing Catalog

While creating a charged item class, configure a new catalog to group the pricing elements for your subscription- and usage-based services to monetize.

Create a Pricing Catalog

As an SAP CC pricing specialist, you want to create a mandatory pricing catalog quickly when configuring some other master data for the pricing configuration of your chargeable service.

i Note

As a prerequisite, you are not assigned to a unique pricing catalog by your user administrator.

1. While creating your catalog element, click the [New](#) button to the right of the [Catalog](#) input field.
2. The app displays the [Create Catalog](#) window.

3. Type the name for the pricing catalog. The catalog name depends on your pricing modeling and design. It can be:
 - The **company name** of the contracting *service provider* that brings value-added services to the market and wants to monetize the service use
 - The **service name** for these *subscription- and usage-based services*
 - The **name for the bundle of services** that you monetize by configuring and sharing some pricing logic in a single catalogYou can use commercial names, technical names, abbreviations, or a combination of different information items.
It must be legible in your environment.
4. Click [Create](#) to request the immediate creation of this pricing catalog.
5. Continue the creation of the catalog element and save it.

Related Information

[Creating or Copying Your Charged Item Classes \[page 233\]](#)

2.3.4.6.4.4 Listing and Searching For Charged Item Classes

To review or modify a charged item class, search for draft and released charged item classes by different criteria.

→ Remember

If you are assigned to a unique pricing catalog, some restrictions apply to you and you can only work with the charged item classes that belong to this catalog. Verify your SAP CC user settings with your user administrator. See [Setting Up a User \[page 766\]](#).

List Charged Item Classes

To list charged item classes, just open the app Manage Charged Item Classes. By default, the app searches for and displays all the classes in the pricing catalogs.

Search For Charged Item Classes

The app searches for search criteria text in the known names, descriptions, and pricing catalogs for one or multiple chargeable services. The app includes your drafts and excludes the classes that you are not allowed to view.

i Note

The search is also applied to the names of the associated billable item classes.

To search for some specific charged item classes:

1. Enter your search criteria in the search field and click . The app updates the result list according to the retrieved content.
2. Organize the content of the result list:

To perform this action,	Click this button
Sort the results by class names, pricing catalogs, or billable item classes	
Filter the results by pricing catalogs or billable item classes	
Group the results by pricing catalogs or billable item classes	

3. Depending on your goal, work with the search result list. Click the charged item class to [view \[page 240\]](#), [edit \[page 242\]](#), or [delete \[page 243\]](#) it.

2.3.4.6.4.5 Viewing a Charged Item Class

View a charged item class and review its details.

From the [search result list \[page 239\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific charged item class to view and review.

1. Check its details, such as the:
 - Pricing catalogs it belongs to
 - **List of data fields** generated in charged items
 - **Setting for each field**
2. View the following tabs:
 - [Header \[page 234\]](#)
 - [Definition \[page 234\]](#)
 - [Billable Item Mapping \[page 237\]](#)

→ Tip

To facilitate the inspection of your charged item class, arrange your user interface by clicking the  or  button to extend the visualization area or click  to maximize the displayed window.

Related Information

[Refreshing the Billable Item Mapping \[page 241\]](#)

[Editing a Charged Item Class \[page 242\]](#)

2.3.4.6.4.6 Refreshing the Billable Item Mapping

Maintain the charged item class and associated billable item mapping to resynchronize these business configurations with a modified billable item class.

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP Convergent Invoicing. For more information and user assistance, see the integration guides at help.sap.com/brim.

i Note

In an integrated *SAP Solution* with SAP S/4HANA Cloud, refreshing the billing item mapping is not available.

When a billable item class is changed in SAP Convergent Invoicing, you manually change some settings in SAP Convergent Charging to enable the SAP CC system to generate and bulkload the appropriate output data.

As an SAP CC pricing specialist, you maintain the charged item class or its associated billable item mapping first, and maintain the charge and allowance plans second. You perform the following actions:

1. Search for the charged item class that maps onto the recently changed billable item class.
2. Click the charged item class to update. The app displays the selected class.
3. View the *Billable Item Mapping* tab and click *Refresh* to start the resynchronization.
4. The app gets the modified billable item class and its field modifications.
5. In your billable item mapping, the app automatically:
 - Adds new fields at the bottom of the table.
 - Detects some typical fields and sets up some suggested definitions.
 - Removes fields removed from the billable item class.
6. Finalize your business configuration operation:
 1. Eventually map a new field onto an already-existing field in the charged item class.
 2. You may need to create a new field in the charged item class.
 3. Check all the undefined fields and determine if you must change their configurations with a constant value or property.
7. Save your recent changes.
8. If you want to configure the generation of a new field that is based on some new logic, you must adapt the relating charge plans and allowance plans.

Maintain your charge plans and allowance plans that use this modified charged item class by redefining the generation of this new field and based on some new pricing logic.

i Note

For backward compatibility between systems, you cannot remove any obsolete fields in the charged item class.

2.3.4.6.4.7 Associating a Charged Item Class with a Billable Item Class

Based on an existing billable item class, change an existing charged item class and create the billable item mapping to associate them together.

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated [SAP Solution](#) scenario with SAP Convergent Invoicing. For more information and user assistance, see the integration guides at help.sap.com/brim.

As an SAP CC pricing specialist, you created a charged item class and you want to configure the field mapping onto an existing billable item class.

→ Tip

If possible in your charged item class, use the same field names as in the billable item class so the app can automatically map these fields together.

- View this existing charged item class.
- Click [Edit](#).
- In the [Billable Item Mapping](#) tab, select a billable item class.
- The app gets the field details for this billable item class.
- Manually map each field onto a field from the charged item class.

2.3.4.6.4.8 Editing a Charged Item Class

Maintain your charged item class to define some new data fields or change some configurations.

When a charged item class is selected, click [Edit](#) to switch to the editing mode and make your changes. You can:

- [Define new fields \[page 234\]](#)
- Set up another value (constant, property, undefined) for an existing field
- Modify field descriptions
- [Change the description for the class \[page 234\]](#)
- [Configure the billable item mapping \[page 237\]](#)
- [Refresh the billable item mapping \[page 241\]](#)

Check the signaled errors by clicking the button  on the footer toolbar.

→ Tip

You cannot change neither the name of the charged item class nor its pricing catalog. You cannot change neither the field names nor their types. Therefore, we recommend that you make a copy of an existing charged item class if necessary.

The modified charged item class is recorded as a draft. This draft remains valid until you click [Save](#), which definitively modifies the charged item class in the target SAP CC system and its back-end database. This final system automatically releases this newer unique version.

i Note

If the charged item class is valid, it is saved and released in the Core Server system when clicking the [Save](#) button. Otherwise, a validation window is displayed to inform you what and where the errors are. Once the corrections are done, the validation window disappears and you can save the charged item class.

2.3.4.6.4.9 Deleting a Charged Item Class

Delete a charged item class and its associated billable item mapping.

Delete a Charged Item Class and Its Billable Item Mapping

From the [search result list \[page 239\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to the class to delete from a pricing catalog.

The app displays the charged item class and its associated billable item mapping that you want to delete.

As an SAP CC pricing specialist, click [Delete](#) to request the target SAP CC system to remove the master data from the back-end database definitively.

By clicking the [Delete](#) button, you are requested to confirm your choice in a confirmation window. The Core Server system verifies that no references exist. Otherwise, first delete all the pricing elements in the catalog that refer to your charged item class.

2.3.4.6.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

2.3.4.6.5.1 Frequently Asked Questions (FAQs)



Why can't I copy a charged item class?

The copy action is only possible for released classes. You cannot copy a draft.



Why can't I see the Refresh button?

The refresh action is only possible in an integrated *SAP Solution* scenario with the SAP ERP system or the SAP S/4HANA system. The *Refresh* button is not available when you are connected to SAP S/4HANA Cloud. This button is only available for the *Marketing* role in your SAP CC user profile.



Searching for charged item classes does not return the expected result list.

For a better user experience, the search is **case insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** back-end application and the Core Server system. In case a user created a charged item class in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft charged item classes?

No. Only you can access and display your drafts, until they are unlocked. These interim versions are personal and available with your user session.

i Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.

2.3.4.6.5.2 Tips and Tricks



How to access a charged item class quickly?

Just use the browser bookmarks to access a given charged item class directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this charged item class.



How to search for a specific field in a class quickly?

At the top of the [Fields](#) tables, enter a partial text to search for in the field names, values and descriptions, and click . The app filters the table and keeps the fields that match your criterion.

For example, type **PR**, **BIL**, or **SRC**.

The search is case insensitive.

2.3.4.6.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Error message: 'No matching charged item classes to display'

This error message means that the app Manage Charged Item Classes cannot display the requested charged item class. This situation may be due to:

- A **parallel deletion** of this charged item class by another individual user with the Core Tool user interface Try to click  to refresh the list of charged item classes and check whether it still exists, or not. In case your charged item class is still present, ask your [system administrator](#) to audit the user operations for SAP Convergent Charging
 - **Insufficient privileges** associated to your user profile, or a catalog restriction. Contact your [user administrator](#) to verify your user profile (credentials, lock status, password expiration, assigned roles, pricing catalog restriction).
 - An **incorrect browser bookmark or link**. Try to use the search mechanism to retrieve your charged item class. In case you find your charged item class, update your bookmark and share the changes with your team members.
 - **Other technical issues**. Contact your local support team or your SAP Support Team.
-

2.3.4.7 Manage Mapping Table Classes

With the app **Manage Mapping Table Classes**, you configure, list, review, and maintain some mapping table classes, which enable you to define all the mapping tables that are necessary for the [pricing configuration](#) of your marketable end-customer services.

In SAP Convergent Charging, [mapping tables](#) are intended for multicurrency and multidimensional pricing. They are used to configure your price lists, pricing data, or any kind of data values to map to result values. [Mapping table classes](#) are some useful templates that define a common multicolumn structure for a subset of mapping tables in your pricing catalog or for a subset of subscriber mapping tables for your subscriber accounts or provider contracts.

[What's New? \[page 246\]](#)

[About This App \[page 247\]](#)

[Important Concepts \[page 248\]](#)

[Tasks \[page 255\]](#)

[FAQs and Tips \[page 263\]](#)

[Troubleshooting \[page 265\]](#)

2.3.4.7.1 What's New?

This section highlights the **main changes in the app** Manage Mapping Table Classes that relate to new or changed features.

What's New in SP 6

Three buttons ( [Sort](#) ,  [Filter](#) , and  [Group](#)) replace the  unique button to enhance your user experience and facilitate the result list organization and display.

What's New in SP 5

As of SP 5, your auto-saved drafts are kept after sign-out or user session expiration.

What's New in SP 4

As of SP 4, the app Manage Mapping Table Classes allows you to **maintain some saved and released mapping table classes**. The app provides you with an [editing mode](#) and manages your [interim drafts](#) transparently. If some master data already references your class, you can only change some descriptions for the input or output columns. You cannot change the data structure for the corresponding mapping tables.

Now when creating a mapping table class, you can also quickly create a pricing catalog for the pricing configuration of your subscription- and usage-based services or bundle of services.

With this app, you complete the following new tasks:

- [Editing a Mapping Table Class \[page 261\]](#)
- [Creating a Pricing Catalog \[page 259\]](#)

What's New in SP 3

Manage Mapping Tables

As of SP 3, **Manage Mapping Tables** is a new app in the SAP CC Cockpit application that enables the SAP CC pricing specialists to create and maintain some mapping tables in the pricing catalog for a service provider company that want to monetize its marketable end-customer services.

You configure these data tables and the associated pricing logic (reusable charges, pricing macros) to model multicurrency and multidimensional pricing.

See SAP Note [2632128](#) for more details.

The *Manage Mapping Table Classes* tile is now available in your Cockpit launchpad. Its tile is visible in the *Pricing Configuration* category.

As an *SAP CC pricing specialist*, discover this new app and get some main concepts if you are not familiar with mapping tables and classes.

With this app you complete the following tasks:

- [Listing and Searching For Mapping Table Classes \[page 260\]](#)
- [Viewing and Reviewing a Mapping Table Class \[page 260\]](#)
- [Creating or Copying a Mapping Table Class \[page 256\]](#)
- [Deleting a Mapping Table Class \[page 263\]](#)

2.3.4.7.2 About This App

Target Audience

The app Manage Mapping Table Classes is mainly intended for the [pricing specialists for SAP Convergent Charging \[page 174\]](#).

App Summary

The app **Manage Mapping Table Classes** provides you with the following capabilities:

- Easier configuration of your mapping table classes, by creating new ones or copying existing ones.
- Searching for mapping table classes in the list of existing ones and organizing (sort, filter, and group) the result list according to your needs.
- Displaying a given mapping table class to view or review.
- Maintaining your master data by editing a given mapping table class or deleting it in case it is no more needed and referenced.

App Workspace

The workspace of the app **Manage Mapping Table Classes** is made up with two main areas:

- A left area provides you with tools to search for, filter, and sort mapping table classes in pricing catalogs. The area displays a result list containing the released mapping table classes and your drafts. See [Listing and Searching For Mapping Table Classes \[page 260\]](#).

- A right area provides you with the detailed information related to a specific mapping table class. This area is only visible when a mapping table class is selected in the left area or during the configuration of a new mapping table class. See:
 - [Viewing and Reviewing a Mapping Table Class \[page 260\]](#)
 - [Creating or Copying a Mapping Table Class \[page 256\]](#)

2.3.4.7.3 Important Concepts

As an SAP CC pricing specialist, you are aware of the following important concepts. You know:

- The *pricing catalog* for the pricing configuration of some marketable end-customer services that a service provider company wants to monetize with the SAP Convergent Charging software product
- The *product and pricing modeling* in SAP CC
- The *pricing catalog design* in SAP CC
- The *pricing configuration* in SAP CC user interfaces and systems
- The concepts for *convergent charging* (charging, refilling, activation)

See here:

[Service Pricing Configuration with Mapping Tables \[page 248\]](#)

[Mapping Tables and Classes \[page 249\]](#)

[Currencies and Custom Currencies \[page 252\]](#)

[Additional Information \[page 254\]](#)

2.3.4.7.3.1 Service Pricing Configuration with Mapping Tables

Service Pricing Configuration with Mapping Tables

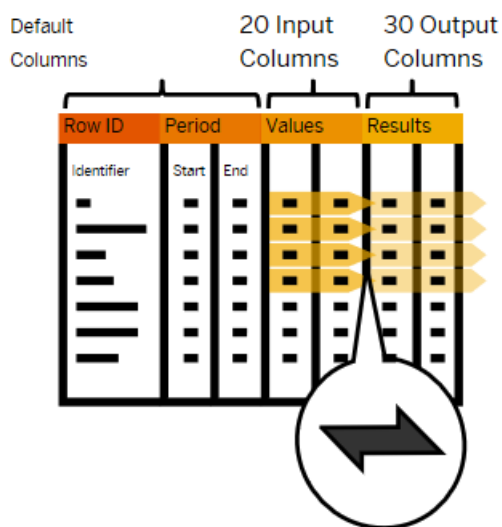
To facilitate and improve the pricing configuration for your services, SAP Convergent Charging can manage some advanced price lists or tables. SAP CC looks up these data tables for specific value sets to determine the correct prices and some other custom information.

Tables that include such pricing data or other business data are named mapping tables in SAP CC.

2.3.4.7.3.2 Mapping Tables and Classes

Mapping Tables and Classes

With your app, you configure and view some mapping table classes ([Tasks \[page 255\]](#)).



Mapping table classes in SAP Convergent Charging are master data that define the common characteristics and the multicolumn structures (input and output columns) for different sets of:

- Mapping tables in a pricing catalog (in master data)
- Subscriber mapping tables for a subscriber account and its associated provider contracts (in customer master data)

A mapping table class is part of a service pricing catalog. It defines the following columns:

- Input columns with the comparative data values
- Output columns with result values

A subset of data values from the input columns maps to a value subset in the output columns.

The format is:

COLUMN RANGE	SCOPE	COLUMN COUNT	COLUMN TYPES	TYPICAL USE OR EX-AMPLE
Default columns (pre-defined)	Row identifiers	1	String	The first column includes unique technical IDs for the row definitions to facilitate the data table maintenance for a given row and for a given period

COLUMN RANGE	SCOPE	COLUMN COUNT	COLUMN TYPES	TYPICAL USE OR EXAMPLE
	Validity periods	2	Date/Time	Two columns include the definition period for each row in a mapping table: • Start dates and times • End dates and times
Input columns with the comparative data values	Pricing data or custom data	Max. 20	• String • Currency (only one input column)	• Currencies [page 819] • Comparison or segmentation keys • Tariff identifiers • Metadata
Output columns	Pricing data or custom data	Max. 30	• String • Number	• Prices, tariffs per minute or distance, unit prices, credits, and other amounts • References • Any resulting information (pricing or technical)

A mapping table class is viewable in SAP CRM (integrated SAP Solutions) or another interfaced CRM application or provisioning system (refer to [Catalog Management](#) section in the [Web Services Documentation](#)).

i Note

In an integrated SAP Solution with SAP Business Suite, a [price table](#) is a specific mapping table class that is used to managed periodic fees (recurring rates) in SAP CRM. It enables synchronizing SAP CC [Recurring Rate \[page 856\]](#)s with SAP CRM prices. This dedicated mapping table class defines two input columns (price key, currency) and one output column (price amount).

The SAP CC pricing specialist designs and configures the pricing configuration for the end-customer services to monetize.

More info here:

- [Using SAP CRM Prices in Recurring Charges](#)
- [Application Help](#)
- [Importing a Price Table \[page 462\]](#)

In SAP Convergent Charging, a [mapping table](#) is a multicolumn price list composed of a set of data rows. Each row defines a mapping between a subset of input values with some output values. You use a mapping table to configure some multidimensional and multicurrency pricing for the end-customer services to monetize.

SAP CC uses a mapping table to determine prices dynamically. At runtime, it compares row by row, the values defined in the input columns of a mapping table with a particular set of values. The dynamic price results from this personalizable comparison and supplementary calculation.

See also:

- [About Subscriber Mapping Tables](#)
- [Primary Help of Core Tool \[page 356\]](#)

2.3.4.7.3.2.1 Examples for Mapping Table Classes

Industry Examples

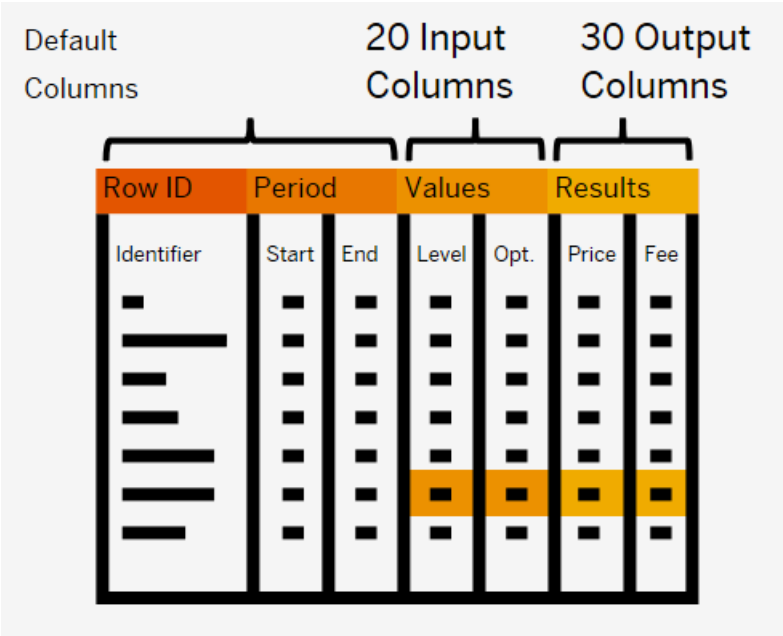
Depending on your [SAP Industry](#) and your business needs (pricing policy and strategy for the end-customer services to monetize) you can design the following mapping tables and corresponding class:

MAPPING TABLES AND CLASSES	INPUT COLUMNS	OUTPUT COLUMNS	INDUSTRY CASES
Prices per minute based on a call destination prefix or ID	• Destination prefixes (or IDs) • Currency IDs	• Prices per minute	• Telecommunications
Prices based on a destination zone prefix or ID (advanced zoning determination based on longest prefix match (LPM) algorithm)	• Zone prefixes or IDs • Currency IDs	• Prices	• Telecommunications • Logistics and Postal Services
Price amounts based on pricing levels and options	• Pricing levels • End-customers service options • Currency IDs	• Unit prices	• High-tech • Media

Your mapping tables may include different family of data: pricing data, business data, or technical data as input values for comparisons or as output values.

For example, you can design and configure a mapping table that is based on:

- Two input columns ([Pricing Level](#), [Pricing Option](#))
- Two output columns ([Unit Price](#), [Supplementary Fee](#))



At runtime, SAP CC compares some key values from the rating context with data values in the input columns of this mapping table:

RATING CONTEXT	COMPARISON
A couple of data values as reference list	The SAP CC system first preselects the rows whose data values in the input columns match the reference data list.
A reference date/time	The SAP CC system selects the row: • Whose time period includes the reference date/time • Whose start date/time is closest to the reference date/time • Whose validity period is the shortest

In this example, the reference data list includes two values because the mapping table has two input columns.

2.3.4.7.3.3 Currencies and Custom Currencies

Currencies and Custom Currencies

SAP Convergent Charging 5.0 manages **ISO and non-ISO based currency definitions**. SAP CC 5.0 assigns a currency to each computed amount (dynamic price) with a personalized precision level. You can process prices with up to six decimal places. Currencies are part of the business data configured in the complete SAP CC system.

SAP CC handles a proprietary definition for country or custom currencies.

An application administrator manages this business data in close cooperation with the SAP CC pricing specialists. The data maintenance depends on various reasons.

Note

- In an integrated [SAP Solution](#) (with SAP S/4HANA or SAP Business Suite), the currency definitions are configured in the SAP S/4HANA or SAP ERP reference system first. The reference system replicates the currency definitions with their number of decimal places to SAP Convergent Charging when requested by an SAP CC user.
- If your deployment scenario is not based on this [SAP Solution](#), each SAP currency must be configured and maintained in the SAP CC system.
- The SAP CC Core Server system stores the currency definitions in the CURRENCY database table (please refer to [Core Database References](#)).
- In SAP Convergent Charging 5.0, you do not configure currencies to manage currency conversion for the pricing configuration.

An [SAP Currency](#) is identified by an **alphanumeric code** (max. five digits).

- This identification code is a **three-letter code** when you configure an SAP currency that represents an original country currency and that is based on the international ISO 4217 standard.
- To manage amounts with more decimal places than an original currency, you define some secondary currencies. Use a four-digit code to configure some secondary currencies that are based on the original one but with some different precision.
- Use a **personalized code** to configure some non-ISO currencies such as the PNT (Point) currency for example. PNT is defined with no decimal precision.

The currency is defined by:

- The precision, which represents the number of decimal places
- A legible name, which is clear enough to be read easily
- An ISO 4217 currency code defined by the International Standards Organization (ISO) when the currency configured in SAP CC relates to an ISO currency.

Example

You configure an SAP CC system with the following currencies:

SAP CURRENCY	PRECISION	LEGIBLE NAME	BASED ON ISO CODE
PNT	Zero decimal places	Point	N/A
EUR	Two decimal places	European Euro	EUR (978)
EUR4	Four decimal places	European Euro (4 Dec. Places)	
EUR6	Six decimal places	European Euro (6 Dec. Places)	
USD	Two decimal places	United States Dollar	USD (840)
USDN	Five decimal places	(Internal) United States Dollar (5 Dec. Places)	
USD6	Six decimal places	(Internal) United States Dollar (6 Dec. Places)	

Based on these currencies, you can model and design some pricing logic for your marketable end-customer services.

For example:

- In pricing catalogs, reusable charge (logic) and redefine charge plans are associated to a single or multicurrency (sections [About Charges](#) and [About Charge Plans](#) in the [Primary Help of Core Tool \[page 356\]](#)).
- In customer master data, subscriber accounts are associated to a currency; subscriber mapping tables can include some currencies (section [About Subscriber Accounts](#) in the [Primary Help of Core Tool \[page 356\]](#)).

SAP Convergent Charging 5.0 manages some **definitions for the ISO 4217 currency codes** to facilitate the configuration of ISO-based country currencies. In SAP CC, you configure the necessary ISO currency codes (three-letter code, numeric code, minor currency unit, and ratio). The international ISO 4217 standard is the reference from the International Standards Organization (ISO).

An application administrator manages this business data in close cooperation with the SAP CC pricing specialists. The data maintenance depends on various reasons.

i Note

The SAP CC Core Server system stores the ISO currency code definitions in the ISO_4217 database table (see [ISO_4217](#) section in the [Core Database References](#)).

2.3.4.7.3.4 Additional Information

In SAP Convergent Charging, [additional information](#) is a custom data that characterizes a catalog element or that is required by an interfaced system or application for further processing. SAP CC does not reuse this data. For example, the pricing specialist can set up a particular reference, code, or attribute. You set up some additional information to:

- Define custom information that is relevant for your business requirements.
- Facilitate the search operations (in Core Tool, in SAP CRM, or in another interfaced system).
- Conform to your integration scenario that requires this typical data for further processing.

There are three types of data: string, number, and date/time. The configured names must be legible and unique.

i Note

- The additional information data is conditionally visible and reusable in a Customer Relationship Management (CRM) application, a provisioning system, a billing system, or another external system that is integrated with SAP Convergent Charging 5.0. In this context, the systems know how to reuse the configured additional information.
- Depending on your integration scenario and your business needs, some of these custom attributes may be mandatory.

→ Remember

You cannot configure the service pricing by reusing this additional information data. The SAP CC system does not reuse any additional information when executing its business processes (charging, refilling, activation, master data configuration). Design and set up the pricing logic by using some other features such as parameters or properties.

In the *Additional Information* tab, add some additional information items to define all the necessary custom characteristics or references.

See:

- [Creating or Copying a Mapping Table Class \[page 256\]](#)
- [Viewing and Reviewing a Mapping Table Class \[page 260\]](#)

Related Information

[Creating or Copying a Mapping Table Class \[page 256\]](#)

2.3.4.7.4 Tasks

i Note

In your app, click  to refresh the visible data when your SAP system landscape includes a Core Tool user interface, a CRM application, or a provisioning system that creates or modifies some master data.

With the app Manage Mapping Table Classes, you complete the following business configuration tasks:

- [Creating or Copying a Mapping Table Class \[page 256\]](#)
- [Creating a Pricing Catalog \[page 259\]](#)
- [Listing and Searching For Mapping Table Classes \[page 260\]](#)
- [Viewing and Reviewing a Mapping Table Class \[page 260\]](#)
- [Editing a Mapping Table Class \[page 261\]](#)
- [Deleting a Mapping Table Class \[page 263\]](#)

→ Tip

To enrich your SAP user experience, view and share our FAQs, tips, and tricks about Cockpit and your app. See [FAQs and Tips \[page 263\]](#).

Prerequisites

A pricing catalog must exist in the system for the marketable end-customer service or service bundle for which you design and set up the pricing configuration. [Create a catalog with Cockpit \[page 259\]](#) or [with Core Tool \[page 403\]](#).

Complementary Tasks

Use the [Core Tool \[page 348\]](#) user interface to complete the following tasks:

- Transporting a mapping table class from a source SAP CC system to a remote system by using the:
 - Transport functionality preparing a [change list \[page 776\]](#)
 - [Export \[page 468\]](#) to and import from an XML file
- [Saving \[page 467\]](#) a mapping table class to an XML file for troubleshooting purpose
- [Importing a Price Table as a Mapping Table Class \[page 462\]](#)

Related Information

[Manage Mapping Tables \[page 268\]](#)

2.3.4.7.4.1 Creating or Copying a Mapping Table Class

Configure a new mapping table class or copy an existing one to define the data structure for multiple mapping tables based on this class.

Prerequisites

- A pricing catalog is mandatory.
- You know the implementation recommendations from SAP. See [Working with Notifications \[page 167\]](#).
- You have modeled and designed the pricing configuration for your subscription- and usage-based services to monetize.

Context

As an SAP CC pricing specialist, you want to create a [mapping table class \[page 249\]](#) for an existing or a new pricing catalog.

7. The app manages different drafts as interim revisions transparently. Drafts are saved automatically to the Cockpit back-end application whenever you add or change information within the mapping table class while in editing mode (auto-save). As long as you work on a draft mapping table class, other SAP CC users cannot access it.

i Note

- *Cockpit* keeps your drafts until you sign out (aka log off) from the web application or are signed out automatically because your user session has expired. Make sure that you save and release the necessary drafts beforehand.
When you close the web browser, your user session remains active thanks to the cookies technology. If you open a new browser, you do not need to sign in (aka log on) again.
- You cannot copy a draft mapping table class.

8. Click [Save](#) to create your mapping table class finally. The target SAP CC system releases the master data automatically. Other SAP CC users can [view \[page 260\]](#) it depending on their privileges.

→ Recommendation

When working with this app in your SAP CC 5.0 Cockpit launchpad, make sure that you are aware of this recommendation if you use multiple tabs in your web browser.

- If you duplicate a tab in your browser, or if you accidentally open the same tab twice in the browser, data changes made in each browser tab may affect some data in the other tab.
- When switching between tabs, first refresh the app by clicking the  [Refresh](#) button that is top of the [search result list \[page 260\]](#).

Results

Now the configuration of the necessary mapping tables is possible:

- Manually [create \[page 275\]](#) your data tables with your cockpit.
- Let a provisioning system or a CRM application configure some new mapping tables.

Related Links

- [Importing a Price Table \[page 462\]](#)
- [Primary Help of Core Tool \[page 356\]](#)

Related Information

[Examples for Mapping Table Classes \[page 251\]](#)

[Mapping Tables and Classes \[page 249\]](#)

2.3.4.7.4.2 Creating a Pricing Catalog

While creating a mapping table class, configure a new catalog to group the pricing elements for your subscription- and usage-based services to monetize.

Create a Pricing Catalog

As an SAP CC pricing specialist, you want to create a mandatory pricing catalog quickly when configuring some other master data for the pricing configuration of your chargeable service.

i Note

As a prerequisite, you are not assigned to a unique pricing catalog by your user administrator.

1. While creating your catalog element, click the [New](#) button to the right of the [Catalog](#) input field.
2. The app displays the [Create Catalog](#) window.
3. Type the name for the pricing catalog. The catalog name depends on your pricing modeling and design. It can be:
 - The **company name** of the contracting [service provider](#) that brings value-added services to the market and wants to monetize the service use
 - The **service name** for these [subscription- and usage-based services](#)
 - The **name for the bundle of services** that you monetize by configuring and sharing some pricing logic in a single catalogYou can use commercial names, technical names, abbreviations, or a combination of different information items.
It must be legible in your environment.
4. Click [Create](#) to request the immediate creation of this pricing catalog.
5. Continue the creation of the catalog element and save it.

Related Information

[Creating or Copying a Mapping Table Class \[page 256\]](#)

2.3.4.7.4.3 Listing and Searching For Mapping Table Classes

List and search for draft and released mapping table classes by different criteria.

i Note

If you are assigned to a unique pricing catalog, some restrictions apply to you and you can only work with the mapping table classes that belong to this catalog.

Verify your SAP CC user settings with your user administrator. See [Setting Up a User \[page 766\]](#) in the [SAP CC 5.0 Primary Help for Core Tool \[page 348\]](#).

Search For Table Classes

1. [Launch \[page 170\]](#) the web application in your browser depending on your local environment.
2. In *Cockpit*, open the app [Manage Mapping Table Classes](#) by clicking the tile.
3. By default, the app searches for and displays all the classes.
4. **Search for mapping table classes** by entering a value in a search field, and organize (filter, alphabetical sort, group) the mapping table classes by different criteria.

The app searches for the text in the known names, descriptions, and pricing catalogs for one or multiple end-customer services. It displays a first result list and automatically extends it.

5. Depending on your goal, work with the search result list. Click the mapping table class to [view \[page 260\]](#), [edit \[page 261\]](#), or [delete \[page 263\]](#) it.

Related Information

[Viewing and Reviewing a Mapping Table Class \[page 260\]](#)

2.3.4.7.4.4 Viewing and Reviewing a Mapping Table Class

View a mapping table class and review its details.

From the [search result list \[page 260\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific mapping table class to view and review its details, such as the definitions of the:

- **Input columns** for comparative data values (string values or [currencies \[page 252\]](#))
- **Output columns** for resulting data values (number or string values)
- [Additional information \[page 254\]](#) items

The app displays the three default columns (row identifier, start date/time, and end date/time for the validity period) that make the base structure of a mapping table.

→ Tip

To facilitate the inspection of your mapping table class, arrange your user interface by clicking the  or  button to extend the visualization area or click  to maximize the displayed window.

Related Information

[Mapping Tables and Classes \[page 249\]](#)

[Currencies and Custom Currencies \[page 252\]](#)

[Additional Information \[page 254\]](#)

2.3.4.7.4.5 Editing a Mapping Table Class

Edit and change the data structure definitions and some additional information items either to finalize the configuration for a mapping table class or to maintain a class regarding to some pricing policy evolutions for your marketable end-customer services.

Context

As an SAP CC pricing specialist, you want to:

- **Finalize** the configuration for a mapping table class and corresponding tables. You may need to define another input or output column that must be present in mapping tables that will be based on this modified class.
- **Maintain** the pricing configuration for your marketable end-customer services to translate the evolutions for the pricing policy.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Procedure

To change a mapping table class:

1. From the [search result list \[page 260\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific mapping table class to edit and change its configuration.

2. Click [Edit](#) to switch to the editing mode and change the mapping table class depending on its use.
3. You can:
 - Change the class description.
 - Add, change, move, or delete some declarations of input columns or output columns.
 - Add, change, move, or delete some additional information items.

i Note

Once the mapping table class is referenced in a mapping table, a pricing macro, or another pricing element from the catalog, you can no longer modify the data structure. Several typical references are possible:

References	Pricing Catalogs (in Master Data)	Master Data for End Customers
Direct	Mapping table	Subscriber mapping table
Indirect	○ Pricing macro ○ Reusable charge ○ Allowance logic ○ Refill logic	

4. The app regularly saves the modified mapping table class as a draft.
5. Click [Save](#) to record your modified mapping table class definitively. The final system processes the operation request and saves the changes in its database permanently.

→ Tip

For some notes, recommendations, and tips, refer to the section [Creating or Copying a Mapping Table Class \[page 256\]](#).

Results

Now you can:

- [Create \[page 275\]](#) or [change \[page 277\]](#) the necessary mapping tables.
- Adapt the pricing logic settings to use some mapping tables based on your recently modified class. Reconfigure the relevant pricing elements in the catalog for your end-customer service or service bundle.

Related Information

[Creating a Mapping Table \[page 275\]](#)

[Editing a Mapping Table and its Rows \[page 277\]](#)

2.3.4.7.4.6 Deleting a Mapping Table Class

Delete a single mapping table class that is no more referenced in the belonging service pricing catalog and in the master data for end customers.

Delete a Single Class

1. From the [search result list \[page 260\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific mapping table class to delete from a service pricing catalog.
2. Display the mapping table class that you must delete.
3. As an SAP CC pricing specialist, click [Delete](#) to request the target SAP CC system to remove the master data definitively. The target and final system verifies that no references exist. Otherwise, first delete all the pricing elements in the catalog that refer to your mapping table class.

2.3.4.7.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 263\]](#)

[Tips and Tricks \[page 264\]](#)

2.3.4.7.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage Mapping Table Classes** app indicates the total number of mapping table classes that are currently released in SAP Convergent Charging 5.0. If your user profile is assigned to a single pricing catalog (catalog restriction), this number counts the released mapping table classes for this catalog.

i Note

This number does not take drafts into consideration.



Searching for mapping table classes does not return the expected results list.

For a better user experience, the search mechanism is **case-insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** application and the Core Server system. In case a user created a mapping table class in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft mapping table classes?

No. Only you can access and display your drafts, until they are unlocked. These interim versions are personal and available with your user session.

i Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.



Why can't I copy a mapping table class?

The copy mechanism is only possible for released mapping table classes.

2.3.4.7.5.2 Tips and Tricks



How to use the search result list optimally?

Try to display the shortest list of mapping table classes that you want to work with. In the **Manage Mapping Table Classes** app, just combine the textual search ([Listing and Searching For Mapping Table Classes \[page 260\]](#)) with the filtering and grouping functions to reduce the number of items in the list.



What kind of input columns could I need?

When designing your mapping tables, you can base the service pricing on the following information:

- Any identifier you can base a price on
- Destination information, destination prefix, zone ID
- Tariff ID
- Time ID
- Various options that the system can use to match some reference data with data in input columns



What kind of output columns could I need?

You can base the service pricing on the following information:

- Price per minute, per destination, or per distance
- Various additional fees such as connection fees or monthly fees
- Free items
- Any information you need to post treat



How to access a mapping table class quickly?

Just use the browser bookmarks to access a given mapping table class directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this mapping table class.



Can I configure a new mapping table class by copying an existing one?

Yes. If you want to create a mapping table class very speedily, just [copy \[page 256\]](#) an existing and released one.

Your **Manage Mapping Table Classes** app makes a copy of the mapping table class that is currently displayed. Rename the new draft and set up the data. If you want to copy the latest released version, first click the  button before performing the copy.

2.3.4.7.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Error message when searching for mapping table classes: 'The sorting and grouping orders you have chosen are incompatible. Please change the view settings. The app uses the sort order that you defined for the grouping. Select the same ascending or descending orders to avoid this message occurring.'

This error message means that the **Manage Mapping Table Classes** app cannot properly display the result list because you have chosen incompatible sorting and grouping orders. When such a situation occurs, SAP SE recommends that you, as an [power user](#), try the following suggestions:

- Click the  button to change the view settings
 - Select the [Sort > Group](#) tabs successively
 - Verify that the sorting and grouping orders are identical (ascendant or descendant)
-



Error encountered when searching for mapping table classes: In the search result list, you cannot find your expected mapping table class.

Several reasons can explain an incomplete result list. This situation may be due to:

- The currently defined filters. Click the  button to change the view and filtering settings
 - The fact that you are assigned to a unique pricing catalog. Contact your [user administrator](#) to verify your user privileges
 - Out-of-date data in **Cockpit**. Click the  button to perform a data synchronization operation
-



Error message when viewing a given mapping table class: 'No matching items to display. Check whether the mapping table class still exists and can be accessed.'

This error message means that the **Manage Mapping Table Classes** app cannot display the mapping table class that you requested. This situation may be due to:

- A parallel deletion of the expected mapping table class by another individual user or service user (CRM²⁴ application, provisioning system). To check this possible reason:
 - Click the  button to refresh the list of mapping table class. Your expected class should disappear
 - Ask your [system administrator](#) to investigate within the audited user operations of SAP CC
- An access restriction to the expected mapping table class (such as a catalog restriction applied to your user profile). To check this possible reason:
 - Contact your [user administrator](#) to verify your user settings (credentials, lock status, password expiration, assigned roles, pricing catalog restriction)
 - The expected mapping table belongs to a given pricing catalog. Ensure that you are not associated to another pricing catalog
- A wrong bookmark or URL²⁵ used to access this mapping table class. To check this possible reason:
 - [Search \[page 260\]](#) for your mapping table class again and use the new URL that is displayed in your web browser
 - Update your browser bookmarks
 - Share the URL changes with your team
- Other technical issues. To investigate on such situation, SAP SE recommends that you contact your local support team, or the SAP Support Team.



Error message when creating a mapping table class: '(Contains errors)'



This message, displayed in the search result list, means that some of your draft mapping table classes contain basic errors that may block the auto-save function of your **Manage Mapping Table Classes** app. For each erroneous draft:

- [View \[page 260\]](#) the erroneous mapping table class. The **Manage Mapping Table Classes** app highlights the erroneous information (fields, values) and displays an error summary in the bottom bar
- Click the  button to display the quick summary
- Correct each single error in your mapping table class
- Click [Save](#) to release the mapping table class and request for additional data controls
- In case of new issues, see the troubleshooting information about the creation, copy, and edition



Error message when creating a mapping table class: 'Sorry, your app can't save the mapping table class. View the message details and take an action. View Details...'



²⁴ Customer Relationship Management

²⁵ Uniform Resource Locator

A large variety of functional or technical reasons, single or cascading issues, and temporary or permanent problems may explain this message in your **Manage Mapping Table Classes** app. When creating a mapping table class, several components (browser, intermediate systems, Core Server system, databases) and communication networks are involved in the background. To display some additional information that you can use to troubleshoot your issue, click "View Details...". The following complementary information may appear:

- **'Change your data and continue. The Cockpit back-end application or the Core Server system signaled the following error: {0}'**

i Note

In this message, the text {0} includes a specific message or an error stack that provides you with more information and user guidance.

This message informs you that the Core Server system has detected and replied an error that relates to the configuration of your mapping table class. When such a situation occurs, SAP SE recommends that you modify your mapping table class and save it again

- **'Please try again later. If it happens again, check the Core Server system and contact the system administrator of the intermediate Java Web Server system. To find out why the error occurred, look at the log messages and traces of both systems.'**
- **'Verify the technical issue and try again later. The Cockpit back-end application signaled the error or exception "{0}"'**

i Note

In this message, the text {0} includes a key or code that provides you with more information.

This message informs you that the **Cockpit** back-end application cannot communicate with the active updater of the Core Server system. Maybe the updater instance is down or overloaded, or there is a network performance decrease. When such a situation occurs, SAP SE recommends that you verify:

- If the active updater instance is down or overloaded
- The performance and health of the communication networks between your web browser, the intermediate Java Web Server system that hosts the **Cockpit** back-end application, and the Core Server system
- The log messages and traces of the Core Server system
- The logs and traces of the Java Web Server system within which your **Cockpit** is deployed



Error message when copying a mapping table class: 'Sorry, your app can't copy this mapping table class.'

Please try again later. If it happens again, check your browser console and contact the IT administrator of the intermediate Java Web Server system. To find out why the error occurred, look at the log messages and traces for the Cockpit web application.'

This error message means that the **Cockpit** back-end application cannot copy a mapping table class.

Note

With **Cockpit**, you can copy a mapping table class that is displayed on your screen even when another user deleted the class. As soon as you refresh the **Manage Mapping Table Classes** app, the mapping table class disappears from the result list, the app displays an empty page, and you cannot copy the mapping table class anymore.

When such a situation occurs, SAP SE recommends you to ensure that you didn't delete this mapping table class in another instance of your app but with the same user session. To do such a verification:

- Verify if you have duplicated the browser tab that displays your app or if you have launched **Cockpit** with another web browser
- Click the  button to refresh the list of mapping table classes. If the mapping table class is still visible, try to perform a copy again
- If the mapping table class is still visible, try to perform a copy again
- Otherwise, contact the [system administrator](#) of SAP CC



Error message when editing a mapping table class: 'Sorry, your app can't edit this mapping table class. Please refresh or try again later. If this happens again, check your browser console and contact the IT administrator of the intermediate Java Web Server system. To find out why the error occurred, look at the log messages and traces for the Cockpit web application.'

This error message depends on the performed action:

- If you clicked the [Edit](#) button, this error message means that the **Manage Mapping Table Classes** app cannot switch to the [editing mode](#). This situation may occur when the mapping table class to modify has been locked or deleted by another SAP CC user
- If you clicked the [Save](#) button, this error message means that the **Manage Mapping Table Classes** app cannot save and release your modified mapping table class. This situation may occur when the mapping table class you want to edit is locked or does not exist anymore.

Whatever the reason is, SAP SE recommends that you, as an [power user](#), try the following suggestions:

- Wait for few seconds and try again
- Refresh the web browser or click the  button to refresh the list of mapping table classes
- Contact the [system administrator](#) of SAP CC

2.3.4.8 Manage Mapping Tables

In SAP Convergent Charging, mapping tables represent master data that are intended for multicurrency and multidimensional pricing. They are used to configure your price lists, pricing data, or any kind of input values that need to be mapped onto output values. They rely on mapping table classes that represent useful templates defining a common multicolumn structure for both mapping tables and subscriber mapping tables.

With the app **Manage Mapping Tables**, you can list, display, create, and maintain all the mapping tables that are necessary for the pricing configuration of your subscription- and usage-based services to monetize. You quickly import your business, pricing, custom data to a mapping table.

[What's New? \[page 269\]](#)

[About This App \[page 270\]](#)

[Important Concepts \[page 271\]](#)

[Tasks \[page 272\]](#)

[FAQs and Tips \[page 279\]](#)

[Troubleshooting \[page 280\]](#)

2.3.4.8.1 What's New?

This section highlights the **main changes in the app** Manage Mapping Tables that relate to new or changed features.

What's New in SP 6

As of SP 6 for release 5.0, you can change or set up some additional information items when editing an existing mapping table. See [Editing a Mapping Table and its Rows \[page 277\]](#).

Three buttons ( [Sort](#) ,  [Filter](#) , and  [Group](#)) replace the  unique button to enhance your user experience and facilitate the result list organization and display.

What's New in SP 5

As of SP 5, your auto-saved drafts are kept after sign-out or user session expiration.

What's New in SP 4

As of SP 4, the app Manage Mapping Tables provides you with the following enhancements:

- **Mapping table row edition:** When a given mapping table is switched to the editing mode, you can now create, modify and delete a set of rows belonging to this mapping table. To help you generating identifiers for your mapping table rows, a new [Identifier](#) dialog window is now available.
- **Mapping table row import:** A new import mechanism is now available to specify whether the imported rows must be merged with the existing ones, or replace the existing set of rows associated to the mapping table.
- When creating or editing a mapping table, an agreement ID can be put in the specific field, as well as a description of this mapping table.
- **Drafts managements:** Personal drafts are now handled when working with both mapping tables and mapping table classes.
- **Performance optimization:** A new `MAPPING_TABLE_DELETED_ROWS_RETENTION_PERIOD` system parameter has been introduced to specify the storage duration for the deleted rows of your mapping tables. This parameter gives the possibility to optimize the performance of the Cockpit application when synchronizing large mapping tables.

What's New in SP 3

As of SP 3 for release 5.0, **Cockpit** provides you with a **new app** named **Manage Mapping Tables**, that is dedicated to pricing specialists. This app gives the possibility to create and maintain some mapping tables in the pricing catalog for a service provider company that want to monetize its marketable end-customer services.

To use **Manage Mapping Tables** quickly and efficiency, first discover the app to become familiar with the different associated concepts. Then, execute the relevant tasks to manage your mapping tables.

- [About This App \[page 270\]](#)
- [Important Concepts \[page 271\]](#)
- [Tasks \[page 272\]](#)
- [FAQs and Tips \[page 279\]](#)

2.3.4.8.2 About This App

Target Audience

The **Manage Mapping Tables** app is mainly intended for the Pricing Specialist (Convergent Charging).

App Summary

The **Manage Mapping Tables** app provides you with the following capabilities:

- Searching for mapping tables within the list of existing ones and organize (sort, filter, and group) the result list according to your needs
- Displaying a given mapping table (and its data rows), and navigate to the mapping table class that defines its structure
- Easier configuration of your mapping tables, by creating new ones or copying existing mapping tables
- Maintaining your master data by editing a given mapping table or deleting it in case it is no more needed
- Importing or exporting the rows of a given mapping table (from and to custom CSV²⁶ files) in order to facilitate the pricing configuration tasks

App Workspace

The workspace of the **Manage Mapping Tables** app is made up with two main areas:

²⁶ Comma Separated Value

- A left area, that provides you with a table containing a result list of existing or draft mapping tables whose content can be customized to fit specific needs. For further information about the available information and the customizing capabilities, refer to the [Listing and Searching For Mapping Tables \[page 272\]](#) task.
- A right area, that provides you with the detailed information related to a given mapping table. This area is only visible when a mapping table is selected in the left area, or during the creation of a new mapping table. For further information about this area, refer to the [Viewing a Mapping Table \[page 274\]](#) and [Creating a Mapping Table \[page 275\]](#) tasks.

2.3.4.8.3 Important Concepts

As an SAP CC pricing specialist, you are aware of the following concepts to use the **Manage Mapping Tables** app.

Mapping Tables

To facilitate and improve the pricing configuration for your end-customer services, SAP Convergent Charging can manage some advanced price lists as table objects. Used at runtime to determine correct prices or custom information, these tables are named Mapping Tables in SAP CC.

For more information about mapping tables, refer to the "Mapping Tables and Mapping Table Classes" section of the [SAP CC 5.0 Application Help](#) documentation.

Additional Information

In SAP Convergent Charging, *additional information* is a custom data (such as a particular reference, code or attribute) that:

- Has a name and a value whose type can be string, number or date/time
- Characterizes a catalog element and defines custom information that is relevant for your business requirements
- Facilitates the search operations (in Core Tool, in SAP CRM, or in another interfaced system)
- May be required by an interfaced system or application for further processing operations
- Is not reused by SAP CC within its own business operations

i Note

In an integrated landscape, *additional information* is conditionally visible and reusable in the external systems that are integrated with SAP Convergent Charging 5.0. In such situations, the external systems know how to reuse the configured *additional information*.

→ Remember

As SAP CC does not reuse the defined [additional information](#) within its own business operations, you cannot configure the service pricing by reusing this [additional information](#). Design and set up the pricing logic by using some other mechanisms such as parameters or properties.

2.3.4.8.4 Tasks

With the **Manage Mapping Tables** app, you complete the following business configuration tasks:

- [Listing and Searching For Mapping Tables \[page 272\]](#)
- [Viewing a Mapping Table \[page 274\]](#)
- [Creating a Mapping Table \[page 275\]](#)
- [Editing a Mapping Table and its Rows \[page 277\]](#)
- [Importing Rows into a Mapping Table \[page 277\]](#)
- [Exporting Mapping Table Rows to a File \[page 278\]](#)
- [Deleting a Mapping Table \[page 279\]](#)

→ Remember

As a prerequisite, a pricing catalog must exist for the marketable service or service bundle for which you design and set up the pricing configuration. This catalog must include the expected mapping table classes, otherwise, you must first design and configure the necessary classes.

→ Tip

In addition, you can use the [Core Tool user interface \[page 348\]](#) to:

- Transport a mapping table between SAP CC landscapes by using either the transport or import/export mechanisms.
- Save a mapping table to an XML file for troubleshooting purpose.

2.3.4.8.4.1 Listing and Searching For Mapping Tables

To list or search for some mapping tables, you use the left area of the **Manage Mapping Tables** app. This area is the area of the workspace that is available when entering the app, and contains the following parts:

- An upper part, that contains:
 - A search field that you can use to enter search criteria.
 - A [Create](#) button that you can use to create a new mapping table. For further information, refer to the [Creating a Mapping Table \[page 275\]](#) task.
 - Three buttons that you use to tune and organize the content of the result list and fit your specific needs:
 - [↑↓ Sort](#)

-  *Filter*
 -  *Group*
- A table, that is located on the lower part of this area and that contains a list of mapping tables whose scope can be customized to fit specific needs using the following criteria:
 - The name of the mapping table
 - The name of the mapping table class that is associated to the mapping table
 - The name of the pricing catalogs you are assigned to
 - The ID of the master agreement (agreement ID) to which the mapping table is linked

Caution

If you are assigned to a single pricing catalog, some restrictions apply to you and you can only work with the mapping table classes that belong to this catalog. Verify with your user administrator if a catalog restriction is set in your SAP CC user profile. For further information, refer to the "Setting up a user" section available in the [Core Tool \[page 348\]](#) documentation.

Available Information

The following table contains the list of displayed information:

Element	Description
<i>Name</i>	The name of the mapping table
<i>Catalog</i>	The name of the pricing catalog containing the mapping table
<i>Class</i>	The mapping table class associated to the mapping table
<i>Agreement ID</i>	The agreement ID associated to this mapping table

Search For Mapping Tables

To search for some mapping tables, enter you search criteria in the search field, and click the  button. The content of the table is then updated according to the retrieved content.

i Note

Organize the content of the result table by:

- Sorting the results by table names, class names, pricing catalogs, or agreement IDs (if any)
- Filtering the results by class names, pricing catalogs, or agreement IDs (if any)
- Grouping the results by class names, pricing catalogs, or agreement IDs (if any)

→ Tip

You can use the  button to reset your search criteria.

2.3.4.8.4.2 Viewing a Mapping Table

The page used to display a given mapping table contains the following parts:

- A title bar
- A header
- A main content

Title Bar

The title bar displays the name of the mapping table and contains the different buttons related to the actions you can perform on this mapping table according to your profile:

- **Edit**, which you can use to modify the mapping table. For further information, refer to the [Editing a Mapping Table and its Rows \[page 277\]](#) task.
- **Delete**, which you can use to delete the mapping table from the back-end database. For further information, refer to the [Deleting a Mapping Table \[page 279\]](#) task.
- **Copy**, which gives the possibility to create a new mapping table by duplicating the currently displayed mapping table.

i Note

In addition to the action buttons, you also have the following buttons to improve your user experience. Click:

-  to hide the left area of the screen and focus on the mapping table itself.
-  to quit the display of the mapping table and return to the search result list.

Header

The header, which can be collapsed or expanded according to your needs, contains the following high-level information related to the mapping table:

- The name of the mapping table class that defines the data structure of the mapping table, with a direct link to this mapping table class (opened within the **Manage Mapping Table Classes** app)
- The name of the pricing catalog containing the mapping table
- The agreement ID, which is the identifier of the master agreement that the mapping table belongs to (optional)
- The business description of the mapping table (optional)

Main Content

The main content part is split in two different tabs:

- **Additional Information**, that contains the list of [additional information \[page 271\]](#) associated to the mapping table.
- **Data**, that contains the list of rows making up this mapping table. This list is displayed as a table whose list of columns depends on the definition of the associated mapping table class. This tab also contains the different buttons related to the actions you can perform on this list of rows:
 - **Show All**, that you can use to hide the other parts of the app and focus on this **Data** tab that contains the entire list of mapping table rows with advanced filtering capabilities.
 - **Export**, that you can use to export the list of mapping table rows in an output file. For further information, refer to the [Exporting Mapping Table Rows to a File \[page 278\]](#) task.
 - **Change View Settings**() , that gives the possibility to organize the content of the table by sorting and/or filtering the list of mapping table rows.

2.3.4.8.4.3 Creating a Mapping Table

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

As an SAP CC pricing specialist, you configure a new mapping table:

- By copying an existing mapping table, using the [Copy](#) button
- From scratch, using the [Create](#) button

When clicking the [Copy](#) button on a displayed mapping table, a draft version of this copied mapping table is created, containing the same information and rows. Only the name of this new mapping table differs, for unicity purpose.

When clicking the [Create](#) button, an empty mapping table is created, and you can use the recommendations afterwards to fill the different information. The newly created mapping table is recorded as a draft. This draft remains valid until you click the [Save](#) button, that definitively creates the mapping table in the target final system and its back-end database system.

→ Tip

For readability and productivity purposes, SAP recommends that you click the  button when editing the mapping table, in order to hide the left area of the screen and focus on the mapping table itself.

Header Tab

The following table contains the list of information you need to fill in the [Header](#) tab:

Element	Description and recommendations	Type
Name	The name of the mapping table, that must be unique among the list of existing mapping tables	M
Class	The name of the mapping table class whose structure must be used for this mapping table. This selection is mandatory to access the Data tab	M
Catalog	The name of the pricing catalog this mapping table must belong to	M
Agreement ID	The agreement ID this mapping table must be associated to	O
Description	A description of the role of this mapping table (2000 char. Maximum)	O

M: Mandatory, O: Optional

Data Tab

The **Data** tab contains the list of rows making up the mapping table. This list is displayed as a table whose list of columns:

- Corresponds to the structure of the selected mapping table class
- Includes an "Editing Status" column that reflects the current status of the mapping table row (new, modified, not modified, deleted or error)

To add one or multiple mapping table rows, you can:

- Click the **Import** button to select a file that contains a list of rows to import in the mapping table. For further information, refer to the [Importing Rows into a Mapping Table \[page 277\]](#) task
- Click the **Edit All** button to manage the rows of the mapping table, and perform the following tasks:
 - Click the **+** button to manually add a row
 - Click the  button to copy a selection of rows
 - Click the  button to delete a selection of rows
 - Click the  button to restore a selection of deleted rows (that were neither drafts nor new rows)
 - Click the [Clear Table](#) button to remove all the rows that currently exist in this mapping table

Note

Importing rows or creating new one is not mandatory. You can import rows or create new ones whenever you want after the creation of the mapping table.

Additional Information Tab

The [Additional Information](#) tab contains the list of [additional information items \[page 271\]](#) associated to your mapping table. To define some new additional information in your mapping table, click [Add](#) and fill the elements according to the following recommendations:

Element	Description and recommendations	Type
<i>Name</i>	The name of the additional information, that must be unique among the list of additional information associated to this mapping table	M
<i>Type</i>	Select the relevant type for the additional information	M
<i>Value</i>	The value that corresponds to this additional information	M
<i>Description</i>	A description of this additional information	M

M: Mandatory, O: Optional

2.3.4.8.4.4 Editing a Mapping Table and its Rows

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

When a mapping table is selected, you can click the *Edit* button located in the title bar to switch to the editing mode. In addition to the already available **Export** feature, this mode also gives you the possibility to:

- Click *Import* to import a set of data rows within this mapping table. See [Importing Rows into a Mapping Table \[page 277\]](#).
- Click *Edit All* to switch the table containing the list of mapping tables to the editing mode. For further information, refer to the "[Data Tab \[page 276\]](#)" section of the [Creating a Mapping Table \[page 275\]](#) task.
- Click *Clear* to remove all the rows that currently exist in this mapping table.

The modified mapping table is recorded as a draft. This draft remains valid until you click the *Save* button, that definitively modifies the mapping table in the target system and its back-end database.

2.3.4.8.4.5 Importing Rows into a Mapping Table

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

When the editing mode is enabled for a selected mapping table, you can use the import mechanism to replace all or part of the rows that currently exist in this mapping table by a set of rows declared within a data file. To use this import mechanism, click the **Import** button to open the **Import From File** dialog window, that contains the following sections:

- **File**, that gives the possibility to select the file containing the rows to import in the mapping table
- **Import Mode**, that gives the possibility to select one of the following importing strategy:
 - **Clear and Replace**, that clears all the existing rows of the mapping table and imports the rows available in the file

- **Merge**, that merges the existing rows with the rows available in the rows, taking into consideration that any identical row or the rows not found in the file will not be modified. Please note that only the changed rows will be considered when saving your modifications (the other rows will reflect the external changes)
- **File Format**, that gives the possibility to specify:
 - Which separator is used in the file to separate the existing fields
 - Which mark is used in the file for comment lines
- **Number Format**, that gives the possibility to specify which separator are used in the file for decimals and thousands
- **Mapping**, that gives the possibility to tune the association between:
 - The fields of each row of the file that will be imported
 - The properties of the mapping table class that is associated to the mapping table

i Note

- By default, the mapping table properties are mapped using the order of the fields of each row
- A given field of a row can be mapped onto multiple properties of the mapping table class

Once you configured all the relevant elements, click the **Import** button to start importing the content of the selected file. At the end of the importing operation, a dialog window will be displayed to inform you about the modifications that have been performed on the set of mapping tables, possibly including:

- The number of **new rows** that have been **added** to the mapping table
- The number of **existing rows** whose content has been **modified** with information coming from the data file
- The number of **existing rows** whose content remains **unchanged** due to identical information found in the data file

2.3.4.8.4.6 Exporting Mapping Table Rows to a File

When a mapping table is selected, you can click the **Export** button to open the **Export to File** dialog window. This dialog window contains the following sections:

- **File Format**, that gives the possibility to specify which separator must be used between each generated field
- **Number Format**, that gives the possibility to specify which separators must be used for decimals and thousands

Once you configured all the relevant elements:

- Click the **Export** button to open the **Save As** dialog window
- Specify the name of the file that will be created, and select the relevant destination for this file
- Click the **Save** button to start exporting the content of the mapping table to the specified file

⚠ Caution

The export mechanism exports the currently displayed version of the mapping table. If this mapping table contains errors, the exported file will also contain these errors. When such a situation occurs, the exported file will have to be manually corrected before being used for future import purposes.

2.3.4.8.4.7 Deleting a Mapping Table

When a mapping table is selected in the search result list, you can click the **Delete** button located in the title bar to definitively remove this mapping table from the back-end database.

2.3.4.8.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 279\]](#)

[Tips and Tricks \[page 280\]](#)

2.3.4.8.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage Mapping Tables** app indicates the total number of mapping tables that are currently released in SAP Convergent Charging 5.0. If your user profile is assigned to a single pricing catalog (catalog restriction), this number counts the released mapping tables for this catalog.

i Note

This number does not take drafts into consideration.



Why is the 'Merge' option already selected in the Import From File dialog window?

The first time that the **Import From File** dialog window is opened during a user session, the "Clear and Replace" option is selected. Next times this dialog window is opened, the option previously selected by the user is automatically positioned.



Searching for mapping tables does not return the expected results.

For a better user experience, the search mechanism is **case-insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** application and the Core Server system. In case a user created a mapping table in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft mapping tables?

No. Only you can access and display your drafts, until they are released. These interim versions are personal and available with your user session.

Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.



Why can't I copy a draft mapping table?

The copy mechanism is only possible for released mapping tables.

2.3.4.8.5.2 Tips and Tricks



How to access a mapping table quickly?

Just use the browser bookmarks to access a given mapping table directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this mapping table.



How to facilitate your tasks?

Just use the rich functions of your app and UI5 technology. Use the copy and the import-data-from-file functions to create a mapping table quickly.

2.3.4.8.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Viewing a mapping table is slow and takes a long time.

In case the loading of a mapping table takes a long time and leads to a slowdown of the **Manage Mapping Tables** app, you need to check whether the mapping table you are trying to load is a large mapping table, or not. In case this mapping table contains a huge number of rows, this latency may be due to the quantity of modifications that have been performed on these rows, which require **Cockpit** to reload the entire content of the mapping table.

When such a situation occurs, SAP SE recommends that you contact your [SAP CC administrator](#) and ask him to increase the retention period for the deleted rows of the mapping tables by modifying the value of the `MAPPING_TABLE_DELETED_ROWS_RETENTION_PERIOD` system parameter.



I cannot restore some deleted mapping table rows.



When the editing mode is enabled for a given mapping table, the restore button is only available once at least one row is selected, and the selection does not contain new (including duplicates) rows. As a consequence, you can only restore some deleted rows whose editing status was neither "Draft" nor "New".



Error message: 'No matching mapping tables to display'



This error message means that the **Manage Mapping Tables** app cannot display the requested mapping table. This situation may be due to:

- A parallel deletion of this mapping table by another individual user or service user (CRM²⁷ application, provisioning system). Try to click the  button to refresh the list of mapping table and check whether it still exists, or not. In case your mapping table is still present, ask your [system administrator](#) to audit the user operations
 - Insufficient privileges associated to your user profile, or a catalog restriction. Contact your [user administrator](#) to verify your user profile (credentials, lock status, password expiration, assigned roles, pricing catalog restriction)
 - An incorrect bookmark or link. Try to use the search mechanism to retrieve your mapping table. In case you find your mapping table, update your bookmark and share the changes with your team
 - Other technical issues. Contact your local support team or the SAP Support Team
-

2.3.4.9 Manage Range Table Classes

With the app **Manage Range Table Classes**, you create, list, review, and maintain some range table classes, which enable you to define all the range tables that are necessary for the [pricing configuration](#) of your subscription- and usage-based services.

In SAP Convergent Charging, [range tables](#) are multicolumn data tables intended for tiered pricing, volume pricing, or block pricing. When extended with input columns, range tables enable multidimensional pricing. Range tables are used to configure the pricing logic that must compare a quantity of service (or another unit) with ranges (numerical intervals) and that computes correct unit/total prices and custom information.

[Range table classes](#) are some useful templates that define a common multicolumn structure for a subset of range tables in your service pricing catalog or for subscriber range tables when the prices are end-customer-specific. Each range table is based on a given range table class.

[What's New? \[page 282\]](#)

[About This App \[page 282\]](#)

[Important Concepts \[page 283\]](#)

[Tasks \[page 286\]](#)

[FAQs and Tips \[page 294\]](#)

[Troubleshooting \[page 296\]](#)

²⁷ Customer Relationship Management

2.3.4.9.1 What's New?

This section highlights the **main changes in the app** Manage Range Table Classes that relate to new or changed features.

What's New in SP 6

Three buttons ( [Sort](#) ,  [Filter](#) , and  [Group](#)) replace the  unique button to enhance your user experience and facilitate the result list organization and display.

What's New in SP 5

As of SP 5 for release 5.0, **Manage Range Table Classes** is a new app in the Convergent Charging Cockpit user interface that enables the SAP CC pricing specialists to [create \[page 287\]](#) and [maintain \[page 292\]](#) some range table classes in the pricing catalog for a service provider company that wants to monetize its subscription- and usage-based services.

You use range tables to configure the pricing logic that includes tiered pricing, volume pricing, or block pricing.

To use **Manage Range Table Classes** quickly and efficiency, first discover the app to become familiar with the different associated concepts. Then, complete the relevant tasks to manage your range tables.

- [About This App \[page 282\]](#)
- [Important Concepts \[page 283\]](#)
- [Tasks \[page 286\]](#)
- [FAQs and Tips \[page 294\]](#)

2.3.4.9.2 About This App

Target Audience

The app Manage Range Table Classes is mainly intended for the Pricing Specialist (Convergent Charging).

App Summary

The app Manage Range Table Classes provides you with the following capabilities:

- Easier configuration of your range table classes by creating new ones or copying existing ones.
- Searching for range table classes in the list of existing ones and organizing (sort, filter, and group) the result list according to your needs.
- Displaying a given range table class to view or review.
- Maintaining your master data by editing a given range table class or deleting it in case it is no more needed and referenced.

App Workspace

The workspace of the app Manage Range Table Classes is made up with two main areas:

- A **left area** provides you with tools to search for, filter, and sort range table classes in pricing catalogs. The area displays a result list containing the released range table classes and your drafts. See [Listing and Searching For Range Table Classes \[page 291\]](#).
- A **right area** provides you with the detailed information related to a specific range table class. This area is only visible when a range table class is selected in the left area or during the configuration of a new range table class. See the tasks:
 - [Viewing and Reviewing a Range Table Class \[page 292\]](#)
 - [Creating or Copying a Range Table Class \[page 287\]](#)

2.3.4.9.3 Important Concepts

As an SAP CC pricing specialist, you are aware of the following concepts to use the app **Manage Range Table Classes**.

Related Information

[Service Pricing Configuration with Range Tables \[page 284\]](#)

[Range Tables and Classes \[page 285\]](#)

[Additional Information \[page 285\]](#)

Core Tool

[Working with Logic Components \[page 831\]](#)

[Range Table Introducer \(Comparator\) \[page 919\]](#)

2.3.4.9.3.1 Service Pricing Configuration with Range Tables

Service Pricing Configuration with Range Tables

To facilitate and improve the pricing configuration for your services, SAP Convergent Charging can manage some advanced price tables that define graduated prices per ranges (numerical intervals) for a service usage or for another measurable quantity. SAP CC looks up data in such a table, compares a consumed service quantity (or another measured unit) with its table ranges to determine the correct prices and some other custom information from the output columns of the selected table. Additionally, SAP CC can compare a set of keys with data in the input columns of the selected table to preselect some ranges in order to enable multidimensional pricing.

- Usage-based pricing is a pricing model in which the amount that an end customer pays depends on the usage level (quantity) for the consumed service. When you want to offer your end customers gradually reducing pricing (or increasing discounting), you can implement different pricing submodels with SAP CC and range tables such as:
 - Volume pricing
 - Tiered pricing
 - Block pricing
- You can use range tables to implement recurring pricing models.

You can test or bring to the market your pricing models:

Pricing/Discounting Model	Description	Range Tables
Volume Pricing	Volume pricing defines graduated prices per ranges of service quantity (or another measured quantity). For a service usage, a ranked range is determined this consumption level. Volume pricing calculates the applicable price by using the total consumed service quantity multiplied by the price that corresponds to the ranked range. Volume pricing offers a discount when the service consumption level increases. As soon as a service usage hits a particular consumption level, all units will cost the lower price.	Computation mode: none
Tiered Pricing	Tiered pricing defines graduated prices per ranges of service quantity (or another measured quantity). Each range is a usage tier. The end customer pays for each consumed tier. For a service usage, tiered pricing calculates the applicable price by cumulating subprices corresponding to the consumed tiers. The applicable price is the sum of these subprices. Each usage tier corresponds a different commercial offer or package.	Computation mode: cumulative, linear

Pricing/Discounting Model	Description	Range Tables
Block Pricing	Block pricing defines graduated prices per ranges of service quantity units (or another measured quantity). Each range is a usage block. In a block, the price does not change whatever the consumption level. For a service usage, block pricing calculates the applicable price by splitting the consumed service quantity into usage blocks of consumptions and sums the interim prices. For example, a first block of 1,000 service units is free of charge, the next blocks have a flat rate.	Computation mode: none

As the SAP CC pricing specialist, you translate the pricing policy and contribute to the pricing strategy for your company by using pricing to achieve its strategic goals.

2.3.4.9.3.2 Range Tables and Classes

For more information and examples about range tables and classes, refer to the section [Range Tables and Range Table Classes](#) in the [SAP CC 5.0 Application Help](#).

2.3.4.9.3.3 Additional Information

In SAP Convergent Charging, *additional information* is a custom data that characterizes a catalog element or that is required by an interfaced system or application for further processing. SAP CC does not reuse this data. For example, the pricing specialist can set up a particular reference, code, or attribute. You set up some additional information to:

- Define custom information that is relevant for your business requirements.
- Facilitate the search operations (in Core Tool, in SAP CRM, or in another interfaced system).
- Conform to your integration scenario that requires this typical data for further processing.

There are three types of data: string, number, and date/time. The configured names must be legible and unique.

i Note

- The additional information data is conditionally visible and reusable in a Customer Relationship Management (CRM) application, a provisioning system, a billing system, or another external system that is integrated with SAP Convergent Charging 5.0. In this context, the systems know how to reuse the configured additional information.
- Depending on your integration scenario and your business needs, some of these custom attributes may be mandatory.

→ Remember

You cannot configure the service pricing by reusing this additional information data. The SAP CC system does not reuse any additional information when executing its business processes (charging, refilling, activation, master data configuration). Design and set up the pricing logic by using some other features such as parameters or properties.

In the [Additional Information](#) tab, add some additional information items to define all the necessary custom characteristics or references.

See: [Additional Information \(Tab\) \[page 290\]](#)

Related Information

[Creating or Copying a Range Table Class \[page 287\]](#)

[Viewing and Reviewing a Range Table Class \[page 292\]](#)

[Editing a Range Table Class \[page 292\]](#)

2.3.4.9.4 Tasks

With the app Manage Range Table Classes, you complete the following business configuration tasks to configure and maintain some master data quickly:

- [Creating or Copying a Range Table Class \[page 287\]](#)
- [Creating a Pricing Catalog \[page 290\]](#)
- [Listing and Searching For Range Table Classes \[page 291\]](#)
- [Viewing and Reviewing a Range Table Class \[page 292\]](#)
- [Editing a Range Table Class \[page 292\]](#)
- [Deleting a Range Table Class \[page 294\]](#)

→ Tip

To enrich your SAP user experience, view and share our FAQs, tips, and tricks about Cockpit and your app. See [FAQs and Tips \[page 294\]](#).

Prerequisites

A pricing catalog must exist in the system for the marketable end-customer service or service bundle for which you design and set up the pricing configuration. [Create a catalog with Cockpit \[page 290\]](#) or [with Core Tool \[page 403\]](#).

Complementary Tasks

Use the [Core Tool \[page 348\]](#) user interface to complete the following tasks:

- Transporting a range table class from a source SAP CC system to a target system by using the:
 - [Configure a transport request \[page 782\]](#) after preparing a [change list. \[page 776\]](#)
 - [Export \[page 502\]](#) to and [import \[page 503\]](#) from an XML file.
- [Saving \[page 501\]](#) a range table class to an XML file for troubleshooting purpose

Related Information

[Manage Range Tables \[page 296\]](#)

2.3.4.9.4.1 Creating or Copying a Range Table Class

Configure a new range table class or copy an existing one to define the data structure for multiple range tables based on this class.

As an SAP CC pricing specialist, you configure a new range table class:

- By copying an existing range table class, using the [Copy](#) button in the right area
- From scratch, using the [Create](#) button in the left area

Create a Range Table Class

When clicking [Copy](#) on a displayed range table class, a draft version of this copied class is created, containing the same information and content. Only the name of this new range table class differs, for unicity purpose.

When clicking [Create](#), an empty range table class is created, and you can use the recommendations afterwards to fill the different information. The newly created range table class is recorded as a draft. This draft remains valid until you click the [Save](#) button, which definitively creates the range table class in the final SAP CC system and its back-end database.

→ Tip

For readability and productivity purposes, SAP recommends that you click the  button when editing the range table class, in order to hide the left area of the screen and focus on the range table class itself.

Fill in the following tabs:

- [Header \[page 288\]](#)
- [Definition \[page 288\]](#)
- [Additional Information \[page 290\]](#)

Once you have finished, click:

- [Save](#) to save your range table class to the Core Server system and its back-end database.
- [Cancel](#) to cancel the creation of this new class. In this case, you are requested to confirm your choice and then, all your interim changes are lost.

Related Information

[Persistent Counters \[page 567\]](#)

[Working with Cockpit](#)

[Creating a Range Table \[page 305\]](#)

2.3.4.9.4.1.1 Header (Tab)

The following table contains the list of information you need to fill in the [Header](#) tab:

Element	Description and Recommendation	Required
Name	Type the name of the range table class. The name must be unique among the list of existing range table classes.	M
Catalog	Select the name of the pricing catalog this range table class must belong to. If needed, create a new catalog [page 290] by clicking the New button.	M
Description	Type a multiline description of the function for this range table class (2,000 characters maximum).	M

M: Mandatory, O: Optional

2.3.4.9.4.1.2 Definition (Tab)

The [Definition](#) tab contains the definitions of the characteristics and data structure for the range tables that are based on your new class.

Element	Subelement	Description and Recommendation	Required
Bounds		Configure bounds of the ranges (positive intervals) for the range tables that are based on this class. To do that, you just have to set up some characteristics for the upper bounds.	M

Element	Subelement	Description and Recommendation	Required
	<i>Upper Bounds</i>	Define if the upper bounds must be inclusive or exclusive for all the ranges in the corresponding range tables. • <i>Include</i> • <i>Exclude</i> Automatically, the lower bounds and the upper bounds are the inverse.	M
	<i>Upper Bound of Last Range</i>	Depending on your business requirements, define if the upper bound of the very last range is $+\infty$ or a user value. Select the appropriate option: • <i>User Value</i> • <i>+Infinite</i>	M
<i>Input Columns</i>		Define up to 5 input columns for the corresponding range tables and subscriber range tables. The type for values in input columns is string.	O
	<i>Name</i>	Type a column name that must be unique in the range table class.	M
	<i>Description</i>	Enter a multiline description for the function of this input column in the corresponding range tables.	M
<i>Output Columns</i>		Define 1 to 15 output columns for the corresponding range tables and subscriber range tables.	M
	<i>Name</i>	Type a column name that must be unique in the range table class.	M
	<i>Type</i>	Select the relevant type of values for each output column: • <i>String</i> • <i>Number</i>	M
	<i>Computation Mode</i>	For numerical output columns, select the computation mode that the system processes when looking up data in the corresponding range tables: • <i>None</i>: There is no additional processing. • <i>Cumulative</i>: The system calculates the applicable price (or another unit) by summing the values in an output column of the selected range table. It starts with the first range and ends with the range that corresponds to the compared service quantity (or another unit). • <i>Cumulative, Linear</i>: The system calculates the applicable price (or another unit) by using an advanced formula based on sums and linear computations. In an output column of the selected range table, it multiplies each value by the range size and cumulates these interim sums. This option is useful when you want to design tiered pricing for a service usage.	M
	<i>Description</i>	Enter a multiline description for the function of this output column.	M

M: Mandatory, O: Optional

→ Tip

The app provides you with some guidance: it displays a preview of the ranges. See these numerical intervals and defined bounds.

2.3.4.9.4.1.3 Additional Information (Tab)

The *Additional Information* tab contains the list of [additional information \[page 285\]](#) associated to your range table class. Define all the necessary custom characteristics or references by adding your information items according to the following recommendations:

Element	Description and Recommendation	Required
<i>Name</i>	Type the name of the additional information item. It must be unique among the list of additional information items associated to this range table class.	M
<i>Type</i>	Select the relevant format type for the additional information: • <i>String</i> • <i>Number</i> • <i>Date/Time</i>	M
<i>Value</i>	Enter the value that corresponds to this additional information.	M
<i>Description</i>	Enter a multiline description for the function of this additional information.	M

M: Mandatory, O: Optional

Related Information

[Additional Information \[page 285\]](#)

2.3.4.9.4.2 Creating a Pricing Catalog

While creating a range table class, configure a new catalog to group the pricing elements for your subscription- and usage-based services to monetize.

Create a Pricing Catalog

As an SAP CC pricing specialist, you want to create a mandatory pricing catalog quickly when configuring some other master data for the pricing configuration of your chargeable service.

i Note

As a prerequisite, you are not assigned to a unique pricing catalog by your user administrator.

1. While creating your catalog element, click the [New](#) button to the right of the [Catalog](#) input field.
2. The app displays the [Create Catalog](#) window.
3. Type the name for the pricing catalog. The catalog name depends on your pricing modeling and design. It can be:
 - The **company name** of the contracting [service provider](#) that brings value-added services to the market and wants to monetize the service use
 - The **service name** for these [subscription- and usage-based services](#)
 - The **name for the bundle of services** that you monetize by configuring and sharing some pricing logic in a single catalogYou can use commercial names, technical names, abbreviations, or a combination of different information items.
It must be legible in your environment.
4. Click [Create](#) to request the immediate creation of this pricing catalog.
5. Continue the creation of the catalog element and save it.

Related Information

[Creating or Copying a Range Table Class \[page 287\]](#)

2.3.4.9.4.3 Listing and Searching For Range Table Classes

To review or modify a range table class, list and search for draft and released range table classes by different criteria.

→ Remember

If you are assigned to a unique pricing catalog, some restrictions apply to you and you can only work with the range table classes that belong to this catalog.

Verify your SAP CC user settings with your user administrator. See [Setting Up a User \[page 766\]](#) in the [SAP CC 5.0 Primary Help for Core Tool \[page 348\]](#).

Search For Table Classes

To search for some range table classes, open the app Manage Range Table Classes. By default, the app searches for and displays all the classes in the service pricing catalogs.

Search for range table classes by entering a value in a search field, and organize (filter, alphabetical sort, group) the range table classes by different criteria.

The app searches for the text in the known names, descriptions, and pricing catalogs for one or multiple services. It displays a first result list and automatically extends it.

Depending on your goal, work with the search result list. Click the range table class to [view \[page 292\]](#), [edit \[page 292\]](#), or [delete \[page 294\]](#) it.

2.3.4.9.4.4 Viewing and Reviewing a Range Table Class

View a range table class and review its details.

From the [search result list \[page 291\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific range table class to view and review its details, such as the definitions of the:

- **Ranges**
- **Input columns** for comparative data values (string values)
- **Output columns** for resulting data values (number or string values)
- [Additional information \[page 254\]](#) items

Review the following tabs:

- [Header \[page 288\]](#)
- [Definition \[page 288\]](#)
- [Additional Information \[page 290\]](#)

→ Tip

To facilitate the inspection of your range table class, arrange your user interface by clicking the  or  button to extend the visualization area or click  to maximize the displayed window.

2.3.4.9.4.5 Editing a Range Table Class

Edit and change the data structure definitions and some additional information items either to finalize the configuration for a range table class or to maintain a class regarding to some pricing policy evolutions for your services.

Context

As an SAP CC pricing specialist, you want to:

- **Finalize** the configuration for a range table class and corresponding tables. You may need to define another input or output column that must be present in range tables that will be based on this modified class.
- **Maintain** the pricing configuration for your usage-based services to translate the evolutions for the pricing policy.

Edit a Range Table Class

From the [search result list \[page 291\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific range table class to edit and change its configuration.

Click [Edit](#) to switch to the editing mode and change the range table class depending on its use.

You can:

- Change the class description. See [Header \(Tab\) \[page 288\]](#).
- Change the range settings for the bounds. See [Definition \(Tab\) \[page 288\]](#).
- Add, change, move, or delete some declarations of input columns or output columns.
- Add, change, move, or delete some additional information items. See [Additional Information \(Tab\) \[page 290\]](#).

i Note

Once the range table class is referenced in a range table, a pricing macro, or another pricing element from the catalog, you can no longer modify the data structure. Several typical references are possible:

References	Pricing Catalogs (in Master Data)	Master Data for End Customers
Direct	Range table	Subscriber range table
Indirect	• Pricing macro • Reusable charge • Allowance logic • Refill logic	

The app regularly saves the modified range table class as a draft.

Once you finish, click:

- [Save](#) to record your modified range table class definitively. The final system processes the operation request and permanently saves the changes in its back-end database.
- [Cancel](#) to cancel the interim modifications of this new class. In this case, you are requested to confirm your choice and then, all your changes are lost. The systems keep the previously released class.

→ Tip

For some notes, recommendations, and tips, refer to the section [Creating or Copying a Range Table Class \[page 287\]](#).

Results

Now you can:

- [Create \[page 305\]](#) or [change \[page 309\]](#) the necessary range tables.
- Adapt the pricing logic settings to use some range tables based on your recently modified class. Reconfigure the relevant pricing elements in the catalog for your end-customer service or service bundle.

Related Information

[Creating a Range Table \[page 305\]](#)

[Editing a Range Table \[page 309\]](#)

2.3.4.9.4.6 Deleting a Range Table Class

Delete a single range table class that is no more referenced in the belonging service pricing catalog and in the master data for end customers.

Delete a Single Class

From the [search result list \[page 291\]](#) in the app, a browser bookmark, or a memorized URL, **navigate** to a specific range table class to delete from a service pricing catalog.

The app displays the range table class that you want to delete.

As an SAP CC pricing specialist, click [Delete](#) to request the target SAP CC system to remove the master data definitively. The system verifies that no references exist. Otherwise, first delete all the pricing elements in the catalog that refer to your range table class.

2.3.4.9.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 295\]](#)

[Tips and Tricks \[page 295\]](#)

2.3.4.9.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage Range Table Classes** app indicates the total number of range table classes that are currently released in SAP Convergent Charging 5.0. If your user profile is assigned to a single pricing catalog (catalog restriction), this number counts the released range table classes for this catalog.

i Note

This number does not take drafts into consideration.



Searching for range table classes does not return the expected result list.

For a better user experience, the search is **case insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** back-end application and the Core Server system. In case a user created a range table class in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft range table classes?

No. Only you can access and display your drafts, until they are unlocked. These interim versions are personal and available with your user session.

i Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.



Why can't I copy a range table class?

The copy function is only possible for released range table classes.

2.3.4.9.5.2 Tips and Tricks



How to use the search result list optimally?

Try to display the shortest list of range table classes that you want to work with. In the **Manage Range Table Classes** app, just combine the textual search with the filtering and grouping functions to reduce the number of items in the list.



How to access a range table class quickly?

Just use the browser bookmarks to access a given range table class directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this range table class.



Can I configure a new range table class by copying an existing one?

Yes. If you want to create a range table class very speedily, just [copy \[page 287\]](#) an existing and released one.

Your **Manage Range Table Classes** app makes a copy of the range table class that is currently displayed. Rename the new draft and set up the data. If you want to copy the latest released version, first click the  button before performing the copy.

2.3.4.9.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



Error message: 'No matching items to display'

This error message means that the **Manage Range Table Classes** app cannot display the requested range table class. This situation may be due to:

- A parallel deletion of this range table class by another individual user or service user (CRM²⁸ application, provisioning system). Try to click  to refresh the list of range table class and check whether it still exists, or not. In case your range table class is still present, ask your [system administrator](#) to audit the user operations for SAP Convergent Charging
- Insufficient privileges associated to your user profile, or a catalog restriction. Contact your [user administrator](#) to verify your user profile (credentials, lock status, password expiration, assigned roles, pricing catalog restriction).
- An incorrect browser bookmark or link. Try to use the search mechanism to retrieve your range table class. In case you find your range table class, update your bookmark and share the changes with your team members.
- Other technical issues. Contact your local support team or your SAP Support Team.

2.3.4.10 Manage Range Tables

In SAP Convergent Charging, range tables are used to implement tier pricing, volume pricing, or block pricing. In addition, a range table allows to define different prices for the same product or service that apply at different times. With the app **Manage Range Tables**, you can search, display, create, and maintain range tables stored in the pricing catalog.

A range table includes one or several versions, managed in a chronological way. Only one version applies at a given time. It allows to define different prices for the same product or service that apply at different times. Version has a validity period and range sets. A range set consists of a key defined as input values and all the corresponding ranges and output values. The table structure is based on a [range table class \[page 281\]](#) defining the name, the type and the description of input and output columns.

→ Remember

A range table consists of **0 to 5 input columns** and **1 to 15 output columns**.

²⁸ Customer Relationship Management

[What's New? \[page 297\]](#)

[About This App \[page 297\]](#)

[Important Concepts \[page 298\]](#)

[Tasks \[page 299\]](#)

[FAQs and Tips \[page 313\]](#)

[Troubleshooting \[page 315\]](#)

2.3.4.10.1 What's New?

This section highlights the **main changes in the app** Manage Range Tables that relate to new or changed features.

What's New in SP 6

Three buttons ( *Sort* ,  *Filter* , and  *Group*) replace the  unique button to enhance your user experience and facilitate the result list organization and display.

What's New in SP 5

As of SP 5 for release 5.0, **Manage Range Tables** is a new app in the Convergent Charging Cockpit user interface that allows the pricing specialists to create and maintain range tables in the service pricing catalogs.

2.3.4.10.2 About This App

Target Audience

The app Manage Range Tables is mainly intended for the Pricing Specialist (Convergent Charging).

App Summary

The **Manage Range Tables** app provides you with the following capabilities:

- Searching for range tables within the list of existing ones and organize (sort, filter, and group) the result list according to your needs
- Displaying a given range table (and its versions, range set keys and ranges), and navigate to the range table class that defines its structure
- Creating, copying, maintaining, or deleting range tables
- Importing or exporting a range table in a CSV²⁹ format

App Layout

The layout of the **Manage Range Tables** app is made up with different views:

- The [Master View](#), that provides you with a result list of existing or draft range tables whose content can be customized to fit specific needs. For further information about this view, refer to the [Listing and Searching For Range Tables \[page 299\]](#) task
- The [Version View](#), that provides you with the detailed information related to a given range table. This view is only visible when a range table is selected in the left area, or during the creation of a new range table. For further information about this view, refer to the [Master and Version View \[page 301\]](#) and [Creating a Range Table \[page 305\]](#) topics
- The [Range Set Key View](#), that provides you with the list of input columns related to a given range table. For further information about this view, refer to the [Range Set Key View \[page 303\]](#) topic
- The [Range View](#), that provides you with the list of ranges and output columns related to a given range table. For further information about this view, refer to the [Range View \[page 304\]](#) topic

2.3.4.10.3 Important Concepts

As a Pricing Specialist (Convergent Charging), you are aware of the following concepts to use the **Manage Range Tables** app.

Range Tables Classes

A range table is necessarily associated to a range table class which defines the structure of this table (input and output value sets).

For further information about range tables, refer to the [Range Tables and Range Table Classes](#) section of the [SAP CC 5.0 Application Help](#) documentation.

²⁹ Comma Separated Value

2.3.4.10.4 Tasks

With the app **Manage Range Tables**, you complete the following business configuration tasks:

- [Listing and Searching For Range Tables \[page 299\]](#)
- [Viewing a Range Table \[page 300\]](#)
- [Creating a Range Table \[page 305\]](#)
- [Editing a Range Table \[page 309\]](#)
- [Importing a Range Table \[page 312\]](#)
- [Exporting a Range Table \[page 312\]](#)
- [Deleting a Range Table \[page 313\]](#)

→ Remember

As a prerequisite, a pricing catalog must exist to store the range tables. This catalog must include the expected range table classes, otherwise, you must define them first.

2.3.4.10.4.1 Listing and Searching For Range Tables

To list or search for some existing range tables, you use the result list that is available when entering the app.

The result list contains the following parts:

- An upper part, containing:
 - A search field to enter search criteria
 - A [Create](#) button to configure a new range table. For further information, refer to the [Creating a Range Table \[page 305\]](#) task.
 - Three buttons that you use to tune and organize the content of the result list and fit your specific needs:
 - ↑↓ [Sort](#)
 - ∇ [Filter](#)
 - [≡] [Group](#)
- A result table located on the lower part displaying a list of range tables whose content can be customized using the following criteria:
 - The name of the range table
 - The name of the pricing catalogs you are assigned to
 - The name of the range table class associated to the range table

→ Tip

- If you click on the name of the range table class, a quick view providing all the information about the class is displayed (name, catalog, bounds...).
- In this quick view, clicking on the name of the range table class opens this one in the dedicated [Manage Range Table Classes \[page 281\]](#) app.

- The ID of the master agreement (agreement ID) to which the range table is linked

- Highlights allow you to know if a range table is a draft (blue color) and contains errors (red color)

⚠ Caution

If you are assigned to a single pricing catalog, some restrictions apply to you and you can only work with the range tables that belong to this catalog. Check with your user administrator if a catalog restriction is set in your SAP CC user profile. For further information, refer to the [Setting Up a User \[page 766\]](#) section available in the [Core Tool \[page 348\]](#) documentation.

Available Information

The following table contains the list of displayed information:

Element	Description
<i>Name</i>	The name of the range table
<i>Catalog</i>	The name of the pricing catalog containing the range table
<i>Class</i>	The range table class associated to the range table
<i>Agreement ID</i>	The ID of the master agreement associated to this range table

Searching For Range Tables

To search for some range tables, enter your search criteria in the search field, and click the  button. The content of the list is then updated accordingly.

i Note

- You can use the  button to organize the content of the result table by:
 - Sorting by range table names, class names, pricing catalogs, or agreement IDs (if any)
 - Filtering by class names, pricing catalogs, or agreement IDs (if any)
 - Grouping by class names, pricing catalogs, or agreement IDs (if any)

→ Tip

You can use the  button to reset your search criteria.

2.3.4.10.4.2 Viewing a Range Table

Data of a range table (versions, range set keys and ranges) are shown in three different views.

[Master and Version View \[page 301\]](#)

[Range Set Key View \[page 303\]](#)

[Range View \[page 304\]](#)

2.3.4.10.4.2.1 Master and Version View

The screen used to display a given range table contains the following parts:

- A title bar
- A header
- A main content

Title Bar

The title bar displays the name of the range table and contains the different buttons related to the actions you can perform on this range table according to your profile:

- *Edit*, that you can use to modify the range table. For further information, refer to the [Editing a Range Table \[page 309\]](#) task.
- *Delete*, that you can use to delete the range table from the system. For further information, refer to the [Deleting a Range Table \[page 313\]](#) task.
- *Copy*, that gives the possibility to create a new range table by duplicating the current range table.

i Note

In addition to the action buttons, you also have the following buttons to change the layout:

- , that you can use to hide the left area of the screen and focus on the range table itself
- , that you can use to quit the display of the range table and return to the search result list

Header

The header, that can be collapsed or expanded according to your needs, contains the following information related to the range table:

- The name of the range table class associated to the range table

→ Tip

- If you click on the name of the range table class, a quick view providing all the information about the class is displayed (name, catalog, bounds...)
- In this quick view, clicking on the name of the range table class opens this one in the dedicated [Manage Range Table Classes \[page 281\]](#) app, in display mode

- The name of the pricing catalog that the range table belongs to

- The agreement ID of the range table (optional)
- The description of the range table (optional)

Main Content

The main part is split into two different tabs:

- **Versions:** The tab contains the list of versions for which the validity period is shown. An access to the corresponding range sets is available thanks to the  button.

i Note

- No gap is possible between two periods (the system adjusts automatically the periods for this purpose)
- The oldest period does not need a start date
- The newest period does not need an end date

In this tab, you can also use the [Export](#) button to export the range table including all its versions in an output csv file. For further information, refer to the [Exporting a Range Table \[page 312\]](#) task.

By clicking on the  button on the right end of a version, you access the next view concerning this version:

- [Range Set Key view \[page 303\]](#) if input columns have been declared in the [class \[page 281\]](#) of the range table
- [Range view \[page 304\]](#) otherwise
- [Additional Information](#), that contains the list of additional information associated to the range table.

Additional Information Tab

In SAP Convergent Charging, [additional information](#) is a custom data (such as a particular reference, code or attribute) that:

- Has a name and a value whose type can be string, number or date/time
- Characterizes a catalog element and defines custom information that is relevant for your business requirements
- Facilitates the search operations (in Core Tool, in SAP CRM, or in another interfaced system)
- May be required by an interfaced system or application for further processing operations
- Is not reused by SAP CC within its own business operations

i Note

In an integrated landscape, [additional information](#) is conditionally visible and reusable in the external systems that are integrated with SAP Convergent Charging 5.0. In such situations, the external systems know how to reuse the configured [additional information](#).

→ Remember

As SAP CC does not reuse the defined [additional information](#) within its own business operations, you cannot configure the service pricing by reusing this [additional information](#). Design and set up the pricing logic by using some other mechanisms such as parameters or properties.

2.3.4.10.4.2.2 Range Set Key View

The screen is used to display the range set keys for a given version of a range table. It contains the following parts:

- A header
- A filter bar
- A main content

A range set key is a multivalue key that is composed of a value in each input column of your range table. This key is not unique as many lines in your range table can include this key.

By the way, this key uniquely identifies a [subset of ranges \[page 304\]](#) in your range table.

Header

The header displays:

- The breadcrumb of the range table version:
 - It gives the possibility to navigate back to the [Master and Version View \[page 301\]](#) page.
 - It provides the name of the version in which the range set keys are displayed as a title, in bold characters.
- The class of the range table

→ Tip

- If you click on the name of the range table class, a quick view providing all the information about the class is displayed (name, catalog, bounds, and so on...).
- In this quick view, clicking on the name of the range table class opens this one in the dedicated [Manage Range Table Classes \[page 281\]](#) app, in display mode.

Filter Bar

The filter bar, that can be collapsed or expanded according to your needs, contains:

- A field for each input column declared in the [class \[page 281\]](#) of the range table, in which you can search for a specific value from existing values in the range table. A  button is available at the right end of each field to define conditions of filtering more precisely.
- An [Adapt Filters](#) button to manage the display of the filters
- A [Go](#) button to trigger the filters

Main Content

The main content part is displayed as a configuration table whose column names are the names of the input columns already declared in the [class \[page 281\]](#) of the range table.

An [Edit](#) button is available to add input values for a range set key, modify existing ones and perform most of the actions related to the [edition \[page 305\]](#) of a range table.

2.3.4.10.4.2.3 Range View

The screen is used to display all the ranges of a range set key and contains the following parts:

- A header
- A header content
- A main content

Header

The header displays the breadcrumb of the ranges and gives the possibility to navigate back to the previous views.

Header Content

The header content displays:

- The range table class

→ Tip

- If you click on the name of the range table class, a quick view providing all the information about the class is displayed (name, catalog, bounds, and so on...)
- In this quick view, clicking on the name of the range table class opens this one in the dedicated [Manage Range Table Classes \[page 281\]](#) app, in display mode

- The range set key whose ranges are displayed in the main content part.

Main Content

The main content part is displayed as a table where:

- The first column represents the ranges
- The subsequent columns represent the output values for each range

An [Edit](#) button provides the possibility to add ranges, modify existing ones and most of the actions related to the [edition \[page 305\]](#) of a range table.

2.3.4.10.4.3 Creating a Range Table

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

From the [master and version](#) view of the app, Pricing Specialist (Convergent Charging) can configure a new range table:

- By copying an existing range table, using the [Copy](#) button
- From scratch, using the [Create](#) button

When clicking [Copy](#) on a displayed range table, a draft version of this copied range table is created, as a clone of the original. Only the name of this new range table differs, for uniqueness purpose.

When clicking [Create](#), an empty range table is created, and you can use the recommendations below to fill the table. The newly created range table is recorded as a draft. This draft remains until you click the [Save](#) button, that definitively creates the range table in the system.

⚠ Caution

If you log out without saving your draft, the range table is not recorded in the system, but the draft is kept.

→ Tip

You can click the [\[icon\]](#) button when editing the range table, in order to hide the left area of the screen and focus on the range table itself.

Header Tab

The following table contains the list of information you need to fill in in the [Header](#) tab:

Element	Description and recommendations	Type
Name	The name of the range table, that must be unique among the list of existing range tables	M
Class	The name of the range table class whose structure is used for this range table. This selection is mandatory to access the Versions tab.	M
Catalog	The name of the pricing catalog this range table belongs to	M
Agreement ID	The agreement ID this range table is associated to	O
Description	A description of the purpose of this range table (2000 char. Maximum)	O

M: Mandatory, O: Optional

Version Tab

For more information about the creation of the versions of a range table, refer to the [dedicated topic \[page 307\]](#).

Additional Information Tab

The *Additional Information* tab contains the list of additional information items associated to the range table. To define some new additional information in your range table, click the *Add* button and fill the elements according to the following recommendations:

Element	Description and recommendations	Type
Name	The name of the additional information, that must be unique among the list of additional information associated to this range table	M
Type	Select the relevant type for the additional information	M
Value	The value that corresponds to this additional information	O
Description	A description of this additional information	M

M: Mandatory, O: Optional

Note

Adding additional information is not mandatory. It is still possible to add any additional information after the creation of the range table.

The modified range table is recorded as a draft. This draft remains until you click the *Save* button, that saves the range table in the system.

If you click the [Cancel](#) button, a popover message appears, inviting you to confirm your choice by clicking the [Discard](#) button. In this case, all changes in each view are discarded and the range table remains in its initial state.

2.3.4.10.4.3.1 Creating the Versions of a Range Table

The [Versions](#) tab contains the list of versions:

- In case of a single version, the name that appears in the [Period](#) column is "Unlimited". Otherwise, the date and time from which the period is valid is shown in the [period](#) column.

i Note

No gap is possible between two versions. The system prevents from this situation.

- The table includes an [Editing Status](#) column that reflects the current status of the version (New, Modified or In error)
- Each row of the table begins with a radio button to select a version

Five action buttons are available to manage the versions of a range table:

- Click the [Import](#) button to select a file that contains a range table with all its versions to be imported. For further information, refer to the [Importing a Range Table \[page 312\]](#) task.
- Click the [Export](#) button to export the current range table including all its versions in a csv file. For further information, refer to the [Exporting a Range Table \[page 312\]](#) task.
- Click the [Edit Period](#) button to edit the period a selected version.
- Click the [Copy](#) button to copy a selected version

→ Remember

Using the copy function also copies all the data of the version, including range set keys and ranges.

- Click the [Add](#) button to add an empty new version.

Once the versions you need are created, you access the next creation step by clicking the  button on the right end of a version:

- [Creating the Range Set Keys of a Range Table \[page 307\]](#) if input columns have been declared in the [class \[page 281\]](#) of the range table
- Or [Creating the Ranges of a Range Table \[page 308\]](#) view [\[page 304\]](#) otherwise

2.3.4.10.4.3.2 Creating the Range Set Keys of a Range Table

The screen used to display range set keys of a given version of a range table. The screen contains the following parts:

- A header

- A filter bar
- A main content

i Note

- For further information about the header and the filter parts, refer to the [relevant section \[page 303\]](#).
- In **editing mode**, the filter area is enhanced with an *Editing Status* field to refine the search.

Range Set Keys

The main content part is displayed as a table whose input columns are declared in the [class \[page 281\]](#) of the range table.

Click on the *Edit* button to manage range set keys.

i Note

The table includes an *Editing Status* column that reflects the current status of the range set keys (New, Modified or In error)

Three buttons, are available:

- *Add* to add a new empty range set key to set up.
- *Remove* to remove a selected range set key.

i Note

Remove works with multiple selection.

- *Copy* to copy a selected range set key.

i Note

Copy is not available with multiple selection.

→ Remember

Using the copy function also copies all the data of the range set key, including the ranges.

Once the range set keys are created, click on the  button on the right end of a row to access the next creation step: [Creating the Ranges of a Range Table \[page 308\]](#).

2.3.4.10.4.3.3 Creating the Ranges of a Range Table

The screen is used to display the ranges of a given range set key. The screen contains the following parts:

- A header
- A header content
- A main content

i Note

For further information about the header and the header content parts, refer to the [relevant section \[page 304\]](#).

Ranges

The main content part is displayed as a table where:

- The first column represents the ranges
- The subsequent columns represent the output values for each range

Click on the [Edit](#) button to manage ranges.

Three buttons are available:

- [Copy](#) to copy a selected range.

i Note

[Copy](#) is not available with multiple selection

- [Remove](#) to remove a selected range.

i Note

[Remove](#) works with multiple selection.

- [Add](#) to add a new empty range.

2.3.4.10.4.4 Editing a Range Table

When a range table is selected, click the [Edit](#) button located in the title bar to switch to the editing mode. This mode gives you the possibility to:

- Use the [Import](#) button to import a range table, with all its versions from a csv file. For further information, refer to the [Importing a Range Table \[page 312\]](#) task.
- Use the [Export](#) button to export the selected range table, with all its versions in a csv file. For further information, refer to the [Exporting a Range Table \[page 312\]](#) task.
- Edit the [versions \[page 310\]](#) of the range table.
- Edit the [additional information \[page 310\]](#) of the range table.

Version Tab

For more information about the edition of the versions of a range table, refer to the [dedicated topic \[page 310\]](#).

Additional Information Tab

In **editing mode**, two buttons are available to manage additional information:

- [Add](#) to set up some new additional information
- [Remove](#) to remove an additional information item

For further information about this tab, refer to the [dedicated section \[page 306\]](#).

The modified range table is recorded as a draft. This draft remains until you click the [Save](#) button, that saves the range table in the system.

If you click the [Cancel](#) button, a popover message appears, inviting you to confirm your choice by clicking the [Discard](#) button. In this case, all changes in each view are discarded and the range table remains in its initial state.

2.3.4.10.4.4.1 Editing the Versions of a Range Table

To edit the period of a version, select a version and click the [Edit Period](#) button. A dialog box appears:

- [Start Date](#) left area: select the radio-button:
 - [Date](#): to define a start date and time by clicking on the calendar icon
 - [Unlimited](#): if there is no start date
 - [Previously Defined](#): to select a previous entered date by choosing it in the dropdown list
- [End Date](#) right area: select the radio-button:
 - [Date](#): to define a end date and time by clicking on the calendar icon
 - [Unlimited](#): if there is no end date
 - [Previously Defined](#): to select a previous entered date by choosing it in the dropdown list

Click [Apply](#) to validate your choices or [Cancel](#).

i Note

For a new version, the [Apply](#) button is replaced by the [Add](#) button

The modified range table is recorded as a draft. This draft remains until you click the [Save](#) button, that saves the range table in the system.

→ Remember

The end date of a version is never included in the period. If an event occurs at this date, the following version will apply.

2.3.4.10.4.4.2 Editing the Range Set Keys of a Range Table

In **editing mode**, use the available buttons to manage the range set keys as described in the [dedicated section \[page 307\]](#).

The main task consists in filling in each field properly.

Once done, you can either:

- Click [Apply](#) to validate your changes and be redirected to the [master and version](#) view
- Or click [Cancel](#) to ignore your changes. A popover message appears, inviting you to confirm your choice by clicking the [Discard](#) button. In this case, all changes in all views are discarded and the range table remains in its initial state. You are redirected to the [master and version](#) view
- Or click  at the right end of the row to edit the ranges of the selected range set key

→ Remember

The modified range table is recorded as a draft. This draft remains until you click the [Save](#) button in the [master and version](#) view, that saves the range table in the system.

2.3.4.10.4.4.3 Editing the Ranges of a Range Table

In **editing mode**, use the available buttons to manage the ranges as described in the [dedicated section \[page 308\]](#).

To edit ranges:

- Fill in the **upper bound** of each range.

i Note

- Similarly to versions, no gap is possible between two ranges.
 - The upper bound of the last range of an unbounded range table is not editable. It is always $+\infty$.
- Fill in the **output value** fields, according to the type defined in the corresponding class of the range table (string or number).

Once done you can either:

- Click the [Apply](#) button to validate your changes and come back to the previous view
- Or click [Cancel](#) to ignore your changes. A popover message appears, inviting you to confirm your choice by clicking the [Discard](#) button. In this case, all changes in all views are discarded and the range table remains in its initial state. You are redirected to the [master and version](#) view.

→ Remember

The modified range table is recorded as a draft. This draft remains until you click the [Save](#) button in the [master and version](#) view, that saves the range table in the system.

2.3.4.10.4.5 Importing a Range Table

In **editing mode**, you can use the import function to replace the content of a range table. To use it, click the [Import](#) button to open the [Import From File](#) dialog box, which contains the following sections:

- [File](#), that gives the possibility to select the file containing the range table versions in csv
- [File Format](#), that gives the possibility to specify:
 - which separator is used in the file to separate the existing fields
 - which mark is used in the field comment lines
- [Number Format](#), that gives the possibility to specify which separator are used in the file for decimals and thousands
- [Mapping](#), that gives the possibility to customize the association between the range table version column names and the column index

Once you have configured all the relevant elements, click the [Import](#) button to start importing the content of the selected file. The new versions replace the existing versions of the range table. If the import is successful, a draft version of the range table is displayed. The user can then save the draft or cancel it. In that last case, the range table is restored to its initial state.

i Note

- One row of the file will be mapped to one and only one range table version range.
- Optionally, one row can be interpreted as comment line if a comment line character is specified in the import request and if the row starts with this character. Comment lines will be ignored.
- The row must contain following values:
 - the version start date (this value is required but can be empty to define that the version is always effective. Otherwise the date must be formatted with the following ISO 8601 date format: YYYY-MM-ddThh:mm:ss)
 - each input field defined in the [class \[page 281\]](#) of the range table (these values can be empty if the class does not define any input fields)
 - the upper bound of the range (this value is required but can be empty for an unbounded range)
 - each output field defined in the class of the range table (string or number values)
- String values can have up to 256 characters.
- Number values can have up to 28 digits including 6 decimal places. The decimal separator can be dot '.' or coma ','. The integer part of the number can contain separators for thousand. In that case digits must be grouped by 3.
- The order of the values is free. You can define the right mapping in the "mapping" section.

2.3.4.10.4.6 Exporting a Range Table

In **editing mode**, click the [Export](#) button to open the [Export to File](#) dialog box.

This dialog box contains the following sections:

- [File Format](#): you specify which separator to be used between each generated value
- [Date Format](#): you specify the format of a date

- **Number Format:** you specify which separators to be used for decimals and thousands

Once you have configured all the relevant elements, click the **Save** button to start exporting the content of the range table.

The file will be downloaded according to your browser configuration and will be named:

`<sanitized_name_of_the_range_table>_<now_date_time>.csv`

Where:

- `<sanitized_name_of_the_range_table>` is the name of the range table (in which the invalid filename characters are removed)
- `<now_date_time>` is the date when you export the range table with the following format: YYYYMMddHHmmss

⚠ Caution

The export feature exports the current range table. If this range table contains errors, the generated file will also contain these errors. When such a situation occurs, the file will have to be manually fixed before being used for import purposes.

2.3.4.10.4.7 Deleting a Range Table

When a range table is selected, you can click the **Delete** button located in the title bar to remove it from the system.

When clicking on **Delete**, a dialog box appears to allow you to confirm your choice.

2.3.4.10.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the *SAP user assistance and product documentation* for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 314\]](#)

[Tips and Tricks \[page 314\]](#)

2.3.4.10.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage Range Tables** app indicates the total number of range tables that are currently released in SAP Convergent Charging 5.0. If your user profile is assigned to a single pricing catalog (catalog restriction), this number counts the released range tables for this catalog.

i Note

This number does not take drafts into consideration.



Searching for range tables does not return the expected results.

For a better user experience, the search mechanism is **case-insensitive**, which may return more elements than expected. In case less results than expected are returned, please note that a synchronization mechanism exists between the **Cockpit** application and the Core Server system. In case a user created a range table in parallel (for example using the **Core Tool** user interface), it might be necessary to click the  button to refresh the list and get these elements.



Can someone view my draft range tables?

No. Only you can access and display your drafts, until they are released. These interim versions are personal and available with your user session.

i Note

If you open multiple user sessions on different web browsers or computers, the drafts differ.



Why can't I copy a draft range table?

The copy mechanism is only possible for released range tables.



Is it mandatory to click on the *Edit* button in each view to edit or create a range table?

No. Once enabled, the **editing mode** is available for each view until you click on the *Save* or the *Cancel* button in the *Master and Version View*.

2.3.4.10.5.2 Tips and Tricks



How to access a range table quickly?

Just use the browser bookmarks to access a given range table directly. You can copy and share a bookmark, taking into account the associated privileges that may be required to access this range table.



How to delete a version?

Just create a new version whose period can overwrite the existing one.

⚠ Caution

If the period overwrites **all** the available versions, this new edited version will be the only existing one.



How to facilitate your tasks?

Just use the rich functions of your app and UI5 technology. Use the copy and the import-data-from-file functions to create a range table quickly.

2.3.4.10.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



I can not save my range table.

To save a range table, the following criteria must be fulfilled:

- This range table must be associated to a catalog
- This range table must have a name
- A range table class must be associated to this range table, and according to this class:
 - An upper bound must exist if the class is bounded
 - Input values must be entered if the class has input columns
- Output values must be specified



"Error message: 'No matching range tables to display'."

This error message means that the **Manage Range Tables** app cannot display the requested range table. This situation may be due to:

- A parallel deletion of this range table by another individual user or service user (CRM³⁰ application, provisioning system). Try to click the  button to refresh the list of range table and check whether it still exists, or not. In case your range table is still present, ask your [system administrator](#) to audit the user operations
- Insufficient privileges associated to your user profile, or a catalog restriction. Contact your [user administrator](#) to verify your user profile (credentials, lock status, password expiration, assigned roles, pricing catalog restriction)
- An incorrect bookmark or link. Try to use the search mechanism to retrieve your range table. In case you find your range table, update your bookmark and share the changes with your team
- Other technical issues. Contact your local support team or the SAP Support Team

³⁰ Customer Relationship Management

2.3.4.11 Manage SAP CC System Parameters

With the app **Manage SAP CC System Parameters**, you can search for and view some system parameter values that are defined in a running SAP CC Core Server system. You quickly and efficiently inspect and change the persistent values and the runtime values.

[What's New? \[page 316\]](#)

[About This App \[page 317\]](#)

[Important Concepts \[page 317\]](#)

[Tasks \[page 318\]](#)

[FAQs and Tips \[page 328\]](#)

[Troubleshooting \[page 329\]](#)

2.3.4.11.1 What's New?

This section highlights the main changes in the **Manage SAP CC System Parameters** app that both relate to new or changed features.

What's New in SP 1

As of SP 1 (see SAP Note [2464828](#)) for release 5.0, the **Manage SAP CC System Parameters** app manages CSV³¹ and XML³² files to facilitate the system configuration and system auditing.

Now with this app, you can complete the following new tasks quickly:

- [Exporting Values to a File \[page 323\]](#) either as a report or as the basis of a custom file
- [Preparing Custom Files \[page 325\]](#)
- [Importing Values from a File \[page 327\]](#)

What's New in SP 0

As of SP 0 (see SAP Note [2380829](#)) for release 5.0, SAP Convergent Charging provides SAP CC administrators with new administration tools based on Web application, SAP Fiori Design, and SAP UI5.

With this first app you can complete the following tasks quickly:

- [Viewing Parameter Values \[page 318\]](#)
- [Filtering Parameter Values \[page 320\]](#)

³¹ Comma Separated Value

³² eXtended Markup Language

- [Configuring Parameter Values \[page 322\]](#)

2.3.4.11.2 About This App

Target Audience

The **Manage SAP CC System Parameters** app is intended for the following audiences:

- Application and System Administrators
- Operations Team Expert
- IT Consultant
- Project Team Member (Implementation, Integration)
- Support Specialist (SAP SE, Local Support Team)

App Summary

The **Manage SAP CC System Parameters** app provides you with the following capabilities:

- [Display and inspect \[page 318\]](#) all the system parameters with their current values (runtime, persistent, initial) in the connected Core Server system
- [Filter or search \[page 320\]](#) for some particular parameters, system instances, and other criteria
- [Change \[page 322\]](#) some system parameter values quickly and efficiently
- Change multiple parameter values at the same time
- [Export \[page 323\]](#) parameter values to files
- [Prepare \[page 325\]](#) and [import \[page 327\]](#) custom files (CSV³³, XML³⁴)

2.3.4.11.3 Important Concepts

As an SAP CC administrator, you are aware of the following concepts to use the app **Manage SAP CC System Parameters** in your SAP system landscape:

- The [technical operations](#) to administer the Core Server systems that are running in your SAP system landscapes
- The architecture of the multihost and multiinstance systems of **Manage SAP CC System Parameters**
- The [system configuration settings](#) based on system parameters and based on advanced configuration structures such as the CIF³⁵ configuration

³³ Comma Separated Value

³⁴ eXtended Markup Language

Files and Formats

The **Manage SAP CC System Parameters** app handles two file formats: CSV and XML, both using the UTF-8 encoding to support many languages ([Exporting Values to a File \[page 323\]](#)).

XML Format

The app supports the XML files of Config Tool. Refer to the XML Files of Config Tool section in the primary help of [Config Tool \[page 1005\]](#).

CSV Format

The file format is CSV (comma separated values), that respects the following rules.

- This file contains the parameter definitions.
- Each line corresponds to a record.
- The file has a table-structured format:
 - The first uncommented line defines this structure.
 - The next uncommented lines define the values of each system parameter. Some of these lines contain the persistent values of a parameter, other lines contain the runtime and initial values for each instance of the Core Server system.

2.3.4.11.4 Tasks

With the app Manage SAP CC System Parameters, you can complete the following administrative tasks:

- [Viewing Parameter Values \[page 318\]](#)
- [Filtering Parameter Values \[page 320\]](#)
- [Configuring Parameter Values \[page 322\]](#)
- [Exporting Values to a File \[page 323\]](#)
- [Preparing Custom Files \[page 325\]](#)
- [Importing Values from a File \[page 327\]](#)

2.3.4.11.4.1 Viewing Parameter Values

Viewing

1. [Launch \[page 170\]](#) the web application in your browser depending on your local environment.
2. In *Cockpit*, open the app Manage *SAP CC System Parameters* by clicking the tile.

³⁵ Charging output Integration Framework

3. Wait a few seconds. By default, the app displays all the system parameter values defined in the running Core Server system.
4. [Filter \[page 320\]](#) the displayed results to focus on particular parameter values.
5. **View or inspect** the system parameters.

i Note

You can [export \[page 323\]](#) some parameter values to a CSV or XML file. The file is either a report when auditing the system or the basis for a custom file to [import later \[page 327\]](#).

6. Refresh  your browser to display the latest values in real time.
7. When you need to configure your system manually, change the values (persistent or runtime) of the system parameters (see [System Parameter Reference](#)).
8. If the app cannot display some parameter values, see the section [Troubleshooting \[page 329\]](#).

Workspace

On your screen, the main area of the app is a [parameter table](#) that includes all the known parameter values (persistent, runtime, initial).

The graphical view is a 3-level [tree](#):

- The first level represents a parameter.
- The second level represents information available for a particular type of system instances.
- The last level represents information available for a specific instance in the Core Server system.

→ Tip

Top of the table, you can use the action buttons ([Parameters](#), [Instance Types](#), and [Instance IDs](#)) to collapse or expand the parameter information tree. Click  to select the columns displayed in the parameter table.

In SAP Convergent Charging, the system parameters ([System Parameter Reference->All System Parameters](#)) have multiple values:

VALUES OF SYSTEM PARAMETERS	DEFINITION
Persistent Value	A persistent value is the value of a system parameter that is used by each system instance when it restarts. The persistent value of a system parameter is recorded in the back-end database. A single value is defined for all the instances of the same type in the Core Server system.
Runtime Value	A runtime value is the current value of a system parameter in a running instance of the Core Server system. The runtime value may differ from the persistent value.

VALUES OF SYSTEM PARAMETERS	DEFINITION
Initial Value	An initial value is the parameter value used at startup time by an instance in the Core Server system.

2.3.4.11.4.2 Filtering Parameter Values

To facilitate your operations, the app allows you to [set up some filters](#) during your working session:

- Parameter names or key words (tokens)
- Types of system instances
- Instance IDs
- Names of parameter groups or key words
- Editing status of each parameter value

Your app [Manage SAP CC System Parameters](#) uses these filter definitions when you view, configure, or export some system parameters.

Procedure

To filter some parameter values:

In the user interface, you define your custom filters and click [GO](#) to apply the filtering. The app completes your inputs automatically. If you defined inconsistent filters, the parameter table is empty.

FILTER

Parameters

USE

To filter numerous parameter values:

- Enter a parameter name or a token in the multi-input field. The app suggests some parameter names.
- Or use the graphical component to define your custom filter.

Click  to define some filtering items or conditions carefully. Enrich your user experience by learning how the app defines tokens when you set up filter conditions.

Example:

ENTER...	TO...
the token *enabled	display the system parameters that end with the key word 'enabled'.
the token *enabled*	display the system parameters that contain the key word 'enabled'.

In the *Select from List* tab, enter your key words. The user interface takes into account the parameter definitions to enhance your research capabilities.

Instance types

Select the types of the system instances you want to show the parameter values (persistent, runtime, initial):

- bulkloader
- dispatcher
- guider
- rater
- taxer
- updater

Your type list depends on the current configuration of the running Core Server system.

Instance identifiers

Select some particular instances in the Core Server system directly.

The list depends on the current configuration of the system. For example, you can select `dispatcher#1` and `dispatcher#2`.

FILTER	USE						
<i>Groups</i>	In the multi-input field: - Enter a group name, the beginning of a group name, or a token. - Click  to define some filtering items carefully. Enrich your user experience by learning how the app defines tokens when you set up filter conditions. Example: <table border="1"> <thead> <tr> <th>ENTER...</th><th>TO...</th></tr> </thead> <tbody> <tr> <td>the token *security*</td><td>display only the system parameters that relate to the security management in SAP CC</td></tr> <tr> <td>the two tokens *security* and *log*</td><td>display only the system parameters that relate to the following configuration settings: - security management - logging and tracing functions </td></tr> </tbody> </table>	ENTER...	TO...	the token *security*	display only the system parameters that relate to the security management in SAP CC	the two tokens *security* and *log*	display only the system parameters that relate to the following configuration settings: - security management - logging and tracing functions
ENTER...	TO...						
the token *security*	display only the system parameters that relate to the security management in SAP CC						
the two tokens *security* and *log*	display only the system parameters that relate to the following configuration settings: - security management - logging and tracing functions						
	See also: the parameter groups (System Parameter Reference) defined in SAP Convergent Charging 5.0.						
<i>Editing status</i>	Select or type the <i>Modified</i> status if you want to highlight the parameter changes before to save.						

→ Tip

Click [GO](#) to apply the filters to the displayed parameter table.

If you quit the app, the filter definitions are lost.

2.3.4.11.4.3 Configuring Parameter Values

To configure your system, you can:

- Change few parameter values manually.
- Import a configuration from a custom file.

Procedure

To change values manually:

In the app *Manage SAP CC System Parameters*:

- Click *Edit* to activate the edition mode to change the values (persistent, runtime) of the available system parameters ([System Parameter Reference](#)->*All System Parameters*).
- *Filter* some parameter values to focus on the relevant parameters.
- Use the interface to change the parameter values:
 - *Persistent values*: a persistent value is defined for all the system instances of same type (such as rater instances or dispatcher instances).
 - *Runtime values*: a runtime value is the current value of a system parameter in a particular running instance in the Core Server system. The runtime value may differ from the persistent value. You can *change immediately and temporarily* a predefined subset of system parameters ([System Parameter Reference](#)->*Immediate Changes*) because the Core Server system does not support this feature.
- Finally, click *Save* to request the Core Server system to take the parameter changes into account:
 - All modified persistent values
 - All modified runtime values

The app summarizes the changes before it sends your relating operation requests to the Core Server system. In case of errors signaled by the Core Server system, an error message explains the issue and how to solve it. See the [Troubleshooting \[page 329\]](#) section.

i Note

It can result in partially saved parameters and thus incoherent system state. Finalize your administrative operation by fixing the signaled errors manually and save the changes again.

As the app saves the values sequentially to the Core Server system, the save action could lead to invalid constraint errors, which are no more accurate because the related parameter may already have been modified.

In this case you may directly retry to save the remaining parameters to complete your task.

See also : [System Parameter Reference](#)

2.3.4.11.4.4 Exporting Values to a File

For security reason, the app does not export any password such as [SLD_PASSWORD](#).

Procedure

To export some parameter values to a file:

In the app *Manage SAP CC System Parameters*:

- [Filter \[page 320\]](#) some parameter values to focus on the parameters that you want to export and download.
- Click [Save to File](#) and select your file format and its content:
 - Persistent values of all parameters (CSV file)
 - All values (CSV file)
 - XML file for Config Tool (sublist of persistent values)

Your app manages two types of text files. The character encoding is UTF-8 to support many languages.

Depending on your needs, you determine the appropriate file type and format by verifying the following detailed information about the file content, file use, and detailed file formats:

FILE TYPE	FILE FORMAT	CONTENT	USE	COMPATIBILITY
CSV (Comma Separated Values)	CSV File Format (System Parameter Values)	• All parameter values (persistent, runtime, and initial) • Or only persistent values The file includes parameter values that relate to CIF and RIF configuration settings such as the POST-PAID_CIT_WRITER_CH ANNEL_COUNT parameter.	Use your file to: • Create a report that you can finalize with spreadsheet applications • prepare a custom file [page 325] to import later	• Any text editors • Any spreadsheet applications

FILE TYPE	FILE FORMAT	CONTENT	USE	COMPATIBILITY
XML (Extensible Markup Language)	Refer to the XML Files section in the primary help of Config Tool [page 1005]	- Limited list of persistent values To be consistent with Config Tool, the app does not export the following parameter values to an XML file. They are incompatible parameters such as: SYSTEM_ID HTTP_SERVER_HOST POST-PAID_CIT_WRITE_R_CHANNEL_COUNT They correspond to parameters that: - Are not modifiable by an SAP CC system administrator - Or relate to CIF and RIF configuration settings	Use your file to prepare a custom file to import with the SAP CC Config Tool [page 1005] user interface when the Core Server system is not started. Do not use this file as a report because it does not include all the parameter values.	- SAP CC Config Tool [page 1005] user interface - Any XML editors

- Click [Download](#).
The app starts exporting and storing the information to a new file. By default, the file name contains the SID of the Core Server system and the export date and time (YYYYMMDDHHMMSS). Depending on your local environment (web browser, user settings, and operating system) the CSV or XML file is in the download folder for example.
- Complete your task:
 - Use this file as a [report](#) when inspecting or auditing the Core Server system
 - Or [prepare some custom files \[page 325\]](#) to import by changing some parameter values and deleting some entries that are not relevant for your administrative operations.
- Store or send the file.

2.3.4.11.4.5 Preparing Custom Files

To configure a system quickly, you can **create a custom file** that includes the persistent values of some SAP CC system parameters that are relevant for your administrative operation.

❖ Example

Example 1

You create two custom files to switch your Core Server system to a debug mode or to a normal mode.

Example 2

You create two custom files to fine-tune the SQLHELPER_CONNECTION_COUNT (see [System Parameter Reference](#)) system parameter and associated parameters that have the same constraint. The first file contains the values before your technical operations. You can use the first file as a backup file. You create a second file that contains a set of values that you want to apply to the running system to test the performance and processing. You modify the file regularly during the tuning activity.

Procedure

To prepare a custom file:

1. **Initiate the file** by [exporting \[page 323\]](#) some *expected persistent values* to a CSV or XML file. The file structure is correct.
2. Customize your text file by editing it to change some values, remove some entries, and adapt the file content to your needs.
You edit the custom file in a text editor, XML editor, or another application.

i Note

The spreadsheet applications may change the format of your CSV file. We recommend that you use a text editor to avoid such potential modifications.

When you edit a CSV file in your spreadsheet application:

- First launch your application. Then open the file from the [File](#) menu. In the text import assistant, select the options "Delimited" and "Unicode (UTF-8)". Set up the delimiter to [Comma](#) uniquely.
- Always save your file as [Unicode UTF-8](#).

Consult the product documentation to know the best procedures to work with CSV files.

3. When editing a CSV file:
 - You write multiple lines to redefine a system parameter and its persistent values. A line corresponds to a parameter persistent value for a particular type of system instance.
 - You clean your custom file by deleting all the lines that correspond to parameter values about the CIF and RIF configuration settings such as the POSTPAID_CIT_WRITER_CHANNEL_COUNT parameter (see [System Parameter Reference](#)). Otherwise, if you try to import your file, the app signals an error and ignores each parameter value.
4. Save and close your file.
5. Test your custom file by importing the system parameters.
6. Depending on your needs, store or send the file.

Now, an SAP CC administrator can [import the persistent values \[page 327\]](#) to configure the SAP CC system parameters of a running Core Server system.

i Note

The export contains only the parameter values available in your app. not all the parameters available in the related Core Server system. If you have setup a Bulk Loader or a Taxer but this instance is not actually

started then the Cockpit and thus the export may not contains such instances. If you need to export the full Core Server parameters then please start these instances or consider using the [Config Tool](#) application.

2.3.4.11.4.6 Importing Values from a File

To configure a system quickly, you can **import the persistent values** of some system parameters. You upload a custom file, review the parameter modifications, and save them to the Core Server system.

With this app, you cannot load parameters that are defined in system configuration structures (XML) such as the notification policy, the CIF, or the RIF. Modify these parameters later in your app or use the SAP CC [Setup Tool \[page 1005\]](#) user interface.

Procedure

To import some parameter values from a file:

i Note

Some parameter values shall not be changed in a productive system. For example, a tuning parameter that depends on a particular host memory.

Before importing parameters from another system, you must carefully validate the parameter subset and their values before importing and propagating their values. Refer to the [SAP CC 5.0 System Parameter Reference](#) to know if the parameter value could be modified safely.

1. [Prepare \[page 325\]](#) the CSV or XML file to import.
2. [Launch \[page 170\]](#) the web application in your browser.
3. In *Cockpit*, open the app [Manage SAP CC System Parameters](#). Wait a few seconds.
4. By default, the app displays all the parameter values that are defined in the running Core Server system.
 1. In the app, click [Load from File](#).
 2. Select the expected file in your environment. By default, the file names start with the SID of your Core ServerCore Server system.
 3. The app can propagate some modified persistent values in order to redefine the corresponding runtime values. Select this option when you need that your app detects valid changes of persistent values and changes the runtime values when they differ from automatically.
View the candidate parameters in the [Immediate Changes](#) section of [SAP CC 5.0 System Parameter Reference](#).
 4. Click [Load](#).
The app verifies the file content. It may warn you about some issues and ask you to continue or cancel the action.
Note that the app ignores:
 - The unknown parameters or wrongly named
 - The invalid parametersThe app does not load the corresponding parameter values that are defined in your custom file. Make sure that you agree with this behavior or contact the file owner.

5. Confirm the ignored parameter redefinitions.
6. If the app cannot load your file, see the section [Troubleshooting \[page 329\]](#).
7. The user interface activates the edition mode and displays the loaded parameter values.
2.
 1. Review the system parameters and decide if you are ready to apply the changes. You can [set up your filters \[page 320\]](#) to display the modified values only.
 2. [Change the values \[page 322\]](#) manually when needed.
 3. Finally, click [Save](#) to request the Core Server system to consider the parameter changes:
 - All modified persistent values
 - All modified runtime values

The app summarizes the changes before it sends your relating operation requests to the Core Server system. In case of errors signaled by the Core Server system, an error message explains the issue and how to solve it. See the [Troubleshooting \[page 329\]](#) section.

i Note

It can result in partially saved parameters and thus incoherent system state. Finalize your administrative operation by fixing the signaled errors manually and save the changes again.

As the app saves the values sequentially to the Core Server system, the save action could lead to invalid constraint errors, which are no more accurate because the related parameter may already have been modified.

In this case you may directly retry to save the remaining parameters to complete your task.

2.3.4.11.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 329\]](#)

[Tips and Tricks \[page 329\]](#)

2.3.4.11.5.1 Frequently Asked Questions (FAQs)



What corresponds to the number displayed in the app tile?

The tile for your **Manage SAP CC System Parameters** app indicates the total number of parameter values (persistent, runtime) that are displayed in the parameter table. This number depends on the filters currently defined by the power user.



Can I keep my filters between two working sessions?

No. The **Manage SAP CC System Parameters** app does not remember your filter settings.

2.3.4.11.5.2 Tips and Tricks



How to enter tokens to define custom filters?

You can enrich your user experience by learning how the **Manage SAP CC System Parameters** app defines tokens when you set up some filter conditions. When you defined a token, just click the  button to view and change it with the assistant.



How to view a subset of parameters quickly?

If you have a defined list of parameters to work with, you can execute the following procedure:

- Put this multi-line list in your text editor
 - Keep the expected parameter names
 - Remove empty lines (when exists)
 - Copy this selection in the clipboard
 - [Paste \[page 320\]](#) this content in the input field in order to define the parameter filter
 - Press *Enter*
-

2.3.4.11.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



The **Manage SAP CC System Parameters** app does not display any information about your bulkloader and taxer instances in the Core Server system that you operate with.

This rare situation only occurs when you never started one of these instances of the SAP CC system. When such a situation occurs, SAP SE recommends that you try to start an instance of each type in order to solve the problem. Refresh the browser and ensure that you have some new rows in the parameters table.



Error message when loading persistent values from an XML file: 'Sorry, your file is empty or contains useless data. Please verify your file or select another one.'

This error message means that the **Manage SAP CC System Parameters** app considers that the custom file is empty or contains parameter configurations that cannot be understood. When such a situation occurs, SAP SE recommends that you, as a [system administrator](#), verify in this custom XML file that the `clusterConfig` element is present and has a correct syntax.



Error message when loading persistent values from an XML file: 'To load this XML, it must be valid. Verify the XML elements and attributes in the file and retry.'

This error message means that the **Manage SAP CC System Parameters** app considers that the custom file does not comply with XML standards. When such a situation occurs, SAP SE recommends that you, as a [system administrator](#), try the following suggestions:

- Verify that two `clusterConfig` elements are present in the XML file, at the beginning and at the end of the file
- Use an XML editor in order to verify why the file is not considered as a valid XML file



Error message when loading persistent values from an XML file: 'Set up a name of an existing parameter.'

This error message means that the **Manage SAP CC System Parameters** app does not know the name of the system parameter. When such a situation occurs, SAP SE recommends that you, as a [system administrator](#), try the following suggestions:

- Verify the parameter name
- Verify the spelling
- Verify that the versions of the **Cockpit** user interface and Core Server systems have the same version exactly. Different versions may introduce or remove a system parameter.

i Note

From the top-right menu in **Cockpit**, select the [About](#) submenu to display the versions of both **Cockpit** and the Core Server system. To know the version of your Core Server system, you can use [Admin+](#) to get the value of the `VERSION` indicator.



Error message when loading persistent values from an XML file: 'Set up a valid instance type that is a technical key.'

This error message means that the **Manage SAP CC System Parameters** app does not know the name of the instance type. It expects a technical name such as `rater` or `bulkLoader`.

i Note

`Rater` ('R' uppercase) or `bulkloader` ('l' lowercase) values are not correct.

When such a situation occurs, SAP SE recommends that you, as a [system administrator](#), try the following suggestions:

- Verify the instance type, specified as:
 - A column in a CSV file
 - An attribute of the `instanceConfiguration` elements in an XML file
- Verify the spelling



Error message when loading persistent values from an XML file: 'You can't load a value for an undetected instance type.'

This error message means that you tried to load and import some persistent values that are defined for a particular instance type of the running Core Server system, but your **Manage SAP CC System Parameters** app did never detect such running instances. When such a situation occurs, SAP SE recommends that you, as a [system administrator](#), try the following suggestions:

- Verify within the instance map that the Core Server system contains the mentioned instance type
 - Verify the reason why your **Manage SAP CC System Parameters** app cannot detect the mentioned instances (instance not started, communication issues, and so on)
 - Verify if the custom file is correct and does not include any parameter modification for this mentioned type of instance
-

2.3.4.12 Process a Chargeable Item

The **Process a Chargeable Item** application is a transactional app that enables the pricing specialist to manually process a chargeable item. He / she can also simulate the processing to check the correctness of the chargeable item data.

In SAP CC, a chargeable item is the input of the charging process. Usually, it represents a consumption of a service by a customer like a phone call for instance.

The structure of a chargeable item is based on a [chargeable item class \[page 219\]](#) which contains a list of properties required for charging purposes.

[What's New? \[page 331\]](#)

[About This App \[page 332\]](#)

[Important Concepts \[page 332\]](#)

[Tasks \[page 333\]](#)

[FAQs and Tips \[page 338\]](#)

[Troubleshooting \[page 339\]](#)

2.3.4.12.1 What's New?

This section highlights the main changes in the **Process a Chargeable Item** app, that both relate to new or changed features.

What's New in SP 6

As of SP 6 for release 5.0, **Process a Chargeable Item** is a new app that allows the Pricing Specialist (Convergent Charging) to perform a charging process from the Cockpit.

2.3.4.12.2 About This App

Target Audience

The app Process a Chargeable Item is intended for the pricing specialists of SAP Convergent Charging.

App Summary

The app **Process a Chargeable Item** provides you with the following capabilities:

- Editing and processing a chargeable item and navigate to the chargeable item class that defines its structure
- Analyzing the result of the processing of a chargeable item
- Saving or loading a chargeable item to or from a file

App Layout

The layout of the app Process a Chargeable Item is made up with two main areas:

- An **upper area**, which allows you to edit the necessary input data for the processing of the chargeable item. For further details about the available information, refer to the [Editing and Processing a Chargeable Item \[page 333\]](#) task.
- A **lower area**, which provides you with the result of the processing of the chargeable item. For further information about this area, refer to the [Analyzing the Processing Result \[page 335\]](#) task.

In addition to these areas, a header, containing the name of the system the app is connected to, and a footer toolbar provide different buttons related to the actions you can perform:

- For further information about the header buttons, refer to the [Loading a Chargeable Item from a File \[page 337\]](#) and [Saving a Chargeable Item to a File \[page 337\]](#) tasks.
- For further information about the footer toolbar buttons, refer to the [Editing and Processing a Chargeable Item \[page 333\]](#) and [Analyzing the Processing Result \[page 335\]](#) tasks.

2.3.4.12.3 Important Concepts

As a Pricing Specialist (Convergent Charging), you are aware of the following concepts to use the **Process a Chargeable Item** app.

Chargeable Item Classes

A chargeable item is associated to a chargeable item class which defines the characteristics (i.e. properties) of each consumption event used by charge plans.

For further information about chargeable items, refer to the [Chargeable Item](#) section of the [SAP CC 5.0 Application Help](#) documentation.

2.3.4.12.4 Tasks

With the app Process a Chargeable Item provides, you complete the following tasks:

- [Editing and Processing a Chargeable Item \[page 333\]](#)
- [Analyzing the Processing Result \[page 335\]](#)
- [Loading a Chargeable Item from a File \[page 337\]](#)
- [Saving a Chargeable Item to a File \[page 337\]](#)

i Note

As a prerequisite, a pricing catalog must exist to run a rating process. This catalog must include the expected chargeable item classes, otherwise, you must define them first.

See also: [Viewing a Chargeable Item Class \[page 223\]](#)

2.3.4.12.4.1 Editing and Processing a Chargeable Item

Chargeable Item

Before processing a chargeable item, you must edit it in the upper main area.

In the header, the name of the current system is displayed and two action buttons [Load from File \[page 337\]](#) and [Save to File \[page 337\]](#) are available.

i Note

If a previous chargeable item has been saved to a file, you can use the [Load from a File](#) button in the header instead of editing a new one.

For more information about this action, refer to the [Loading a Chargeable Item from a File \[page 337\]](#) task.

This section is divided into 2 subsections: [Default Properties](#) and [Custom Properties](#).

Default Properties

Provide common information of chargeable items used for rating purposes. All chargeable item classes contain the same default properties:

- **Service ID:** Define the identifier of the chargeable service (or product) consumed by the end customer. Type the identifier of the related service.
- **User ID:** Define the technical identifier of the end customer consuming the service (or using a product). Type the identifier of the related end customer.
- **Consumption Date:** Define the date and time when the service is consumed by the end customer. Select the related date and time in the dialog box by clicking on the calendar icon.

Custom Properties

Provide additional information usually specific to the consumed service.

- **Chargeable Item Class:** select the related chargeable item class in the dropdown list by clicking on the button at the right end of the field

i Note

Once the chargeable item class is provided, a clickable link appears under its field. This link allows you to open a quick view displaying information about this chargeable item class, and a shortcut to open it in its [dedicated application \[page 219\]](#), in display mode.

- **Catalog:** Select the related catalog in the dropdown list by clicking on the button at the right end of the field.

→ Remember

- If the chargeable item class is already provided, this field is automatically filled in.
- If you are assigned to only one catalog, this field is automatically filled in.

- **Properties:** This table shows the custom properties declared in the chargeable item class. Fill in the **Value** fields properly.

i Note

The `string` type properties are limited to 2000 characters maximum.

Processing a Chargeable Item

Once all the necessary information provided, click on one of the two buttons on the right end of the footer toolbar:

- **Simulate:** executes the charging process in simulated mode. All the changes are canceled at the end of process (like counter updates for example) and no charged items are generated
- **Execute:** executes the charging process in real mode

→ Tip

If you change your mind after clicking on the **Execute** button, click anywhere else from the confirmation popover message to cancel the execution.

The result of the processing displays in the lower main area of the app. For further information about how to analyze the result of the processing, refer to the [Analyzing the Processing Result \[page 335\]](#) task.

→ Remember

Logs for these charging operations are not auditable.

2.3.4.12.4.2 Analyzing the Processing Result

Processing Result

This section is divided into 3 subsections: *Provider Contract*, *Charged Items* and *Notifications*.

Provider Contract

This subsection provides general information about the provider contract involved in the processing:

- *Subscriber Account ID*: displays the ID of the subscriber account associated to the impacted provider contract
- *Provider Contract ID*: displays the ID of the provider contract retrieved from the Service ID and User ID data
- *Provider Contract Item External ID*: displays the ID of the provider contract item used for integration purposes

Charged Items

In this subsection, a table provides a summary of the charged items generated during the processing. The number of charged items depends on the charge plan.

- *Key*: displays the index of the charged item in the result list
- *Class*: displays the name of the class of the generated charged item
- *Account ID*: displays the name of the external or prepaid account determined by the charge plan
- *Operation Type*: displays the type of operation applied to the account (debit or credit)
- *Amount*: displays the amount calculated by the charge plan

By clicking  at the right end of the row, you access the [detailed charged item page \[page 336\]](#).

Notifications

In this subsection, a table provides a summary of the notifications generated during the processing (User Alert or a No Access). The number of notifications depends on the charge plan.

- *Key*: displays the index of the notification in the result list
- *Type*: displays if the notification is a User Alert or a No Access
- *Name*: displays the name of the notification in the charge plan
- *Message*: displays the text message of the notification

By clicking  at the right end of the row, you access the [detailed notification page \[page 336\]](#).

i Note

- In the footer toolbar, a summary button  shows the number of executions of the charging process. If you click on this button, you access to the list of executions whether they are simulation or real ones. Each execution failure is clickable to see the details.
- The number of displayed properties is limited to 100 by default. If the number of generated properties exceeds this limit, click on the [More](#) button.
- The number of displayed charged items and notifications is limited to 20 by default. If the number of generated charged items exceeds this limit, click on the [More](#) button.

Charged Item Page

The header displays:

- the name of the current charged item
- the summary of the current charged item as shown in the table on the main page ([Class](#), [Account](#), [Operation Type](#) and [Amount](#))

→ Tip

- If you click on the name of the charged item class, a quick view providing all the information about the class displays (name, catalog...)
- In this quick view, clicking on the name of the charged item class opens it in the dedicated [Manage Charged Item Classes \[page 228\]](#) app, in display mode

This page is divided into 3 sections: [Properties](#), [Related Charged Items](#) and [Notifications](#).

- [Properties](#): displays the table of the properties generated by the charge plan, according to the class of the charged item
- [Related Charged Items](#): displays
 - the name of the [Parent](#) charged item, if applicable (`empty`) if the current charged item has no parent)

→ Tip

If you click on the name of the parent charged item, you are automatically redirected to its page.

- the list of the [Children](#) charged items
- [Notification](#): displays the notifications related to this charged item

Notification Page

The header displays the name and the text message of the current notification. This page contains:

- A table named [Properties](#) which summarizes the list of the properties generated by the charge plan according to the class of the charged item
- The name of the [Related Charged Item](#) concerned by this notification.

→ Tip

If you click on it, you are redirected to the [page \[page 336\]](#) of this charged item.

→ Tip

From any page, use the  button in the header bar to navigate back to the previous page.

2.3.4.12.4.3 Loading a Chargeable Item from a File

If a previous chargeable item has been saved to a file, you can use the [Load from File](#) button in the header.

To load a chargeable item:

1. Click on the [Load from File](#) button
2. In the [file selection](#) window of the browser, browse the directory in which the chargeable item has been saved
3. Select the relevant XML file
4. Click [Open](#)

⚠ Caution

If the catalog in the file is not allowed for the user, the loading fails.

2.3.4.12.4.4 Saving a Chargeable Item to a File

You can save a chargeable item to an XML file. Use the [Save to File](#) button in the header.

To save a chargeable item:

1. Click on the [Save to File](#) button
2. Depending on your web browser settings:
 - **Your web browser does not ask for download location:** the file is downloaded in the default folder and is named `process_chargeable_item_<YYYY_MM_DD>T<HHMMSS>.xml` where:
 - `<YYYY_MM_DD>` is the date of the download
 - `<HHMMSS>` is the time of the download
 - **Your web browser asks for download location:**
 - Browse the directory in which the file will be saved
 - Name the file at your convenience (by default, it is named `process_chargeable_item_<YYYY_MM_DD>T<HHMMSS>.xml`)
 - Click [OK](#)

i Note

The saved file includes both the chargeable item and the processing result.

2.3.4.12.5 FAQs and Tips

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. In addition, we complete these solutions with some best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

[Frequently Asked Questions \(FAQs\) \[page 338\]](#)

[Tips and Tricks \[page 338\]](#)

2.3.4.12.5.1 Frequently Asked Questions (FAQs)



Can I use the app in two different tabs of my browser?

SAP SE highly recommends not to display the app in two different tabs of a single browser as it may cause inconsistencies.



Do I lose my data if I switch to another app?

Not necessary. An empty form occurs only when:

- you use the app just after a log on to the Cockpit
- you come back to the home page of the Cockpit and re-launch the app

2.3.4.12.5.2 Tips and Tricks



How to navigate easily through the app?

Have you noticed the header bar? It provides you some smart buttons to ease your navigation.

On the left side of this bar, you can click on:

- the  button to navigate back to the previous page
- the [SAP](#) icon button to navigate back to the home page
- the name of the page to display a dropdown list to choose where you want to navigate

2.3.4.12.6 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using this app or working with your SAP CC environment (systems, data, users) in your SAP system landscape. Please find afterwards a list of possible symptoms and related solutions that you can try to implement by yourself.



I can't see the [Process a Chargeable Item \[page 331\]](#) app tile in the Cockpit launchpad.

Ensure your SAP user settings are granted with the **Marketing** role. Contact your user administrator.



The [Process a Chargeable Item \[page 331\]](#) app tile in the Cockpit is **grayed out** with the message "Charging is not available".

This means that the Process a Chargeable Item app is unavailable.

If you click the tile, a message appears.

This message provides with you the reason of the dysfunction (which may be temporary).

Ensure the Cockpit configuration file is correct, regarding the requirements provided in the [Configuring Cockpit](#) section of the [SAP CC 5.0 Tuning Guide](#) documentation.

2.3.5 FAQs and Tips About Cockpit

Based on SAP user feedbacks, we deliver Frequently Asked Questions (FAQs) about all aspects of working with the Cockpit application and its apps efficiently. We complete these solutions with our best time-saving and task-completion tips and tricks.

→ Remember

Please **share your SAP user experience** to enrich these sections in the [SAP user assistance and product documentation](#) for SAP Convergent Charging 5.0.

See here:

- [Frequently Asked Questions \(FAQs\) \[page 339\]](#)
- [Tips \[page 341\]](#)

Frequently Asked Questions (FAQs)

Review this section [Frequently Asked Questions \(FAQs\)](#) to **find useful answers** about SAP Convergent Charging 5.0 Cockpit and its apps.

"How to install Cockpit?"

Refer to the sections:

- [Installing and Launching Cockpit](#) in [SAP CC 5.0 Installation and Upgrade Guide](#)
- [Configuring Cockpit](#) in [SAP CC 5.0 Tuning Guide](#)

"How to launch Cockpit?"

Refer to the section [Launching Cockpit \[page 170\]](#) in this primary help.

"Why will Cockpit not start?"

Maybe Cockpit is running on an Apache Tomcat Server 6 or a former release. Your web application does not support this release and requires servlet 3.0. See SAP Note [2492244](#)  for more information and user assistance.

"Can Cockpit work without a running dispatcher instance?"

No, Cockpit regularly connects to the master dispatcher instance in the SAP CC Core Server system. When implementing the web application in your SAP system landscape, you define the SID and the URLs of a particular system. The master dispatcher instance can change.

"How do I sign out?"

As of SP 3 for release 5.0, you can **log off** by displaying your user preferences in the Cockpit user interface.

1. Just click  at the top left corner of the screen. It is visible in the shell header of the launchpad.
2. Click  [Sign Out](#) to log off and close your user session.

"What happens when I sign out?"

You end your user session. All your catalog draft objects are unlocked. If another web browser of the same technology was previously launched, you must log on again with the sign-in page. You will recover your draft items on your next log on. In the meantime, other users will be able to see that there are unsaved changes on the active documents you were modifying. They could not access the draft object modification but they could delete it or start a new edition.

If another web browser for another supported technology is launched with a running SAP CC Cockpit, the user session is different whatever the user name you used to log on to the user interface.

"Can I create a catalog with Cockpit?"

Yes. As of SP 4 for release 5.0, you can **quickly configure a new pricing catalog** while configuring a new mapping table class. Just [start creating \[page 256\]](#) a mapping table class and click the [New](#) button to the right of the [Catalog](#) input field.

"Can another user view my drafts?"

No. Drafts are personal. By the way, other users can see that there are unsaved changes by the person who modifies a draft for an already-released data. [Locked by <USER_ID>](#) indicates that a user is currently editing a data object. [Unsaved Changes by <USER_ID>](#) that a user has started editing a data object but this person has signed out.

Tips

Share your [tips and tricks](#) with SAP CC users and experts. Our user assistance reflects this rich experience.

"How to search for more information about Cockpit?"

Search for **cockpit** from [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#) - Please refresh your web browser and then filter the results by setting up the component filter to: IS-CC.

"What is an SAP CC pricing specialist for beginners?"

Typical Persona	Main Goals	Responsibilities
<i>Pricing Specialist (Convergent Charging)</i> Business Role Description: - Responsible for designing price plans – which include pricing algorithms for one-time, recurring, and usage-based fees – with SAP Convergent Charging (SAP CC) to meet the business needs. - Tasks include configuring, maintaining, testing, and debugging price plans and tables, and investigating price plan and table issues. - Common job titles for the role are: "Price Plan Expert" and "Product Developer".	- Analyze how to design pricing algorithms with SAP Convergent Charging, given that there are typically several ways for implementing a given requirement, based on price plans and tables. - Regularly configure new and easy-to-maintain price plans and tables with SAP Convergent Charging to meet new business needs. - Maintain existing price plans and tables e.g. for enriching existing pricing algorithms or in case of issues.	- Configure and maintain price plans and tables. - Test and debug price plans and tables. - Notify other stakeholders when price plans are ready for validation. - Investigate and fix price plan and table issues.

"How to delete a draft?"

To delete a draft, just open the corresponding app, select the draft in the list, and click the [Cancel](#) button in the footer toolbar.

Related Links

Your app is part of the Cockpit user interface. We recommend that you see the FAQs and tips sections in this primary help or visit the SAP sites for all your questions and answers:

- [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#)
- [SAP Questions and Answers \(answers.sap.com\) for SAP Convergent Charging](#) 
- [Troubleshooting with Cockpit \[page 342\]](#)

→ Tip

In SAP ONE Support Launchpad, use the app [My SAP Notes & KBAs](#) to manage your key efficiently:

- [Favorites](#)

- [New](#)

2.3.6 Troubleshooting with Cockpit

Troubleshooting Problems

As part of the technical operations, you may have to troubleshoot some problems with your user interface or with your SAP CC environment (systems, data, users) in the SAP system landscape.

[Troubleshooting Problems with SAP CC \[page 342\]](#)

[Troubleshooting Problems of the User Interface \[page 343\]](#)

2.3.6.1 Troubleshooting Problems with SAP CC

SAP Convergent Charging is part of a complex system landscape with multiple systems, applications, and components that are interfaced together.

You can use Cockpit and its apps to troubleshoot some technical or business problems that may occur in the communication chains between individual users and heterogeneous cascaded systems.

As part of a specific investigation and troubleshooting procedure, you use this user interface to troubleshoot some problems by:

- Retrieving some information and analyze symptoms.
- Performing some important actions (immediate corrections, preventive actions).
- Determining the root causes.
- Resolving an issue.

→ Recommendation

Consult the SAP Convergent Charging [Operations Guide](#) for more troubleshooting information and tasks. See the main chapter *Troubleshooting of SAP CC*.

♣ Example

For example, as an SAP CC administrator, you may use this user interface to configure a system by enabling the log and trace functions or changing some system parameter values.

As an SAP CC pricing specialist, you may correct some pricing configuration settings because of some erroneous computed prices.

2.3.6.2 Troubleshooting Problems of the User Interface

You may have to troubleshoot some user interface issues. Various symptoms are possible:

- Error messages
- Slow performances
- Unexpected behavior or experience

You troubleshoot some problems when:

- Launching the Cockpit user interface, signing in to the launchpad, locking/unlocking, or signing out
- Using the Cockpit launchpad and its features
- Working with your apps
- Operating the target SAP CC system with an app

To troubleshoot problems that relate to the [SAP CC Cockpit user interface](#), you can:

1. First use **the error messages displayed by the user interface**. They are helpful and provide you with the best experience and support to continue your investigations.

WHEN CONNECTING	AT ANY TIME	WHEN WORKING WITH THE COCKPIT	WHEN WORKING WITH AN APP	WHEN LEAVING
When logging on to the user interface See: - Issues When Launching the User Interface [page 346] - Issues When Logging On to the User Interface with the Sign-In Window [page 347]	Once connected and authenticated you can encounter: - Communication failures - Issues with your SAP CC user account - Issues with your user session that can be locked or expired	When using the Cockpit launchpad, you can encounter: - Workspace Issues [page 347] - Navigation Issues [page 347]	When using your app in <i>Cockpit</i>, issues may appear. The app provides you with error information to solve the issue quickly. In this primary help, refer to the <i>Troubleshooting</i> sections of each app [page 176]: - Issues with Analyze Item Files [page 185] - Issues with Display System Status [page 195] - Issues with Display Usage Metrics [page 210] - Issues with Display User Operations [page 219] - Issues with Manage	When leaving the launchpad application or an app page. See Log-Off Issues [page 347].

WHEN CONNECTING	AT ANY TIME	WHEN WORKING WITH THE COCKPIT	WHEN WORKING WITH AN APP	WHEN LEAVING
				Chargeable Item Classes [page 228]
			- Issues with Manage Charged Item Classes [page 245] - Issues with Manage Mapping Table Classes [page 265] - Issues with Manage Mapping Tables [page 280] - Issues with Manage Range Table Classes [page 296] - Issues with Manage Range Tables [page 315] - Issues with Manage SAP CC System Parameters	

Issues When Logging On to the User Interface with the Sign-In Window



Error message: "Check your user name and password combination."



For security reasons and to prevent attacks, the message is not detailed. Several issues with credentials are possible. This situation may be due to:

- Entered user ID is wrong or the SAP CC user does not exist.
- Entered password is wrong or has expired and must be changed first.
- User is locked in SAP CC.

Try again carefully. Otherwise, contact your user administrator for SAP Convergent Charging.

Issues at any Time



Error message repetitively displayed: "Sorry, your access to this application has been restricted or your session no longer exists."

You can observe this unexpected message while using the Microsoft Internet Explorer browser with its *Microsoft F12 Developer Tools* window.

Close the *Microsoft F12 Developer Tools* window and reload the page, or use another web browser. See [Technical Requirements \[page 163\]](#).

Workspace Issues



I can't see the tile for my app.

In the Convergent Charging Cockpit launchpad, if a tile is not visible, verify your user settings about roles currently assigned to your user profile in SAP Convergent Charging.

Navigation Issues

See also: [Keyboard Navigation \[page 167\]](#)

Log-Off Issues



Even I previously locked my user session, I've been signed out by the Cockpit launchpad.

It is the normal behavior. See [Automatic Sign-Out When Inactive \[page 167\]](#).

2.4 Core Tool

SAP Convergent Charging 5.0 is built upon a powerful, flexible pricing modeling, and charging solution. SAP CC drives a powerful set of systems and user applications to profitably rate and charge millions of service consumption events in prepaid or postpaid environments. SAP Convergent Charging's modular design includes an implementation framework for fast and low-cost integration (low TCO) to quickly deploy solutions that enable you to get a rapid return on your investment (rapid ROI).

SAP Convergent Charging

SAP Convergent Charging (SAP CC) is your solution for pricing, charging, and refilling processes. You can:

- Use the panel of tools to streamline the way you create pricing element with reusable charges, charge plans, and refill plans
- Use the intuitive GUI that enables "visual programming" to customize subscriptions.

To help you get the most out of SAP Convergent Charging, SAP SE has set up a [Help Portal](#) which features a regularly updated knowledge base, the latest release notes, and expert advice from our SAP Support Team.

Purpose of This Primary Help

As an IT administrator or an IT consultant, this primary help describes **how to use your SAP CC Core Tool user interface** to configure and manage your data and system. It explains:

- [Functions and limitations \[page 354\]](#) of the user interface
- How to work with SAP Convergent Charging's [concepts \[page 356\]](#) and [objects \(data, users, others\) \[page 371\]](#)
- Tasks you have to perform and complete with Core Tool and associated procedures during both the implementation project phase and the production operation phase

For more information about help, refer to [Help Resources \[page 383\]](#).

→ Tip

This product documentation and user assistance relates to the former Data Model (DM) based on offers in pricing catalogs and subscriptions for end customers of usage-based services to monetize.

If you configure charge plans or allowance plans for the service pricing and provider contracts for the end customers of the service provider company, we recommend that you read our dedicated product documentation and user assistance. See [SAP CC 5.0 Primary Help for Core Tool \(New Data Model Only\)](#) and select your software version.

Target Audience

- Pricing Specialist (Convergent Charging)
- Implementation consultants
- Project Team Member (Implementation, Integration)
- Power User
- Administrators (systems, applications, users)

Reader	Responsibilities	Knowledgeable
Pricing Specialist	This primary help is intended for SAP CC pricing specialists (power users, IT consultants) who create and manage the master data for a service provider and its end-customer services to monetize: reusable charges, charge plans, refill plans and offers. This master data is grouped in a pricing catalog [page 400] to configure the pricing logic for the use (usage-based charges, periodic or on-off fees) of the marketable end-customer services. Note For test purposes, consultants and project team members can manage master data related to the end customers for a service provider. This customer master data includes subscriber accounts [page 668], provider contracts and subscriptions [page 700]. During the <i>Implementation Project Phase</i>, SAP Convergent Charging is integrated with a CRM application or a provisioning system that is responsible for the creation and maintenance of this customer master data See the SAP CC Tuning Guide in help resources.	They should have knowledge of: • Core Tool • Pricing and rating concepts • Charging concepts • Refilling concepts
Application Administrator	This primary help is intended for application administrators who create business data [page 376] such as currencies, public holidays.	
User Administrator	This primary help is intended for user administrators who create SAP CC users [page 760].	They should have knowledge of: • Core Tool • Security concepts for SAP CC • Security policy for the company • Security-related settings in SAP CC
System Administrator	This primary help is intended for system administrators who manage the system with the Core Tool user interface: • Audits [page 770] • Generate License Auditing File [page 824]	

Related Information

[Getting Started \[page 378\]](#)

[Core Tool Functions and Limitations \[page 354\]](#)

2.4.1 What's New?

What's New in Core Tool

This section highlights the main changes in this *SAP Product Document and User Assistance Deliverable*. They relate both to **new or changed features** in the SAP Convergent Charging 5.0 software and to **documentation enhancements** for enriching your SAP user experience continuously.

What's New in SP 6

This version introduces the **Distributed Increment Counter** feature used in shared allowances.

Distributed Increment Counters (New)

As of SP 6 for release 5.0, **Shared Allowances** are enhanced with the **Distributed Increment Counters** feature. It enables the Pricing Specialist (Convergent Charging) to create and maintain a new type of distributed counters, allowing read and increment operations in shared allowances.

This feature impacts the following topics:

- [Shared Allowances](#)
- [Allowance Logic: Persistent Counters](#)
- [Matrix of Components \[page 839\]](#)
- [Allowance Plans](#)

and introduces the new [Increment Counter Operator \[page 968\]](#) component.

Therefore, for a matter of consistency, the Debit Counter Operator is renamed [Decrement Counter Operator \[page 961\]](#).

What's New in SP 5

In case of an installation scenario integrated with SAP S/4HANA Cloud, the Prepaid Accounts Management feature is automatically deactivated within SAP CC, which impacts some elements of the Core Tool user interface. For further information, refer to the **Limitations** description of the [Core Tool Functions and Limitations \[page 354\]](#) section.

What's New in SP 4

Your [Primary Help](#) migrates to a new content management system. You can benefit from:

- Rich navigation between the other SAP product documents and user assistance deliverables
- PDF deliveries for offline consultation
- Powerful search and indexing tools
- Feedbacks and live comments

This version includes the following changes:

- Agreement Tables (New)
- 4-4-5 Calendar (New)

Agreement Tables (New)

As of SP 4 and in the integrated [SAP Solution](#) scenario based on SAP S/4HANA, the catalog tables (mapping and range tables) are enhanced with a new attribute to store an agreement identifier provided by SAP S/4HANA for Customer Management as of FPS01 for release 2.0.

In your integrated [SAP Solution](#), [agreement tables](#) are defined within a [master agreement](#) to store specific conditions like prices, discounts applying to one or several end customers only. Agreement tables are replicated into SAP Convergent Charging as catalog tables with the agreement identifier filled in.

A new field called [Agreement ID](#) appears in the [Definition](#) tab for the [Mapping Table](#) and [Range Table](#) windows.

This software change impacts the following topics:

- [Definition tab for a mapping table \[page 480\]](#) (in [Setting Up a Mapping Table \[page 480\]](#))
- [Definition tab for a range table \[page 520\]](#) (in [Setting Up a Range Table \[page 519\]](#))

Core Tool provides you with some options to tune its behavior (search, display). See the user interface settings [Agreement Tables in Catalog](#) in [Setting Up the Preferences \[page 787\]](#).

i Note

In order to be consistent with range tables, the [Description](#) field appears in [Mapping Table](#) and [Subscriber Mapping Table](#) configuration windows, in which the role of the table can be detailed.

4-4-5 Calendar (Update)

As of SP 4, a new calendar type called 4-4-5 calendar is introduced to base recurring fees on. The 4-4-5 calendar structure consists of 4 quarters of 13 weeks each grouped into two "4-week" months and one "5-week" month. It starts on the 1st January and ends on the 31st December.

As a pricing specialist, you use this new calendar to define monthly, quarterly, semi-annually, and annually recurring fees. The following components are enhanced to take this calendar into account: the charge, the refill logic, the allowance logic and the prorata operator.

This software change impacts the following topics:

- [Recurring Rate \[page 856\]](#)
- [Recurring Refill \[page 879\]](#)
- [Recurring Trigger \[page 888\]](#)
- [Prorata Operator \[page 978\]](#)

What's New in SP 3

No new information.

What's New in SP 2

This version includes the following change:

- New search criterion for the audit feature

New search criterion for the audit feature

This change enhances the graphical user interface by adding a new search criterion (Instance ID) in the [Audited Operations](#) window that allows you to search for audited user operations.

This change impacts the following topic:

- [Viewing Operations \[page 825\]](#)

What's New in SP 1

This version includes the following changes:

- Input columns in range tables
- Importing objects

Input columns in range tables

This change enhances the graphical user interface by allowing you to add input columns to ranges tables.

In SAP CC Core Tool, you can now add input columns to range tables and manage up to five input columns.

This change impacts the following topics:

- [Range Table Classes \[page 489\]](#)
- [Industry Examples of Range Table Classes \[page 490\]](#)
- [Setting Up a Range Table Class \[page 498\]](#)
- [Range Tables \[page 503\]](#)
- [Industry Examples of Range Tables \[page 506\]](#)
- [Setting Up a Range Table \[page 519\]](#)
- [Subscriber Range Tables](#)
- [Setting Up a Subscriber Range Table](#)

Importing objects

This change enhances the graphical user interface for facilitating the import of data objects into a pricing catalog.

In SAP CC Core Tool, you can now use two new buttons ([Select All](#) and [Deselect All](#)) in the [Import Objects](#) window to facilitate your SAP user experience when you import objects from an XML file into a pricing catalog.

This change impacts all the topics related to the import of objects into a pricing catalog.

What's New in SP 0

This version includes the following changes:

- Large mapping table support
- Export of mapping tables and subscriber mapping tables into CSV format
- Shared allowances
- Counter snapshot deactivation
- Troubleshooting
- Minor changes

Large mapping table support

This change enhances the graphical user interface for manipulating large mapping tables.

In SAP CC Core Tool, you can now filter, display, create, or modify a subset of rows in a large [Mapping Tables \[page 469\]](#) or [Subscriber Mapping Tables](#).

This change impacts the following topics:

- [Opening an Existing Mapping Table \[page 478\]](#)
- [Modifying a Mapping Table \[page 479\]](#)
- [Setting Up a Mapping Table \[page 480\]](#)
- [Setting Up a Subscriber Mapping Table](#)

Export of mapping tables and subscriber mapping tables into CSV format

This change enhances the graphical user interface for exporting mapping tables and subscriber mapping tables into CSV files.

This change impacts the following topics:

- [Setting Up a Mapping Table \[page 480\]](#)
- [Setting Up a Subscriber Mapping Table](#)
- [Exporting a Mapping Table \[page 488\]](#)

Shared allowances

This change enhances the graphical user interface for sharing allowances between subscriber accounts.

This change impacts the following topics:

- [Allowances](#)
- [Searching For and Viewing the Allowances of a Provider Contract](#)
- [Allowance Logic](#)
- [Allowance Logic: Definition](#)
- [Saving the Allowance Logic](#)
- [Allowance Plans](#)
- [Allowance Plan: Definition](#)
- [Saving an Allowance Plan](#)

- [Rerating \[page 790\]](#)
- [Rerating from a Charge Plan \[page 794\]](#)
- [Allowance Interface](#)

Counter snapshot deactivation

This change deactivates the recharging operations that are based on counter snapshots.

This change impacts the topic [Rerating \[page 790\]](#).

Troubleshooting

The new topic [Troubleshooting Connection Issues to Core Server \[page 992\]](#) provides information to solve the issue that occurs when SAP CC Core Tool tries to connect to SAP CC Core Server.

This change impacts the following topics:

- [Launching Core Tool \[page 379\]](#)
- [Help Resources \[page 383\]](#)

Minor changes

Links in the [Help Resources \[page 383\]](#) topic have been changed to access the new SAP [Help Portal](#).

Related Information

[What's New in Support Package 6](#)

2.4.2 Core Tool Functions and Limitations

Core Tool Functions

In an SAP Convergent Charging environment, the main functions of the [Core Tool](#) user interface are the following:

- Configuration during the implementation phase:
 - Configurations of business data or technical data available for the complete system
 - Configurations of the master data related to the pricing of a customer service: You set up the pricing logic of its customer services
 - Configurations of the master data related to end customers of a service provider in a B2B environment with few subscriber data
 - Dummy configurations of the master data related to the end customers of a service provider for test or demo purposes
- Operations during the production operation phase:

- Master data (pricing catalogs) and business data maintenance
- Technical data maintenance (users)
- Rerating operations
- Auditing

i Note

Core Tool provides you with some additional [tools \[page 790\]](#) to facilitate your:

- Business operations
- Data maintenance
- Audit operations

For more information on data objects (business data, master data, transactional data, and so on), see [Data Objects in Core Tool \[page 371\]](#).

Core Tool Limitations

In case of an installation scenario integrated with SAP S/4HANA Cloud, the Prepaid Accounts Management feature is automatically deactivated within SAP CC, which impacts the following elements:

- Main window:
 - [New](#) and [Open](#) menus no more give the possibility to create refill plans, refill record classes, refill item classes and refill logic objects
 - [Open From File](#) and [Import](#) menus no more give the possibility to open or import objects relating to prepaid accounts
- [Allowance Plan](#) window: Prepaid-related fields are no more available within charged item mappings
- [Catalog](#) window: Refill Plan, Refill Record Class, Refill Item Class and Refill Logic categories are no more available
- [Charge component](#) window: Switching operator is no more available
- [Charged Item Class](#) window: Prepaid-related fields are no more available
- [Charge Plan](#) window:
 - Prepaid account assignments are no more available
 - Prepaid-related fields are no more available within charged item mappings and response item mappings
- [Choose Object](#) window (in case of [New](#) and [Open](#) actions):
 - [Refill plans](#), [refill record classes](#), [refill item classes](#) and [refill logic](#) objects are no more available
 - [Refilling](#) category is no more available
- [Internal Component Reference](#) component window:
 - Settings related to prepaid accounts are no more available
 - Overspending radio button has been converted to a checkbox for credit-limit purpose only
- [Provider Contract](#) window: The [Activate Refill Plan](#) action is no more available
- [Subscriber Account](#) window: Settings related to prepaid accounts are no more available

Related Information

[Configuration of Business Data Step by Step \[page 398\]](#)

[Business Data \[page 376\]](#)

[Master Data \[page 373\]](#)

[Catalogs \[page 400\]](#)

[Rerating \[page 790\]](#)

[Audits \[page 770\]](#)

2.4.3 Concept Overview

This section explains the main concepts necessary to be familiar with SAP Convergent Charging (SAP CC) and its Core Tool user interface:

- Business objects used to implement the pricing policy and evolution for the subscription- and usage-based services to monetize
- Processes step by step
- Rating (dynamic pricing) and charging (multiaccount determination and amount splitting)
- [Account and balance management \[page 357\]](#)
- [Charging information flow \[page 361\]](#)
- Prerating, reservation, and postrating (deprecated, replaced by session-based charging)
- [Session-based charging and reservation \[page 364\]](#)
 - [Session-Based Charging Limitations \[page 366\]](#)

→ Recommendation

Consult the [Application Help](#) for more information and user assistance.

2.4.3.1 Configuring the Master Data

In SAP Convergent Charging 5.0, the *SAP Master Data* includes:

- **Master data** related to the *pricing configuration* of an end-customer service to monetize. In your *Core Tool* user interface, the business configuration activities consist in setting up this data for SAP Convergent Charging.
- **Customer master data**, which are master data related to the *end customers* and *subscribers* of the service provider company and can represent very high volume of data to store and manage in SAP Convergent Charging.

Related Information

[Master Data \[page 373\]](#)

[Customer Master Data \[page 374\]](#)

2.4.3.2 Rating Context

The rating (dynamic pricing) function of SAP Convergent Charging 5.0 uses a set of data to complete its tasks at runtime. All of this data, for which the values vary over time, is referred to as the *rating context*. Data that is part of a rating context is also referred to, in more general terms, as *rating context properties*.

The properties of a chargeable item or the following sources provide the results of usage used to calculate prices:

- [Counters \[page 567\]](#) values from subscriptions or provider contracts
- [Parameters \[page 574\]](#) values from subscriptions, offers, provider contracts, charge plans, or charges
- [Translation Tables \[page 422\]](#) or [Tier Tables \[page 437\]](#) rows
- Subscriptions or provider contract properties such as dates, for example

Note

When you are at the stage of adjusting and finalizing your offer or charge plan, you can view the rating context in detail. You can also manipulate it in the user interface by performing a [trial run \[page 603\]](#) on the price plan (see).

2.4.3.3 Account and Balance Management (ABM)

→ Recommendation

As of release 5.0, SAP Convergent Charging provides you with the *Allowance Management* feature to model time-limited service allowances. This feature is available with the newer data model (DM) based on charge plans and allowance plans in pricing catalogs and provider contracts for the end customers.

See [Allowance Management](#) in the [SAP CC 5.0 Application Help](#).

The *Account Balance Management (ABM)* feature adds [prepaid accounts \[page 670\]](#) and credit control features to SAP Convergent Charging and:

- Holds subscriber accounts.
- Controls the addition or deduction of monetary or non-monetary amounts from accounts.
- Performs credit reservation on accounts.
- Manages counters applicable for accounts.

The benefits of the account balance management are the following:

- Offer a single platform to manage balances for all subscribers, independent of their payment method.
- Support subscriber groups with sets of interrelated prepaid/postpaid balances, for example, for families or corporate customers.
- Enable flexible configuration of spending caps, allowances, credit limits, and service-specific wallets.
- Manage dynamic charging where the balances to be charged are determined per transaction at runtime.
- Ensure real-time online operations with high performance and high availability.

Subscriber Accounts

Creating a [subscriber account \[page 668\]](#) is the first step before creating any subscriptions. SAP Convergent Charging, the [subscriber account \[page 668\]](#) contains all the accounts which are debited or credited when a service is consumed. The accounts are the following:

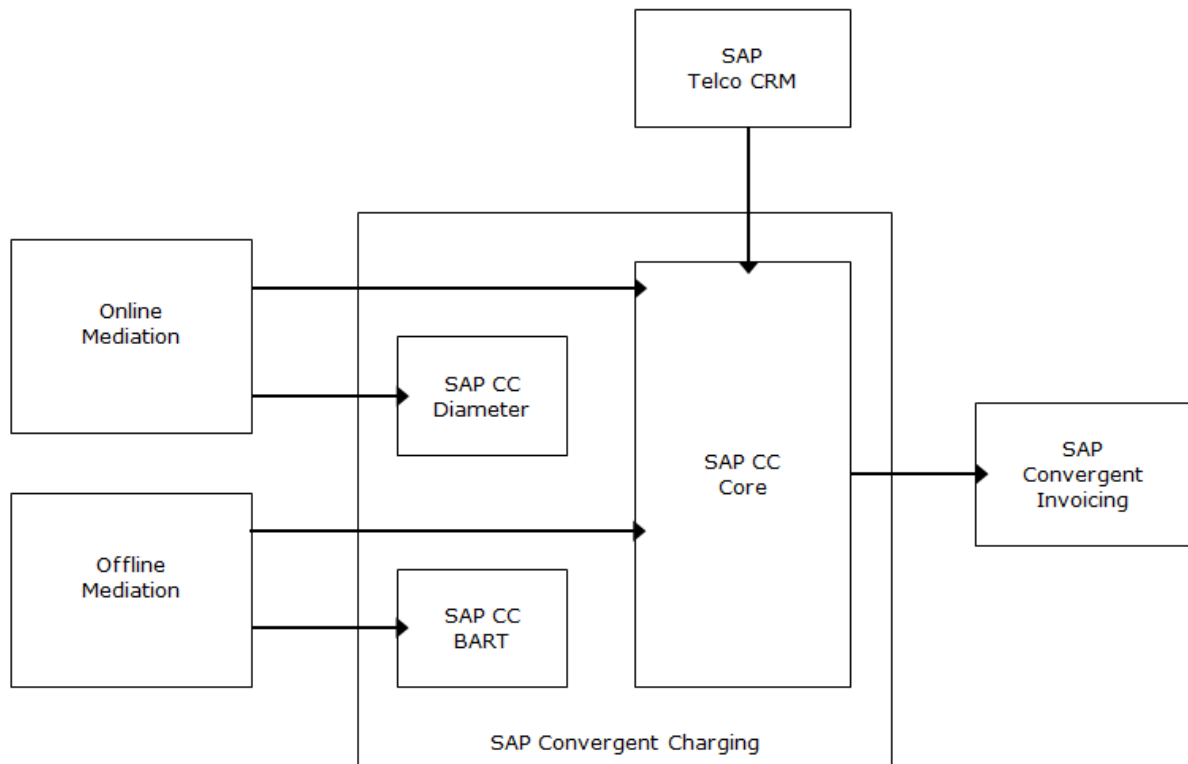
- [Prepaid Accounts \[page 670\]](#)
- [External Accounts \[page 675\]](#) (postpaid)

[Credit Limit Balances \[page 678\]](#) can be used with external accounts for credit control purposes.

Charging Policy and Multiaccount Determination

The charging policy identifies the accounts that will be debited or credited with the priced amount calculated with the price plan. The configuration is mainly based on information set in the SAP Master Data for SAP Convergent Charging:

- Master data related to the pricing configuration for the usage-based service delivered by a service provider company:
 - In reusable charges: [Charging Plans](#)
- Master data related to the end customers who consumes the services: subscriptions (see [Charging Mapping \[page 738\]](#))



i Note

Online and Offline Charging

A distinction is usually made between online and offline charging:

- **Online charging:** An online charging layer applies real-time technology to manage the multiple services. It enables an exchange of information between the charging layer and the network element or the applications in real time; the information exchanged can affect the delivery of service for the end user. The interaction is to handle authorization, rating, credit control, and the balance management of subscriber accounts. In SAP Convergent Charging 5.0, the online charging function is used for prepaid services.
- **Offline charging:** An offline charging function is necessary to handle postpaid services. The charging information does not affect the service rendered in real time. The final result of this charging mechanism is the forwarding of rated call-detail record files to the billing domain. The offline charging function is applied to users who pay for their services periodically, for example, at the end of the month.

Charging Process in a Business Scenario

SAP CC processes any service usage event (named *chargeable item*) coming from an external mediation system in the following order: *identification*, *rating (dynamic pricing)* and *account determination*.

1. **Identification:** The properties (technical identifier for the end customer (see service user identifier), service identifier, usage date) contained in the chargeable item allow to identify a business agreement ([Subscriptions \[page 700\]](#) or [Provider Contracts](#)) and its charges through an [access \[page 752\]](#).
2. **Rating and dependent fees:** For each charge, the price plan ([Price Plans \[page 570\]](#)) is carried out, and the related transactions are created with the calculated price amount. Dependent fees are computed. If some dependent charges ([Charges \[page 560\]](#)) exist, the steps "rating" and "account determination" are repeated for each dependent charge.
3. **Account determination and customer data updates (balances, counters):** The charging plan ([Charging Plans](#)) is carried out through charging references which are links to accounts from the subscriber account. During this process, persistent counters are updated, the prepaid account balances are debited or credited, and charged transactions are created to debit or credit the balances of external postpaid accounts. Account and balance notifications are managed and alerts are sent to external systems.
4. **Result data:** When all the charges are processed, all the charged transactions are sent to the external billing system or saved to files. Different formats are possible: transactions, charged items, billable items (SAP Convergent Invoicing).

i Note

About alerts and the rejection of the charging process:

- An alert is triggered if one of the balances goes below a specified threshold.
- In the case of a prepaid account, the charging process is rejected if the charged account is locked or closed (states of a prepaid account ([Prepaid Accounts \[page 670\]](#))).
- The charging process is rejected when only one balance threshold is reached or if an incompatible currency is used.

Refilling Policy

The [refilling policy](#) identifies the prepaid account that will be credited with a refill (money, units, and so on). The refilling policy is mainly based on the [Refill Plans](#) and their [Refill Logic](#).

Refilling Process in a Business Scenario

Any refill event (refill item class) coming from an external system is processed in the following order:

1. **Identification:** The properties (for example, account identifier, MSISDN, URL, and SIP) contained in the refill item class allow to identify the prepaid account.
2. **Refill:** The refill plan and its refill logic is carried out by the SAP CC system to compute the credit to add to the prepaid account and updates the prepaid balance and the counters of the related services accordingly. Refill records (or resulting transactions) are generated and stored in files.

2.4.3.4 Charging Information Flow

Charging information flows through SAP Convergent Charging system in the following way:

1. An end customer subscribes to the [offer \[page 611\]](#) of a service provider. Agreed pricing and charging terms are saved in a subscriber account and in a subscription.
2. The end customer consumes a chargeable service³⁶ included in the offer. An external system outside SAP Convergent Charging can meter the service consumptions.
3. A ticket, which is information about consumption, arrives at SAP CC Core Server.
4. SAP CC Core Server system calculates the amount of the consumed service according to one or more predefined price plans and subscriptions including counter values.
5. The charging process debits or credits prepaid accounts, credit limit balances or external accounts with the amounts calculated by the price plans. The balance management system controls the addition or deduction of monetary or non-monetary amounts from accounts.
6. One or more charged transactions are produced, which are returned to the external system, your billing system, or saved to a CSV file. Counters are updated in the database.

Objects such as chargeable item classes and charges are saved to the relational database. You can use the graphical user interface (SAP CC Core Tool) to configure the pricing objects that are master data related to the service provider. You can perform [trial runs \[page 603\]](#) of price plans to test your pricing logic.

2.4.3.5 Basic Charging Concepts

At the heart of SAP CC Core Server lies the concept of the [offer \[page 611\]](#). You build up an offer by listing all the charges/suboffers that the customer can subscribe to. You then activate each charge contained in the offer, depending on whether a customer subscribes to the whole offer or part of it.

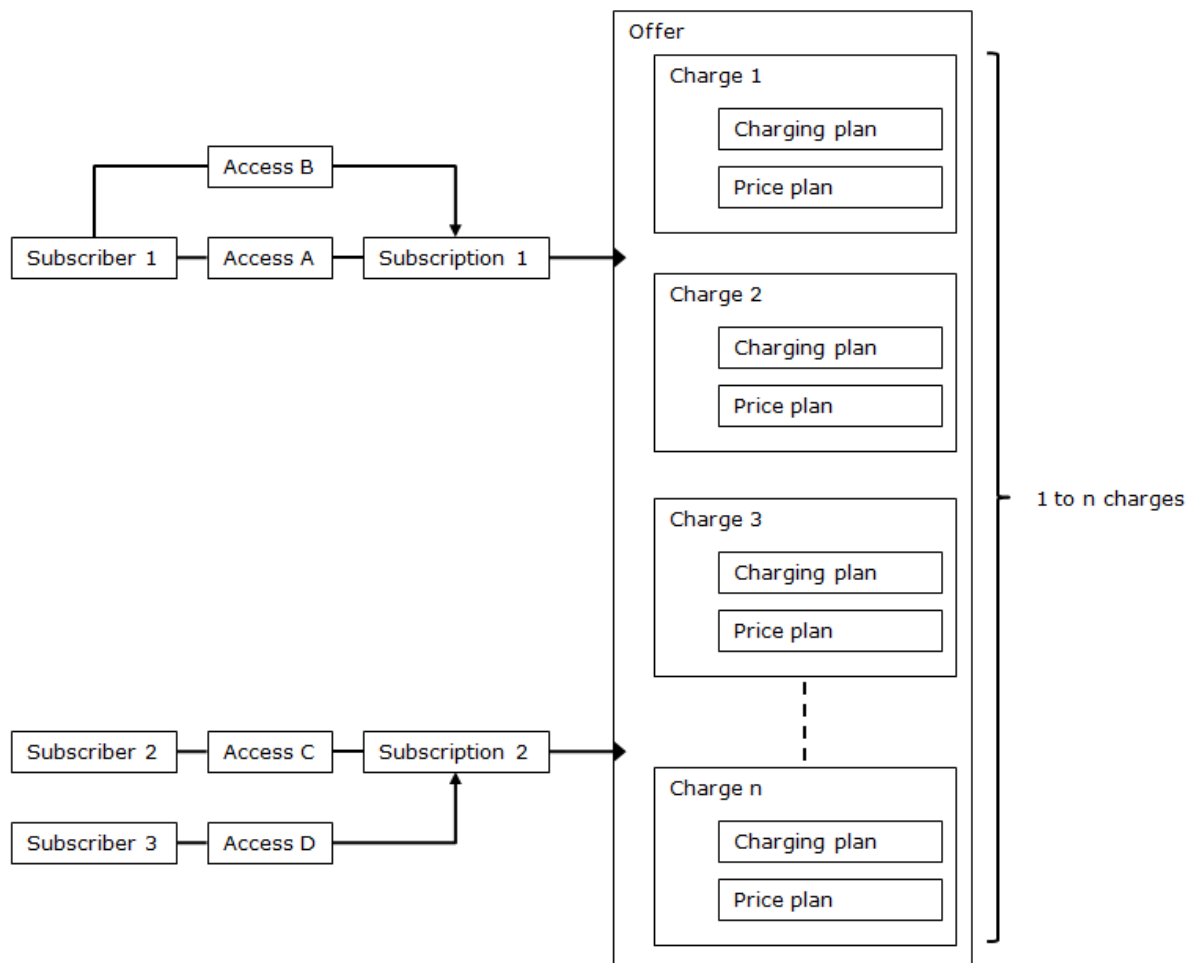
An offer is made up of charges. A charge is a reusable pricing block that contains one or more [Chargeable Item Classes \[page 531\]](#)³⁷ linked to a [price plan \[page 570\]](#). A price plan calculates how much a subscriber must pay to consume a service (chargeable item class).

A [subscription \[page 700\]](#) is the contract between a service provider and a subscriber. It consists of some or all the charges in an offer while some charges can be subscribed more than once. It is created and maintained by an external provisioning system and synchronized with SAP Convergent Charging through a dedicated technical interface (HCI: Http Communication Interface/Http Communication Interface).

[Identifiers \[page 752\]](#) (or accesses) under which the subscriber consumes the service are specified. A subscriber can access a service through various technical identifiers.

³⁶ Consuming a chargeable service means that the charge in the charge plan is associated to a [Chargeable Item Classes \[page 531\]](#) chargeable item class and the charge contains at least one [usage rate component \[page 573\]](#).

³⁷ Only if your price plan contains usage rate components. Chargeable item classes are not mandatory if your price plan only contains recurring or one-shot rates.



2.4.3.6 (Deprecated) Prerating, Reservation and Postrating

→ Remember

These features are deprecated since release 1.0 (ATS) of SAP Convergent Charging (SAP CC) and must be replaced by the [session-based charging \[page 364\]](#) in your SAP system landscapes. They are available only if you use offers and subscriptions, but they are not available for charge plans and provider contracts in the new SAP Data Model (DM).

Basic rating simply consists of the rating of all events related to the consumption of a service. If your configuration of SAP Convergent Charging uses the prerating and postrating feature, you need to know how this rating mechanism differs from the basic rating.

Prerating

Prerating is an advanced feature that enables a service provider to prevent a customer's balance from going below 0 when a service is consumed. This is done by using a reservation mechanism.

When SAP Convergent Charging receives a ticket from the reservation mechanism, the prerating operation calculates an amount for that ticket request and transmits the result of the prerating operation to the system to request and reserve the consumption. The system verifies the amount against the end-customer's balance. If the balance is sufficient, the consumption is allowed.

When the calculated amount is greater than the balance, the consumption is not allowed. If the system generates a new ticket request for a smaller consumption volume, the prerating function regenerates a total amount for the modified request. The system verifies if the end-customer balance is sufficient for the new requested consumption.

❖ Example

Making a telephone call

For long duration/large volume use, the prerating request is repeated towards the end of each allowed communication period in order to reserve more minutes.

A customer has \$5 remaining in a prepaid account and wants to make a telephone call. A ticket is delivered by the system, which is calculated as a chargeable item class according to the subscription and charge fees.

The prepaid function calculates the amount of money required for a defined volume of consumption. If the balance is sufficient, the call is made. During the call, the system makes successive prerating requests in order to verify if the caller can continue the call. When there are insufficient funds for the requested volume, subsequent requests are generated for progressively decreasing amounts. This continues until there are insufficient funds to consume any service. The call is then terminated.

Postrating

Postrating is the confirmation or the cancellation of a prerated event. If an event is canceled or modified, SAP Convergent Charging takes into account the impact this will have on other rated or prerated events by resetting subscription elements such as counters. The balance is updated accordingly.

After having been prerated, an event is postrated depending on the service delivery result:

- **Failed delivery:** The postrating cancels the prerated event. If necessary, SAP CC Core Server takes into account the impacts on results of other events already rated or prerated. In addition, the subscription context such as counter values are updated.
- **Successful delivery:** The postrating confirms the prerated event. The price previously calculated is confirmed. The balance is updated accordingly.
- **Successful delivery but with modified conditions:** The postrating confirms the prerated event with a new ticket. The balance is updated accordingly. If necessary, SAP CC Core Server takes into account the impacts on results of other events already rated or prerated.

A prerating event can be canceled if:

- The service was not delivered to the customer's recipient.
- In the case of session management, the system has prerated a 5 minutes session but the user ends the call after 3 minutes.

❖ Example

A customer sends a multimedia file and the customer is charged for the file reception (prerating). After several days have elapsed, SAP Convergent Charging receives information that the multimedia file was not received by the customer's recipient. During the postrating process, SAP Convergent Charging recalculates the prerating result and provides enough information to the external billing system in order to update the balance accordingly.

Considerations for Modifying SAP CC Master Data

If you are modifying a [subscription \[page 700\]](#) or an element of it such as an [offer \[page 611\]](#), a [charge \[page 560\]](#), a [pricing macro \[page 411\]](#), or a [translation table \[page 422\]](#), and then you save the subscription in the past (before the last prerating date), you may encounter rating problems if unresolved prerating events are associated with the subscription. You may also encounter rating problems if you structurally modify a subscription, resulting in a new rating result and if there are unresolved prerating events are associated with it. Rating problems are encountered in these cases because the postrating value for the consumption of a service is different from the prerating value.

To solve this problem, SAP Convergent Charging warns you if you try to modify a subscription (or an element of it) and if there are one or more unresolved prerating events associated with it. You are free to continue with the modification if you think that the modification is safe to make.

However, you are not warned if you modify parts of an offer. For this reason, warnings are added in the documentation for each procedure that may cause prerating and postrating discrepancies.

2.4.3.7 Session-Based Charging and Reservation

In SAP Convergent Charging 5.0, four types of online charging are provided:

- Event-based charging with or without credit control
- Session-based charging (with credit control and quota reservation)
- Blank charging for advice of charge functions
- [\(Deprecated\) Prerating, Reservation and Postrating \[page 362\]](#)

Offline charging of past events is supported in a postpaid environment.

Prerating and postrating

These features are deprecated since version 1.0 and must be replaced by the session-based charging. These features are available only if you use offers and subscriptions. They are not available for charge plans and provider contracts.

SAP Convergent Charging 5.0 allows you to reserve resource usage by using the prerating and postrating functionality; however, this functionality is especially suitable for the charging of events like SMS (Short Message Service) because such events do not depend on time.

Session-Based Charging

→ Remember

SAP SE strongly recommends that you read the conditions and limitations on the session-based charging. Refer to the [Session-Based Charging Limitations \[page 366\]](#) topic.

Unlike the prerating and postrating, the session-based charging is more suitable to handle a wide variety of rateable instances such as:

- Rating of volume: Video download, for example
- Rating of time: Telephone calls, for example

Concurrent Services in Real Time

The session-based charging is performed in real time and is able to manage the reservation of units for many services at the same time. For example, while calling on a mobile phone, a client can download a video. The units include the balance of a prepaid account and the counters in a provider contract).

Counter Reservation and Credit Control

A session-based charging is provided with counter reservation and credit control. The credit control is a mechanism which directly interacts in real time with a balance and controls or monitors the charges related to service usage. The credit control does the following:

- Checks if credit is available on the balance
- Reserves credit
- Deducts the reserved credit from the balance when the service is completed
- Refunds the balance with the reserved credit not used

How Does a Session-Based Charging Operate?

The session-based charging is well adapted for telephone services for two reasons:

- The amount of resources that a subscriber may consume cannot be a priori known.
- Other services debit the same balances and counters at the same time; therefore, counters and monetary balance must be reserved in advance.

In this case, a certain amount of monetary or non-monetary units is reserved on the subscriber's balance. Permission to use an amount of resources that matches the unit reservation is then allowed. When the granted units have been used or when a new, not yet authorized chargeable event occurs, a new request is sent for unit allocation. When resource usage has been executed, the actual amount of resource usage (used units) must be known so that reserved amounts can be credited to the subscriber's balance, ensuring that the correct amount gets debited.

2.4.3.7.1 Session-Based Charging Limitations

⚠ Caution

SAP SE recommends that you read the following limitations on the [Session-Based Charging and Reservation \[page 364\]](#).

About Information on Reservations and Confirmations

A session-based charging is usually a succession of reservations and confirmations. The information relating to a reservation or a confirmation is available in a [price plan \[page 570\]](#) only through a custom property (aka user-defined property) that you must create and define in a [chargeable item class \[page 531\]](#) for the usage-based service to monetize.

This "reservation vs confirmation" information is required in the incoming chargeable items that relate to the service consumptions.

The downstream system (mediation) that massively sends chargeable items to the SAP CC system must include this "reservation/confirmation" information in these chargeable items for being charged for the service usages.

About Transient Counters

A [transient counter \[page 568\]](#) is **unique to a charging session**. The values of a transient counter are updated in memory both at the time of reservation and confirmation. If you want a transient counter to be incremented at a specified time (reservation or confirmation), you must create a dedicated property in a chargeable item class (refer to the previous paragraph *About information on reservations and confirmations*) [About Information on Reservations and Confirmations \[page 366\]](#). Then, in the price plan settings, you add some instructions to test the property and update the transient counter at the specified time according to the test result.

❖ Example

For example, when the counter is used to add up periods of time (sessions) to calculate the session duration, the counter must not be incremented when a quota is reserved but only when it is confirmed.

The SAP CC pricing specialist must then configure the price plan so that the transient counter is incremented only at the time of confirmation. This requires that the information relating to the reservation/confirmation comes from a custom property of the incoming chargeable items.

About Persistent Counters

Unlike transient counters, [persistent counters \[page 567\]](#) can be shared by several charging sessions. For example, the persistent counters allow sessions to share free units. At the time of reservation, persistent counters are not updated in the database, but counter reservations are stored in the database. Persistent counters are updated in the database at the time of confirmation.

When using persistent counters in a session-based charging environment, pay attention to the following:

- In a [Usage Rate](#) branch, use the operations such as + or – and avoid the operations such as set, reset, *, or /.
- In a [Recurring Rate](#) or [One-Shot Rate](#) branch, the operations such as set or reset can be used and possibly mixed with operations such as *, /, +, or –.

A persistent counter has the following values:

- **A current value:** This value is displayed in the counters of a decision tree, a [price plan \[page 570\]](#), or in a charged item (see [Charged Item Classes \[page 543\]](#)) when viewing a persistent counter. The current value includes the modifications resulting from the ongoing reservations.
- **A reservation-free value:** This value is displayed in the counters of a provider contract when viewing the [provider contract](#) or its [service allowances](#). The reservation-free value does not include the modifications resulting from the ongoing reservations.

i Note

You can also access the reservation-free values through the [Property Introducer Operator](#) component. For more information, see the primary help of logic components: [Working with Logic Components \[page 831\]](#).

About Loyalty Points and Free Minutes

It is recommended to be careful when using session operations to establish a tariff giving loyalty points or free minutes. In the current session of a session-based charging, adding free units or loyalty points to a persistent counter must be done at the time of confirmation to prevent the counter from being used by other sessions. The most appropriate time is at the confirmation of the last consumption quota (last confirmation of the session). If free units or loyalty points are added to the persistent counter at the time of reservation, other sessions may use the persistent counter. For example, a persistent counter which is reserved by a first session, and then reserved and modified meanwhile by a second session, can cause a balance to go below zero.

About Reserving a Persistent Counter

Because a persistent counter may be reserved simultaneously by several sessions, its value may continuously change. For example, the value of a persistent counter at the time of reservation may be different from its value at the time of confirmation. Therefore, a price plan calculating a price must accurately test a persistent counter in order to avoid an amount of reservation less than the related amount of confirmation (see the example below). Testing a persistent counter of free units can be carried out by using a splitter component to split the value of the counter into free or not free units. This solution allows getting a correct price.

❖ Example

As shown in this example, a session management is not always able to allow accurate tests on a persistent counter.

In the chargeable item class "Telephone services", each call is priced at \$0.25 per minute (VIP tariff) or priced \$0.50 per minute (normal tariff). In addition, in the related price plan, each national call adds 10 points to a persistent counter "C" of loyalty points while each international call subtracts 10 points from the counter "C". As a customer, John Smith has accumulated more than 200 loyalty points, and his account balance is \$1.50.

1. Session 1 (national call) starts, and then reserves 2 minutes: pre.C = 195 (*), C = 205, VIP tariff, price = \$0.50
2. Session 2 (international call) starts, and then reserves 2 minutes: pre.C = 205, C = 195, normal tariff, price = \$1
3. Session 2 (international call) stops, and then confirms 2 minutes: pre.C = 195, C = 185 (195 – 10), normal tariff, price = \$1
4. Session 1 (national call) stops, and then confirms 2 minutes: pre.C = 185, C = 195 (185 + 10), normal tariff, price = \$1

(*): "pre.C" contains the value of the counter before rating while the counter "C" contains the value of the counter after rating.

This example shows that the context of the confirmation differs from the context of the reservation. This means that testing a persistent counter value shared by multiple sessions will not provide a constant result. Because the value of a persistent counter can change between the time of reservation and the time of confirmation, the result of a test branch in a price plan may change. Therefore, SAP SE strongly recommends to use a splitter component for managing free units and testing persistent counter values at the time of confirmation when the current counter value does not change.

About Emptying the Free Units of a Persistent Counter

At the time of reservation, if a session (*) empties the free units of a persistent counter without totally confirming the consumption of a service, another session running at the same time cannot use the free units of the counter, and thus, will entirely be charged. Therefore, a client will pay for the consumption of a service even if free units are still available. This exceptional case however occurs only when several sessions are simultaneously open and a persistent counter is emptied.

(*) In price plans including persistent counters of free units

❖ Example

The persistent counter "C" contains 60 seconds. Session 1 starts and reserves 120 seconds. Session 1 empties the persistent counter "C" because the first minute is free. Session 2 starts, reserves 120 seconds, and cannot use the free units of the empty counter "C". Session 2 then stops and confirms 2 minutes, which are debited from the customer's balance. A little while later, session 1 stops, and 30 seconds are only confirmed. At the end of both sessions, 30 seconds of free units are still available, and the respective customers' balances have already been debited.

About Reserved, Confirmed Amounts, and Balances

As for any other rating operation which reserves, and then confirms a consumption quota, a balance may be less than the value of 0 if the related price plan does not respect the following rule: In the same context of rating, and for the same duration, the confirmed amount must not be greater than the reserved amount. For example, if 5 minutes are reserved at the price of \$2.50, the confirmed amount must not be greater than \$12.50.

About compatibility between session-based charging and prerating

A session-based charging is usually not compatible with a prerating on a same subscription; however, through a configuration parameter of the server, you can enable the concurrent use of a session rating with a prerating on a same subscription if no persistent counters³⁸ are shared by both the session-based charging and prerating in the related offers. If persistent counters³⁹ are shared by both the session-based rating and prerating, some database inconsistencies can occur on persistent counter values.

About Transactions

Each confirmation in a session-based charging generates a rated transaction that is assigned to the relevant accounts. The sessionID⁴⁰ field of transactions allows finding all the transactions generated by the same charging session.

2.4.3.8 Spending Status Monitoring

i Note

The spending status monitoring enables a registered and connected policy or monitoring system to make policy decisions that are based on information about an end customer and the service usage context. SAP CC converts some counter values in provider contracts as the form of spending statuses and manages the reporting of these indicators when they change.

³⁸ Not only persistent counters but also prepaid accounts or credit limit balances

³⁹ Not only persistent counters but also prepaid accounts or credit limit balances

⁴⁰ Provided by an external system.

In online environment, the spending status monitoring enables to implement policy control in your system landscape. Downstream systems (policy, monitoring) can make policy decisions based on end customer experience and service spending information reported by SAP Convergent Charging 5.0.

The spending status monitoring adds a monitoring plan and spending status reporting features to SAP Convergent Charging 5.0.

The benefits of the spending status monitoring enables a flexible configuration in master data through:

- The easy data configuration in pricing catalog (master data): Basic objects to configure monitoring plans
- The fine configuration in customer master data: Configuration in [Contract Items](#) in provider contracts

i Note

- The spending status monitoring feature does not support the counter sharing between provider contracts (enterprise counter pooling). Do not share a pool of counters with parent and linked provider contracts.
- The offline charging operations do not influence the spending status reporting. Counter changes relating to batch charging operations do not trigger new spending status reports.

Spending Status Reporting

The SAP CC systems can detect changes in the business context of the end customers and sends spending status reports to the registered policy or monitoring system.

Implementation

Refer to the SAP CC [Tuning Guide](#) (see in [Help Resources \[page 383\]](#)) for more information about the implementation of this feature in your system landscape:

- When SAP CC is connected to SAP CRM.
- When SAP CC must be interfaced with another CRM or provisioning system.

Application Example

❖ Example

A service provider needs to focus on the quality of services it delivers to increase perceived quality and performances and reduce churn. It must implement a fair usage management function in the system landscape to be able to act on traffic control and service usage (consumption).

An end customer subscribes to a mobile data plan allowing for "unlimited data usage".

To protect itself from customer abuse in network usage, the operator adds a clause to the contract small prints.

It explains that data usage is unlimited with regular quality of service up to a consumption threshold (2.5GB per month). Once the customer has used these 2.5GB in a month, service is continued but throttled, downgraded in quality of service.

The service provider implements policy control in its system landscape to ensure fair usage and to optimize the network bandwidth allocation with predefined policy rules.

A policy system registers to the SAP CC system and monitor fair usage of end customers.

To model this business case in SAP CC, the service provider configures in the pricing catalog (see [Catalogs \[page 400\]](#)) of this customer service:

- The necessary entry in the counter name dictionary: 'DATA_USAGE' is a counter name that will be used in the charge plans and monitoring plans
- The necessary reusable charge and charge plan
- The necessary [Spending Status Description](#): 'Data fair usage'
- The necessary range table class (see [Range Table Classes \[page 489\]](#)): 'RTC dedicated to data monitoring'
- The necessary range tables (see [Range Tables \[page 503\]](#)): 'RT dedicated to data monitoring'
- The necessary monitoring plan (see [Monitoring Plans](#)): 'Monitoring plan dedicated to data usage'

Additional Information

See the [Application Help](#) about the spending status monitoring feature and related processes.

Related Information

[Spending Statuses](#)

[Configuration of Business Data Step by Step \[page 398\]](#)

[Spending Status Description](#)

[Monitoring Plans](#)

[Setting Up a Monitoring Plan in a Provider Contract](#)

2.4.3.9 Data Objects in Core Tool

SAP Convergent Charging 5.0 extends your [core data](#) with other data useful for managing the pricing and charging of end-customer service's use: Master data, customer master data, business data. You configure this data with the Core Tool user interface.

For example, as a pricing specialist, you use the Core Tool user interface to configure some master data and business data. When you start working with this user interface, you usually create some pricing elements such as [chargeable item classes \[page 531\]](#) and [reusable charges \[page 560\]](#), and [pricing macros \[page 411\]](#). You can use objects to configure more complex objects such as charge plans.

With the Core Tool user interface, you can configure some [technical data](#) as a system administrator. In an SAP environment, this data includes SAP CC users and audits for user operations.

Master Data

Master data is the set of data which is commonly used across the entire organization and all business processes. SAP Convergent Charging defines data objects that relate to the implementation of the pricing policy for chargeable services or products. As a pricing specialist, you configure this master data in a pricing catalog with the Core Tool user interface.

More information here: [Master Data \[page 373\]](#)

Customer Master Data

Customer master data (or master data for end customers) is a subset of the master data that relates to the end customers of the service provider.

- In business-to-customer (B2C) environment, this data represents very high volumes in the back-end database system.
- In a B2B environment, you may configure this data with the Core Tool user interface by creating a [Subscriber Accounts \[page 668\]](#) and some [Provider Contracts](#).

More information here: [Customer Master Data \[page 374\]](#)

Business Data

Business data is a master data that is configured for a complete system. As an application administrator, you must configure this data.

More information here: [Business Data \[page 376\]](#)

Technical Data

With Core Tool, administrators (system or user) configure and manage some objects for technical features of SAP Convergent Charging.

More information here: [Technical Data \[page 377\]](#)

2.4.3.9.1 Master Data

In SAP Convergent Charging (SAP CC), the **SAP Master Data** includes:

- Master data related to the **pricing configuration settings for an end-customer service to monetize**
- [Customer Master Data \[page 374\]](#), which is **master data related to the end customers and subscribers** of the service provider and can represent very high volume of data to store and manage in SAP CC

The following master data allows you to configure the pricing logic of a chargeable service or product.

[Pricing Catalogs \[page 400\]](#)

To help you organize your work more efficiently, you create pricing catalogs for storing all the objects (pricing elements) that are needed for the pricing of a chargeable service or product that are offered by the service/product provider company.

To implement the pricing policy of an end-customer service in SAP CC, you configure the pricing logic in a catalog.

[Chargeable Item Classes \[page 531\]](#)

You need to define chargeable item classes that represent services which can be rated and charged according to their usage. As of release 4.0, the chargeable item classes are independent objects which are no longer subsumed within chargeable item packages.

[Charged Item Classes \[page 543\]](#)

You create charged item classes to retrieve all the necessary information included in the resulting transactions of the charging process. The SAP CC system generates this information in charged items.

[Aggregation Policies \[page 552\]](#)

You can merge multiple charged items into a single one through the aggregation policies, and thus decrease the number of consumption items which are sent to the SAP Convergent Invoicing in the SAP ERP system.

[Reusable Charges \[page 560\]](#)

You create reusable charges that define the price plan and the charging plan to be applied to the usage of a service by end customers.

[Offers \[page 611\]](#) (former Data Model)

You create offers which represent the way that you sell services.

[Pricing Macros \[page 411\]](#)

You can create pricing macros that are small reusable modules for applying calculation formulas within the charges.

[Translation Tables \[page 422\]](#)

To assign specific output values to input values, you can create translation tables used within the charges and refill logic.

[Tier Tables \[page 437\]](#)

You need to define refill item classes that describe the refill events also called refill items coming from an external system such as SAP. To assign a combination of output values to numeric input intervals, you can create tier tables used within the charges and refill logic.

[Mapping Tables \[page 469\]](#) and [Range Tables \[page 503\]](#)

To assign specific output values to input values, you can create mapping/range tables used within the charges and refill logic. You can import a price table to use recurring charges defined in a CRM application.

→ Tip

In SAP Convergent Charging, the [Billable Item Mapping](#), [Consumption Item Mapping](#), [Currencies \[page 819\]](#), and [Public Holidays \[page 808\]](#) are not part of the master data because they are available for the complete system and cannot be configured for each pricing catalog of a service provider. They are part of the [business data \[page 376\]](#).

Related Information

[Customer Master Data \[page 374\]](#)

[Business Data \[page 376\]](#)

[Data Objects in Core Tool \[page 371\]](#)

[Configuration of Business Data Step by Step \[page 398\]](#)

2.4.3.9.2 Customer Master Data

Customer master data is part of the [SAP Master Data](#) for the subscription- and usage-based service pricing. This high volume data relates to the end customers and subscribers of a provider contract company.

Subscriber Accounts

Before creating subscriptions, you must create one or more subscriber accounts representing customers in SAP Convergent Charging. If you work with provider contracts, the corresponding subscriber accounts are automatically created in SAP CC Core Tool.

Subscriber Mapping Tables and Subscriber Range Tables

You can create [Subscriber Mapping Tables](#) or [Subscriber Range Tables](#) to store customer related data. Subscriber mapping/range tables are business data tables attached to a subscriber account and used in the provider contracts relating to the same subscriber account.

Provider Contracts (New Data Model)

You can create [provider contracts](#) that contain the terms of the agreements signed by service providers and end customers or subscribers.

Subscriptions (Former Data Model)

You can allow end customers to subscribe to one or more offers proposed by service providers and manage all the conditions relating to these [subscriptions \[page 700\]](#).

Accesses

At subscription or provider contract level, a [user access \[page 752\]](#) specifies the *technical identifier* under which an end customer consumes a usage-based service.

Related Information

[Master Data \[page 373\]](#)

[Business Data \[page 376\]](#)

2.4.3.9.3 Data Tables

To configure the master data, SAP CC manages several business data tables. These data tables include business information that allows you to implement the marketing and pricing policy of a chargeable service/product for configuring the pricing logic in SAP CC:

Data tables	Are used in	Can be redefined in offers	Can be redefined in subscriptions	Can be redefined in provider contract
Mapping Tables [page 469]	- Charges - Refill Logic - Allowance Logic	No	No	Yes
Subscriber Mapping Tables	N/A	No	No	Yes (through the relating Subscriber Accounts [page 668])

Data tables	Are used in	Can be redefined in offers	Can be redefined in subscriptions	Can be redefined in provider contract
Range Tables [page 503]	• Charge • Refill Logic • Allowance Logic • Monitoring Plan	No	No	Yes
Subscriber Range Tables	N/A	No	No	Yes (through the relating Subscriber Accounts [page 668])
Tier Tables [page 437]	• Charge • Refill Logic • Allowance Logic	Yes	Yes	No
Translation Tables [page 422]	• Charge • Refill Logic • Allowance Logic	Yes	Yes	No

2.4.3.9.4 Business Data

SAP Convergent Charging 5.0 defines some business data that is **configured for a complete SAP CC system**.

The application administrator configures and maintains this data. The pricing specialist uses this data when configuring the pricing logic in the [Core Tool](#) user interface. The SAP CC systems use this data when processing the charging or refilling operations.

The following business data allows you to configure the pricing logic in the Core Tool user interface.

Billable Item Mapping and Consumption Item Mapping

Regarding the billable item mapping, you map billable item classes defined in the SAP ERP/FI-CA reference system onto [Charged Item Classes \[page 543\]](#) (or [Refill Record Classes](#)) to define which information you need from the resulting business transactions of the charging and refilling processes.

Regarding the consumption item mapping, you map [Chargeable Item Classes \[page 531\]](#) onto consumption item classes defined in the SAP ERP/FI-CA reference system so that the SAP CC system can convert chargeable items to consumption items and load them to the relevant SAP ERP/FI-CA systems for temporary data storage.

i Note

This business data is only relevant when SAP Convergent Charging 5.0 is interfaced with SAP Convergent Invoicing in an integrated [SAP Solution](#) scenario with SAP S/4HANA or SAP ERP.

Currencies [\[page 819\]](#)

You manage the currencies necessary to configure the master data and the customer master data.

Public Holidays [\[page 808\]](#)

You manage the public holidays necessary to configure the master data and the customer master data.

VAT rates and rules - [Taxes \[page 683\]](#)

As a pricing specialist, you use customized VAT rates and rules when configuring the master data and the customer master data.

As an application administrator, you configure and maintain this business data with dedicated user interface (see Setup Tool).

Related Information

[Master Data \[page 373\]](#)

2.4.3.9.5 Technical Data

With the Core Tool user interface, you can configure and maintain some technical data. In an SAP environment, this data includes SAP CC users and audits for user operations.

Technical Data

SAP CC Users



As a user administrator (or system administrator) for SAP Convergent Charging, you can assign a logon (user ID or user name), a password, and one or more roles to each SAP user (individual or service).

More information here: [Users \[page 760\]](#)

Audits



The SAP CC system can save user operations to the back-end database for audit purposes. As a system administrator, you can create filters to search for audited user operations in your database. You complete some technical or business audits.

More information here: [Audits \[page 770\]](#)

2.4.3.10 Transactional Data

Transactional Data

In SAP Convergent Charging 5.0, **transactional data** is a data that is created during an event or operation and dependent on another data such as master data or business data.

For example, transactional data relates to the following:

- Incoming data:
 - Chargeable items (CIs) that are usage events for an end-customer service. It contains some service consumption information that is necessary to rate (dynamic price) and charge to an account. In *SAP Telecommunications industry*, call detail records (CDRs) contain such information.
- Resulting output data:
 - Rated transactions
 - Charged transactions (former releases of SAP CC)
 - Charged items (CITs)
 - Refill records
 - Accounting operations
 - Charged chargeable items
 - Notifications (business, technical)

2.4.4 Getting Started

If this is your first time using the SAP CC Core Tool user interface, get started by working through these steps:

1. Familiarize yourself with the [graphical environment of the Core Tool workspace \[page 386\]](#) and how to [launch \[page 379\]](#) the user interface.
2. Learn [basic concepts \(pricing, rating, charging\)](#).
3. Learn [Account and Balance Management \(ABM\) \[page 357\]](#) features.
4. Learn the objects you will work with ([Data Objects in Core Tool \[page 371\]](#)).
5. Read through the steps involved in creating a typical offer in [Configuration of Master Data Step by Step \[page 396\]](#).

Related Information

[Exploring the Core Tool Workspace \[page 386\]](#)

2.4.4.1 Launching Core Tool

Once the required files have been installed on your workstation by your IT administrator, you can launch the SAP CC Core Tool user interface.

Before you begin, make sure that you have the user name and password given by your SAP CC user administrator. Verify that you have the host address of the SAP CC Core Server system to connect to.

i Note

If the [Connection](#) dialog box is not displayed after step 2 in the following procedure, refer to your administrator for troubleshooting.

To launch Core Tool

This procedure is valid for a MS Windows environment.

1. Using Windows Explorer, open the `SAP Convergent Charging` directory.
2. Open the `bin` directory and double-click the `core_tool.bat` file.
The [Connection](#) dialog box appears.
3. In the [Connection](#) dialog box, type your user name in the [Login](#) field. The user name must correspond to an individual user
4. Type your password in the [Password](#) field.
5. Type one or more machine, IPv4, or IPv6 addresses in the [Server URL](#) field. You can type as many addresses as you have dispatchers in your system. Separate each address by a comma. For example, `http://machine1:9100, http://machine2:9100, http://machine3:9100`.
Contact your SAP CC administrator to know the HCI URLs of the dispatcher instances in the remote Core Server system.
6. Click [OK](#). One of the following windows is displayed:
 - The list of previously failed login authentication attempts
 - The window used to change your password
 - The [Main Window \[page 386\]](#) of the Core Tool application
 - The error window that indicates a communication issue (see the [Troubleshooting \[page 992\]](#) chapter and check with your administrator that the SAP CC system is up and running)

Failed Login Authentication Attempts Window

This window displays a list of all the previously failed login attempts. Each login attempt is displayed with the following information:

- The date and time relating to each failed attempt of the user name
- The IPv4 or IPv6 address of the computer which is the cause of the failed authentication

i Note

This window provides only information about the connected user.

Password Modification Window

The administrator can configure the SAP CC system to use a password management policy which can oblige SAP CC users to change their password.

If the password management policy is enabled and if it applies to you, a message is displayed to inform that your password must be changed. A window is then displayed to change this password (see [Changing Your Password \[page 763\]](#)).

Main application window

If the password management policy does not apply to you, or if it has been disabled:

- A user session starts if user session management has been enabled at system level (see [User Sessions \[page 380\]](#))
- Core Tool displays the [Main Window \[page 386\]](#).

Related Information

[Exploring the Core Tool Workspace \[page 386\]](#)

[Core Tool Functions and Limitations \[page 354\]](#)

[Disconnecting from Core Tool \[page 382\]](#)

2.4.4.2 Configuring Data

Procedures

- Configure the [Business Data \[page 376\]](#) or technical data available for the complete system
- Configure the [Configuration of Master Data Step by Step \[page 396\]](#) master data

2.4.4.3 User Sessions

i Note

This topic is relevant only if the *user session management* feature is enabled in your SAP CC system.

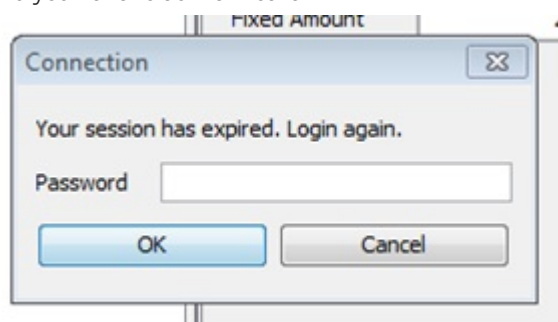
The user session begins when an [SAP CC user \[page 760\]](#) accesses the *Core Tool* user interface. The session ends when this user logs out or quits the user interface or when the administrator terminates the session.

The following characteristics of user sessions are configured at system level:

- The maximum period during which the session remains inactive
- The maximum number of sessions allowed for the same user ID on *Core Tool*

Maximum Inactivity Period

When the session is inactive for a period longer than the period configured at system level, the session expires and you have to authenticate.



A new session starts and you are allowed to continue working with the *Core Tool* user interface.

⚠ Caution

When the session expires, objects opened in edit mode (see [Display/Edit Mode \[page 390\]](#)) are not protected against concurrent edition any longer (see [Concurrent Edition Management \[page 391\]](#)).

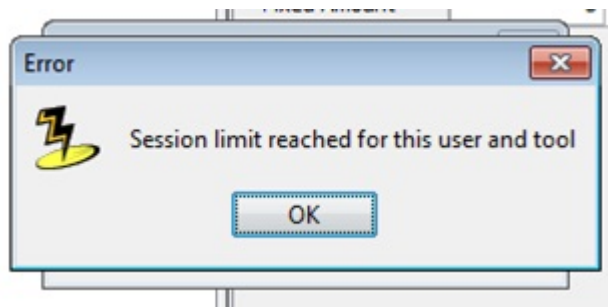
The following actions in the *Core Tool* prevent the session from being inactive and expiring:

- Opening an object
- Saving an object
- Clicking the root of an object tree

On the contrary, modifying a field without saving the object does not prevent the session from expiring. The session is considered as inactive.

Maximum Number of Sessions

If you try to open more sessions on *Core Tool* than the maximum number of sessions authorized, the following error displays:



You are not allowed to connect to another instance of *Core Tool* until one of your sessions ends.

How to Close a User Session?

You can close your session by [Disconnecting from Core Tool \[page 382\]](#).

If the Core Tool user interface you were connected to has failed, contact your system administrator. He can close your session by using [Admin+ \[page 1002\]](#).

Related Information

[Users \[page 760\]](#)

2.4.4.4 Disconnecting from Core Tool

Use this procedure to quit the SAP CC *Core Tool* user interface.

To disconnect from Core Tool

In the main window, do one of the following:

- From the menu bar, select ► *File* ► *Exit* ►



- On the title bar, double-click on , and then click *Close*.

The window closes and you are disconnected from the distant SAP CC system. Your user session ends.

2.4.4.5 Getting Help

Related Information

[Help Resources \[page 383\]](#)

[Typographical Conventions \[page 385\]](#)

2.4.4.5.1 Help Resources

To help you get the most out of SAP Convergent Charging, SAP SE provides you with an extensive list of resources you can use for support and guidance.

Integrated SAP Solution Scenarios

SAP Convergent Charging is integrated with different software components of the SAP Business Suite: SAP CRM, SAP ERP/FI-CA, and SAP Convergent Invoicing in SAP ERP.

The primary help provides you with specific information and recommendations for configuring data in SAP Convergent Charging for the integrated [SAP Solution](#) scenarios.

Consult the SAP Help Portal

On [SAP Help Portal](#), you find extensive documentation from the SAP Library on SAP products and solutions, along with additional information about the documentation, information design at SAP, education services, and links to the SAP Community Network (SCN).

i Note

SAP Convergent Charging is part of SAP Billing and Revenue Innovation Management. When your SAP CC system is connected to the SAP CRM system or to SAP Convergent Invoicing in the SAP ERP system, the following SAP libraries are relevant on [SAP Help Portal](#) at:

- [SAP EHP 4 for SAP CRM 7.0](#) > Application Help > SAP Library > SAP CRM for Industries > Telecommunications > Functions for Provider Sales and Order Management
 - Products > Cross Catalog Mapping
 - Business Agreement
 - Provider Order and Provider Contract
 - Sharing Contract

and at:

- [SAP EHP 8 for SAP ERP 6.0](#) > Application Help > SAP Library > Industries in SAP ERP > SAP Telecommunications > Contract Accounts Receivable and Payable > SAP Convergent Invoicing
- - Master Data
 - Rating
 - Billing
 - Discounts and Charges on Billable Items
 - Partner Settlement
 - Invoicing

Access the Reference Guides of SAP Convergent Charging

These guides are available in PDF format and provided on the DVD-ROM with the release of this product. They contain comprehensive information about each functional aspect of SAP Convergent Charging. The guides are also available on [SAP Help Portal](#) for online consultation or download.

- [Master Guide](#)
- [Operations Guide](#)
- [Installation and Upgrade Guide](#)

To find a key word once a guide is open, press CTRL + F (Windows users), type the word in the [Find](#) field, and then click [Find Next](#).

Access the Configuration Guide of SAP Convergent Charging

If you need more information about configuring and maintaining the master data for a service provider, we recommend that you consult the SAP Convergent Charging [Tuning Guide](#) on SAP Help Portal.

Access the Primary help for Subscription-Based Business

In case of a system landscape with customer master data including subscriptions, you can set up the SAP CC Core Tool user interface to work with all kinds of data related to the charging process based either on subscriptions or provider contracts.

Consult the [Primary Help of Core Tool \[page 356\]](#) and the [Logic Component Reference \[page 831\]](#) Reference on the SAP site.

Access the Application Help Documentation

The [Application Help](#) document is provided in the Software Development Kit (SDK) of SAP Convergent Charging. A version is available in SAP Help Portal for online consultation.

Access the technical Documentation

The Web Services Documentation, the SAP CC Java/XML API References, and the SAP CC Error Code Reference documents are provided in the Software Development Kit (SDK) of SAP Convergent Charging. A version is available on SAP Help Portal for online consultation,

- [Web Services Documentation](#)
- [Core APIs](#)
- [Error Code Reference](#)

→ Tip

You can also download these product documents on [SAP Help Portal](#).

Access the SAP Notes

SAP Notes and SAP Knowledge Base Articles (KBA) help you find answers to questions that arise from your daily work with SAP Convergent Charging:

- [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#)

2.4.4.5.2 Typographical Conventions

The following typographical conventions are used in the primary help of SAP Convergent Charging 5.0:

- Text or a button that appears on the graphical user interface is written like *this*.
- System commands, names of folders and files, and codes used in APIs are written in `code` font.
- Menu choices are shown in this format: ► *menu name* ► *submenu name* ► *menu item name* ►.
- Text to be typed into a field is shown as follows: **userinput**.
- Blue text indicates an active hyperlink to another part of the primary help or a pop-up window that provides you with extra information on a task.
- UI names or features are displayed in purple.

2.4.4.6 Exploring the Core Tool Workspace

This section presents the elements of the graphical user interface of SAP CC 5.0 Core Tool.

Main Window

The [Main Window \[page 386\]](#) integrates the SAP CC Core Tool functions into one workspace. It provides you with the same graphical interface whether your company uses one or several SAP Convergent Charging modules.

Objects and Icons

Inside the main window, you work with objects that you organize in a catalog for each service provider. Each object in SAP CC Core Tool opens in its own object window (see [Objects Windows \[page 389\]](#)) and can be recognized in the graphical user interface by distinctive [Object Icons](#).

Because SAP CC Core Tool is an object-oriented program, icons are frequently used to represent the different objects and actions you can perform. Become familiar with the icons most commonly used on the tabs ([Common Icons \[page 395\]](#)) and with the windows of SAP CC Core Tool.

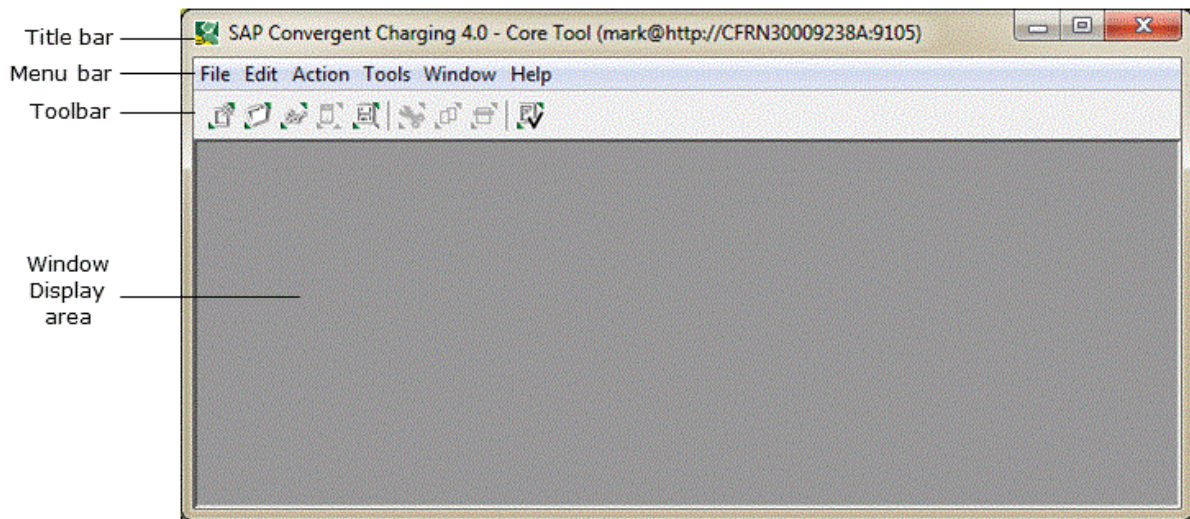
Related Information

[Setting Up the Preferences \[page 787\]](#)

2.4.4.6.1 Main Window

The main window appears once you have [started \[page 379\]](#) the *Core Tool* user interface for SAP Convergent Charging 5.0.

Main Window



Title Bar

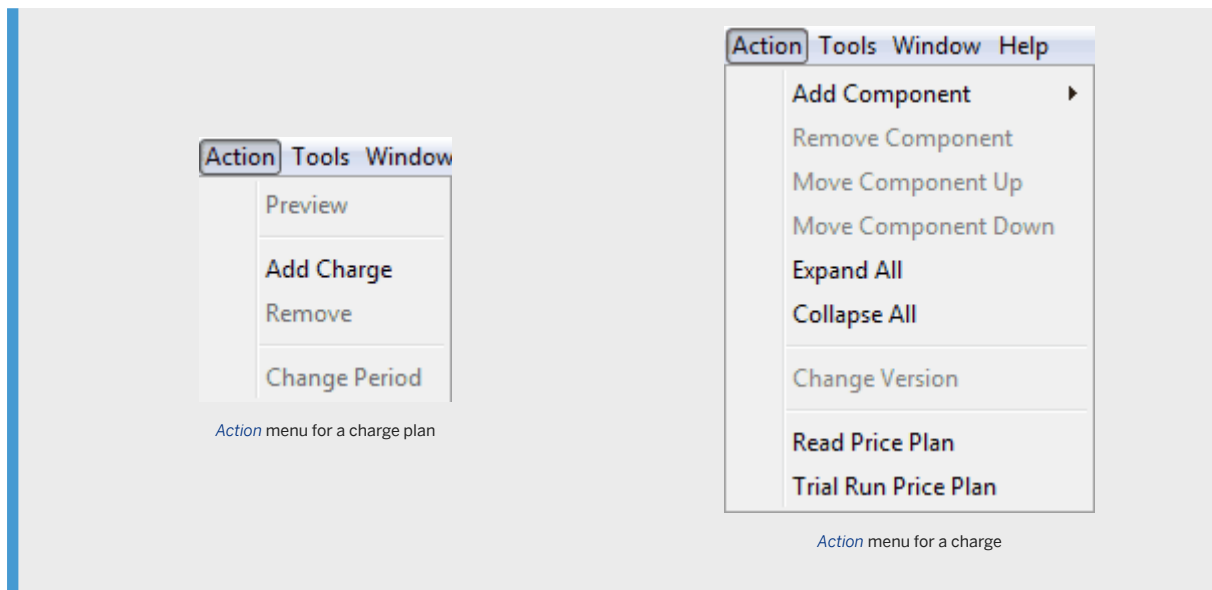
The *Title* bar displays the name of the software on the left and the *Minimize*, *Maximize*, and *Close* buttons on the right.

Menu Bar

The *Menu* bar displays the different menus for manipulating objects in the graphical user interface. The submenu choices that are available depend on the type of object that is active in the window and the context of the work session. Unavailable choices are dimmed.

❖ Example

Submenu choices in the *Action* menu differ depending on whether a charge plan or a charge is the active object.

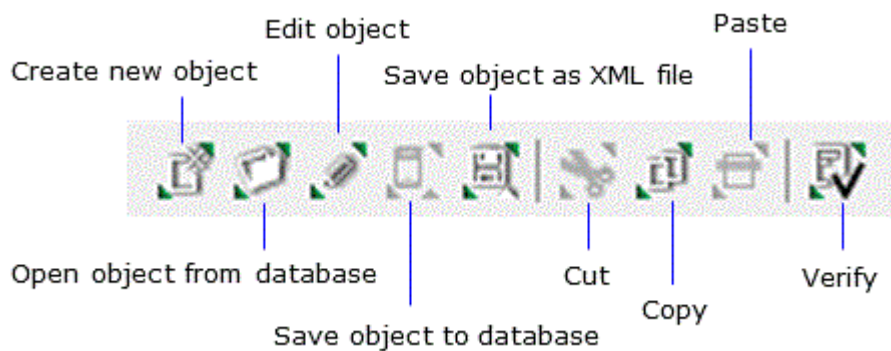


See: [Edit \[page 786\]](#), [Action](#), [Tools \[page 790\]](#), and [Window \[page 824\]](#)

Toolbar

The [Toolbar](#) buttons are shortcuts for certain menu commands. The toolbar is dynamic, meaning that the buttons which appear on it depend on the object window that is open. For buttons that are not shown below, rest the cursor over a button to read its description.

The following illustration shows the principal buttons of the toolbar:



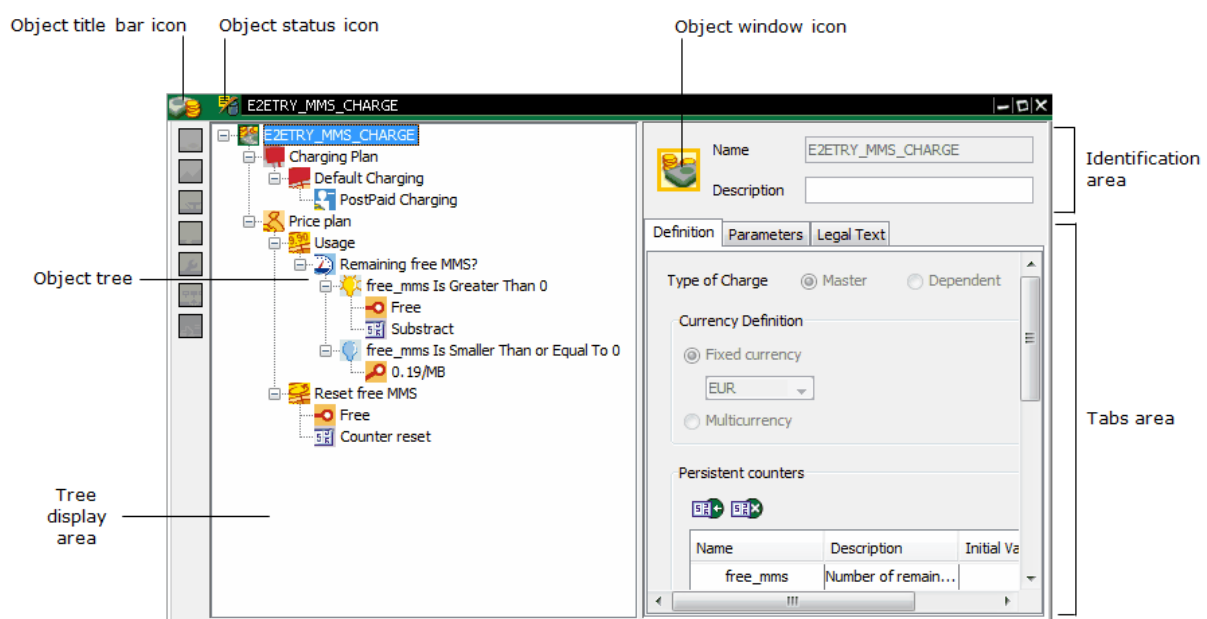
Window Display Area

The [Window Display](#) area displays the different windows and dialog boxes that open during your work session.

2.4.4.6.2 Objects in the Core Tool Workspace

2.4.4.6.2.1 Objects Windows

The windows that you open to work with the subscriber accounts, chargeable item class, charge, pricing macro, offers and subscriptions objects contain common characteristics that are shown in the figure below:



Note

This window is in [edit mode \[page 390\]](#).

Two [object icons](#) are shown on each object window: One on the far left of the title bar and one on the upper left of the right pane.

The [object status icon \[page 395\]](#) on the title bar shows you the status of the object you are working with:

- Being created
- Has been saved to the database
- Has been reopened and is in the process of being modified

You create the object as a tree structure in the tree display area. Each building block of an object tree is represented by an icon.

The identification area allows the object to be saved in the database under a unique name. You can choose to describe the object if you wish.

The tabs area contains one or more tabs that are available depending on how the object is structured. The tabs allow you to define and characterize the object and its elements in the tree display area.

2.4.4.6.2.2 Display/Edit Mode

In SAP CC Core Tool, main catalog objects open in the display mode. You have to switch to the edit mode if you need to modify an object by clicking the [Edit Mode](#) icon  on the main toolbar.

If the object has been modified since you opened it, an [Information](#) dialog box opens to inform you that the object will be reloaded. Click [OK](#) to reload the object in the edit mode.

You come back to the display mode by clicking the [Display Mode](#) icon  on the main toolbar. You are asked to save your changes. If you click:

- [No](#), your previous modifications are lost, the object is reloaded and the object windows is in the display mode.
- [Yes](#), the object is saved and the object windows is in the display mode.
- [Cancel](#), the object remains unchanged and the object windows is in the edit mode.

List of objects using the display or edit mode

- Aggregation policy
- Allowance event class
- Allowance logic
- Allowance plan
- Charge plan
- Chargeable item class
- Charged item class
- Charge
- Mapping table
- Monitoring plan
- Pricing macro
- Range table class
- Range table
- Refill item class
- Refill logic
- Refill plan
- Refill record class
- Tier table
- Translation table
- Offer

Related Information

[Concurrent Edition Management \[page 391\]](#)

2.4.4.6.2.3 Concurrent Edition Management

i Note

This topic is relevant:

- Only if the [User Sessions \[page 380\]](#) management feature is enabled in your SAP CC system.
- For the catalog objects using the [Display/Edit Mode \[page 390\]](#).

When user sessions are enabled in your system, the objects being edited in *Core Tool* cannot be modified or deleted at the same time in another *Core Tool*. If you therefore set an object in the edit mode, no other *Core Tool* user is allowed to edit this object.

⚠ Caution

When the session expires, objects opened in the edit mode are not protected against concurrent edition any longer.

⚠ Caution

Importing an object results in overwriting this object, even if it is being edited. Therefore, another user can modify an object being edited in *Core Tool* with the import operation (refer to [Object Transport and Deletion \[page 391\]](#)).

If the object is already being edited by another Core Tool user, you are not allowed:

- To set the edit mode
- To delete the object

If you try to set the edit mode or to delete the object, a *Warning* dialog box opens to inform you who is editing the object and in which session. You can go and ask this user to switch the object you need to modify from the edit mode to the display mode. Otherwise, you can either wait for the session to expire or ask your administrator to delete this session if it is not used any longer.

⚠ Caution

SAP CC users who are not connected to *Core Tool* can modify an object being edited in *Core Tool*. For instance, SAP CRM uses the SAP CC web service user to modify mapping tables.

2.4.4.6.2.4 Object Transport and Deletion

Transporting objects

SAP CC Core Tool makes it easy to import and export a set of objects linked together. For example, you could import the following master data:

- [Pricing Macros \[page 411\]](#) with their associated [Translation Tables \[page 422\]](#)
- [Charges \[page 560\]](#) with their associated [Chargeable Item Classes \[page 531\]](#), [Translation Tables \[page 422\]](#), [Tier Tables \[page 437\]](#), and [Pricing Macros \[page 411\]](#)
- [Offers \[page 611\]](#) with charges and all the objects linked to the charges

Deleting objects

⚠ Caution

There is no “undo” function in Core Tool. Before deleting an object, make sure that this action is necessary.

You can delete objects used at runtime for charging or refilling. You can only delete an object if you have first deleted all the objects that reference it. For example, you can only delete an offer once you have deleted all [Subscriptions \[page 700\]](#) that refer to it.

2.4.4.6.2.5 Shortcuts for the Menus File and Edit

Shortcuts are available for the menus *File* and *Edit* of the *Menu* bar.

Shortcuts for the File menu

The list of available shortcuts are the following:

Shortcut	Corresponding Action
CTRL + N	Create a new object
CTRL + O	Open an existing object
CTRL + S	Save the currently edited object in the Core Database
CTRL + SHIFT + N	Save the currently edited object in a file
CTRL + K	Validate the currently edited object
CTRL + W	Close the currently edited object
F6	Switch between display mode and edit mode for the selected object

Shortcuts for the Edit menu

Shortcut	Corresponding Action
 + 	Copy a tree structure from the selected node
 + 	Cut a tree structure from the selected node
 + 	Paste a tree structure under the selected node

2.4.4.6.2.6 Object Icons

Each object is represented by a specific icon, which allows to you recognize it in windows and tree structures of the SAP Convergent Charging workspace.

Below, the list of object icons:

Object	Icon
Chargeable Item Classes [page 531]	
Charged Item Classes [page 543]	
Billable Item Mapping	
Consumption Item Mapping	
Charges [page 560]	
Charge Plans	
Refill Plans	
Allowance Event Classes	
Allowance Plans	
Allowance Logic	

Object	Icon
Allowance Interface	
Monitoring Plans	
Offer [page 611]	
Subscriber Accounts [page 668]	
Provider Contracts	
Subscription [page 700]	
Accesses [page 752]	
Pricing Macros [page 411]	
Translation Tables [page 422]	
Tier Tables [page 437]	
Mapping Table Classes [page 457]	
Mapping Tables [page 469]	
Subscriber Mapping Tables	
Range Table Classes [page 489]	
Range Tables [page 503]	
Subscriber Range Tables	
Spending Status Description	
Users [page 760]	
Audits [page 770]	

Object	Icon
Change Lists [page 776]	

2.4.4.6.2.7 Object Status Icons

Object status refers to whether an object is being created, modified, or has been saved to the back-end database system.

An object status icon appears at the left of the [title bar \[page 386\]](#) of an object window:

-  **New:** Object is being created.
-  **Saved:** Object has been created and saved in the database.
-  **Being Modified:** Object has been retrieved from the database and is in the process of being modified.

Related Information

[Objects Windows \[page 389\]](#)

2.4.4.6.2.8 Common Icons

These icons are common to many of the windows and tabs of SAP Convergent Charging 5.0. They represent the following:

Properties

 Default property

 User-defined property

 Generated (by the system at runtime) property

Dates and Times

 Add a date or date/time

Tables and Lists



Add a row



Delete a row



Move a row down one place in a list



Move a row up one place in a list

Shared Items



Counter



Transient counter



Add a counter



Delete a counter



Parameter



Add a parameter



Delete a parameter

2.4.5 Configuration of Master Data Step by Step

Prerequisites

The [business data \[page 376\]](#) is configured in the SAP CC system.

First configure necessary business data with Core Tool (refer to [Configuration of Business Data Step by Step \[page 398\]](#)) and other user interfaces.

Generic Procedure

The steps below outline the order in which you create and define new objects when you want to set up an offer, a subscriber account and a subscription.

Note

Some of the steps can be performed in an external provisioning system.

Some steps may not apply to your business requirements and models.

1. : [Create a pricing catalog \[page 403\]](#) for the customer service of a service provider.
2. : [Create a chargeable item class \[page 531\]](#).
This step is optional if you do not use a *Usage Rate* component in your charge. For more information, click [here \[page 531\]](#)
3. : [Create a charge \[page 580\]](#)
 - Build a price plan that will be used to charge the service
 - Build a charging plan that will be used to charge accounts
4. : [Create a charged item class \[page 545\]](#).
5. : [Create an offer \[page 623\]](#)
 1. Add master charges, dependent charges and/or suboffers
 2. Set up the charges and/or suboffers
 3. Set up the offer and define relationships between master and dependent charges

This ends the configuration of the master data related to the service provider in his catalog.
The master data related to the end customers (mostly subscriber accounts and subscriptions) is automatically created in SAP CC if the system is connected to an external provisioning system.
You can simulate these creations.
6. : [Create a subscriber account \[page 686\]](#).
 1. Add accounts (prepaid, external postpaid).
 2. Set up the accounts.
7. : [Create a subscription to an offer \[page 710\]](#).
 1. Activate optional charges and suboffers of the corresponding offer
 2. Set up the activated charges and/or suboffers, assigning user access to master charges with usage rates
 3. Link the internal references included in charges to accounts
 4. Set up the subscription
8. Correct if necessary.
 - [Rerate \[page 790\]](#) if exceptional mistakes or errors occur in offers, subscriptions, or price plans, for example.

Related Information

[Configuration of Business Data Step by Step \[page 398\]](#)

2.4.6 Configuration of Business Data Step by Step

After installing the SAP CC system landscape, the system administrator ([Administrator role \[page 760\]](#)) and the SAP CC pricing specialists or power users ([Marketing role \[page 760\]](#)) must configure some [Business Data \[page 376\]](#).

Prerequisites

The *SAP CC system administrator* has configured the necessary business data with the appropriate Admin+ and Setup Tool user interfaces. Before creating a [pricing catalog \[page 400\]](#) for implementing the pricing policy of a customer service, you can check this data. Ask for reports about:

- VAT taxes
- VAT rules

Procedure

In Core Tool, you set up the following business data whose some data is predefined during the installation of the SAP CC system.

i Note

You can configure some business data when [configuring the master data](#) for the first time.

Marketing Role

1. Manage the [Currencies \[page 819\]](#) necessary to configure the [Master Data \[page 373\]](#) of the pricing catalog and the customer master data.

- In an integrated *SAP Solution* when SAP CC is connected to the ERP reference system, synchronize the currencies ([Synchronizing Currencies \[page 823\]](#)).
- Otherwise check (see [Exporting Currencies \[page 821\]](#)) and change (see [Importing Currencies \[page 822\]](#)) the predefined currencies.

Marketing Role	2. Manage the Public Holidays [page 808] necessary to configure some pricing logic based on public holiday information relating to the customer service consumption or other operations: • Check (see Exporting Public Holidays [page 818]) and change (see Importing Public Holidays [page 818]) the predefined public holidays
Administrator Role	3. In an integrated <i>SAP Solution</i> with one or more SAP ERP/FI-CA and CRM systems, manage the Customer Management Areas necessary to configure master data. You set up the pairs of SAP ERP/FI-CA systems and SAP CRM systems that maintain the customer master data in the SAP CC system.
Marketing Role	4. You can configure the master data (refer to Configuration of Master Data Step by Step) for a service provider.

Next Steps

Now the pricing specialists for SAP CC can configure the pricing catalogs the chargeable services or products to monetize.

Related Information

[Configuration of Master Data Step by Step](#)

[Configuration of Master Data Step by Step \[page 396\]](#)

2.4.7 Transporting Catalog and Data

Use these procedures to transport a consistent subset of pricing elements from a source SAP CC system to target SAP CC systems (as transport destinations).

Transport Data

1. [Create a change list object \[page 778\]](#) that includes the data objects to transport to the target systems.
2. [Run or schedule a transport request \[page 782\]](#).
3. When relevant, monitor your scheduled requests.
4. Verify the final execution status.

5. [Troubleshoot \[page 785\]](#) when necessary.

Transport Data by Using CTS

1. [Create a change list object \[page 778\]](#) that includes the data objects to transport.
2. [Export the change list \[page 785\]](#) containing the consistent master data to a file.
3. In SAP Solution Manager, use the exported file to trigger transport operations.

Related Information

[Catalog Transport](#)

2.4.8 Catalogs

A catalog is a storage structure used by SAP Convergent Charging to help you organize your work more efficiently.

In SAP Convergent Charging, a pricing catalog includes the [pricing configuration](#) for an end-customer service to monetize. A catalog contains all the pricing elements that configure the necessary pricing logic and charging logic for this chargeable service.

Depending on your modeling and design, you [create a pricing catalog \[page 403\]](#) for each service provider company that you represent, or for each end-customer service, or for a bundle of services that you must monetize.

In your SAP CC Core Tool user interface, each catalog consists of subfolders inside an [All Objects](#) folder. The [All Objects](#) folder stores all the pricing elements you create for a service provider such as chargeable item classes, reusable charges, offers and pricing macros.

You can add folders to this basic structure but you cannot delete the basic structure itself.

Note that a catalog is made up of the following master data, whose availability or behavior depends (as of SAP CC 5.0 SP 6) on the installation scenario:

- Chargeable Item Class
- Charged Item Class
- Aggregation Policy
- Pricing Macro
- Translation Table
- Tier Table
- Mapping Table Class
- Mapping Table
- Range Table Class

- Range Table
- Charge
- Charge Plan
- Allowance Event Class
- Allowance Logic
- Allowance Plan
- Refill Item Class
- Refill Logic
- Refill Record Class
- Refill Plan
- Monitoring Plan
- Offer

i Note

- When an agreement table is created, it appears in a new subfolder located in the folder of the corresponding table type (range or mapping table).
- If at least one agreement table exists, the subfolder *Agreement Tables* cannot be deleted.

Related Information

[Working with Pricing Catalogs \[page 402\]](#)

2.4.8.1 Catalog Owner

Catalog Owner

A **service provider** is an actor that provides some marketable value-added services to end customers. The service provider company monetizes the service usage and consumption. The company launches customer-focused pricing models and offers that differentiate from the competition. To price its end-customer services dynamically, the service provider owns a pricing catalog in *SAP Master Data*.

i Note

In SAP Convergent Charging 5.0, the catalog owner information is a textual reference to:

- The "contracting" service provider (such as the company name) that want to monetize one or multiple end-customer services
- An end-customer service (such as the service name or a comprehensive abbreviation)
- A bundle of end-customer services (such as the name of this bundle) that can be priced by using some common pricing elements from a unique catalog

The exact meaning depends on your implementation requirements.

Modeling and Design

The SAP CC pricing specialist is an SAP CC individual user who represents the contracting service provider. This expert translates the service pricing policy and strategy to SAP Convergent Charging capabilities and features. He designs how to configure the SAP CC systems and data and performs the pricing configuration, validation, and maintenance.

→ Recommendation

When modeling and designing the catalog owner information, use a **combination** of:

- The *company name* of the service provider that you represent.
- The name of the *marketable end-customer service* or the name of a service bundle that must be priced by using the corresponding pricing catalog.

For example, configure your system with: *GAFA*, *GAFA Digital Services*, or *GAFA Duo Services*.

Use the same information to define the name for the pricing catalog and facilitate the maintenance and troubleshooting.

In a training system, SAP CC users can set up the catalog owners by using their user ID or family name for example.

Configuration

As an SAP CC pricing specialist, you set up the owner information when [configuring a pricing catalog \[page 259\]](#) and its pricing elements such as a charge plan, a mapping table, or a pricing macro.

The SAP CC system uses this technical information to control the master data consistency. A pricing catalog and all its pricing elements must have the same owner information.

i Note

The catalog owner is not the SAP CC individual user (pricing specialist) who configures a pricing catalog and its elements.

There is an exception. In a training system, a user can set up the owner information with a family name.

2.4.8.2 Working with Pricing Catalogs

As a pricing specialist, you manually configure and maintain your pricing catalogs and their elements (see [Working with Catalog Objects \[page 407\]](#)).

Note that you can also customize some folders (see [Working with Catalog Folders \[page 405\]](#)).

→ Remember

A user administrator can assign an SAP CC user to a unique pricing catalog.

Related Information

[Creating a Catalog \[page 403\]](#)

[Opening a Catalog \[page 403\]](#)

[Modifying a Catalog \[page 404\]](#)

[Deleting a Catalog \[page 404\]](#)

2.4.8.2.1 Creating a Catalog

Use this procedure to create a pricing catalog.

Create a Pricing Catalog

1. From the menu bar in the main window, select **File > New > Catalog**. The *New Catalog* window opens.
2. In the *Owner* field, type the name of the service provider.
3. Click *OK*. The *Catalog* window opens.

i Note

An SAP CC user associated to a pricing catalog cannot create a new catalog. If such a user tries to create a catalog, an error message is displayed to inform the user that creating a catalog cannot be performed.

Related Information

[Working with Catalog Objects \[page 407\]](#)

2.4.8.2.2 Opening a Catalog

At any point in your work session, you can check whether a pricing catalog has been created for a service provider and [modify \[page 404\]](#) it if necessary.

Open a Pricing Catalog

1. From the menu bar in the main window, select ► **Window** ► **View Catalogs** ►. The *Catalog* window opens.
2. In the *Owner* drop-down menu, select the owner of the catalog that you want open.

i Note

If the name of the service provider does not appear in the *Owner* drop-down menu, this means that no catalog has been created for the service provider. In this case, you can [create \[page 403\]](#) a pricing catalog for the service provider company and its chargeable services.

2.4.8.2.3 Modifying a Catalog

Modify Your Pricing Catalog

You can modify the pricing catalog structure only in the following ways:

- [Add \[page 405\]](#) new folders to the basic structure.
- Copy existing [folder \[page 406\]](#) or [objects \[page 408\]](#) (pricing elements) and paste them into new folders.
- [Rename \[page 406\]](#) new folders.
- Delete [folders \[page 406\]](#) or [objects \[page 410\]](#).
- [Modify \[page 407\]](#) objects.

i Note

You cannot delete the default object folders (such as the *Chargeable Item Classes* and the *Charges* or *Offers* folders) from the *All Objects* folder.

2.4.8.2.4 Deleting a Catalog

Before you delete a pricing catalog, you must first delete all data objects contained in the catalog. Only empty catalogs can be deleted.

⚠ Caution

There is no “undo” function in your SAP CC Core Tool user interface. Before deleting an object, make sure that this action is necessary.

Delete a Pricing Catalog

1. From the menu bar in the main window, select **File > Delete > Catalog**. The *Choose Owner* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the catalog.
3. Click *OK*. A dialog box confirms that the catalog has been successfully deleted.

Note

If a warning message appears after clicking *OK* at step 3, you must delete the object or objects contained in the pricing catalog.

2.4.8.3 Working with Catalog Folders

Related Information

[Adding a New Catalog Folder \[page 405\]](#)
[Copying and Pasting a Catalog Folder \[page 406\]](#)
[Renaming a Catalog Folder \[page 406\]](#)
[Deleting a Catalog Folder \[page 406\]](#)

2.4.8.3.1 Adding a New Catalog Folder

You can add new folders to the basic catalog structure and add subfolders within those folders.

Add a Folder to a Catalog

1. [Open \[page 403\]](#) a pricing catalog.
2. In the *Owner* drop-down menu, select the owner of the catalog that you want to open.
3. Select the catalog or folder in which you want to add a new folder.
4. Right-click the item selected in the previous step and select *New Directory*. A folder called *New Directory* is added. If you want, you can [rename \[page 406\]](#) it.

2.4.8.3.2 Copying and Pasting a Catalog Folder

You can copy existing folders and paste them into [new folders created \[page 405\]](#) in the pricing catalog.

Copy and Paste a Catalog Folder

1. [Open \[page 403\]](#) a pricing catalog.
2. In the catalog, select the folder that you want to copy.
3. Right-click the item selected in the previous step, and then select *Copy*.
4. Select the destination folder for pasting the folder.
5. Right-click the folder selected in the previous step, and then select *Paste*. The folder appears in the destination folder.

i Note

Using the same method, you can select *Cut* instead of *Copy* but only with folders outside the *All Objects* folder.

2.4.8.3.3 Renaming a Catalog Folder

You can only rename folders that have been created outside the *All Objects* folder.

Rename a Catalog Folder

1. [Open \[page 403\]](#) a pricing catalog.
2. In the catalog, select the folder that you want to rename.
3. Right-click the item selected in the previous step and select *Rename Directory*.
4. Type the new name for the folder.

2.4.8.3.4 Deleting a Catalog Folder

You can only delete folders that have been created outside the *All Objects* folder.

Delete a Catalog Folder

1. [Open \[page 403\]](#) a pricing catalog.
2. In the catalog, select the folder outside the *All Objects* folder that you want to delete.
3. Right-click the item selected in the previous step, and then select *Delete Directory*. The folder is deleted.

i Note

Deleting a folder does not delete the objects that are included in the folder. The objects of the deleted folder are always available in the *All objects* folder.

2.4.8.4 Working with Catalog Objects

Related Information

[Modifying a Catalog Object \[page 407\]](#)

[Copying and Pasting a Catalog Object \[page 408\]](#)

[Deleting the Versions of a Catalog Object \[page 408\]](#)

[Deleting a Catalog Object \[page 410\]](#)

[Exporting an Object from a Catalog \[page 411\]](#)

2.4.8.4.1 Modifying a Catalog Object

You can change catalog elements that are displayed in the folders of your pricing catalog.

Modify a Catalog Object

1. [Open \[page 403\]](#) a pricing catalog for a chargeable service.
2. In the catalog, double-click the object that you want to modify. The related object window opens.
3. Switch to the [editing mode \[page 390\]](#).
4. Modify the object.
5. Save the object by selecting one of two methods:
 - To save and release the object to the SAP Convergent Charging back-end database, select **File > Save > In The Database**, choose an effective date and time, and then click *OK*.
 - To save the object as an XML file on your hard disk, select **File > Save > In A File**, name the file, and then click *Save*. You can use this text file for troubleshooting purposes.

2.4.8.4.2 Copying and Pasting a Catalog Object

You can copy existing objects and paste them into [new folders created \[page 405\]](#) in the catalog.

Copy and Paste a Catalog Object

1. [Open \[page 403\]](#) a pricing catalog.
2. In the catalog, select the object that you want to copy.
3. Right-click the item selected in the previous step, and then select *Copy*.
4. Select the destination folder for pasting the object.
5. Right-click the folder selected in the previous step, and then select *Paste*. The object appears in the destination folder.

i Note

Using the same method, you can select *Cut* instead of *Copy* but only with objects outside the *All Objects* folder.

→ Tip

Use the same method to copy/paste an object from your user interface to a text editor. The pasted object is an XML element.

2.4.8.4.3 Deleting the Versions of a Catalog Object

When deleting one or more versions of a catalog object, you take the following decisions:

- Which versions you want to delete.
- Which version you want to extend.

i Note

- You can delete one or several consecutive versions at the same time.
- You cannot delete all the versions of a catalog object.

When deleting one or more versions of a catalog object, you extend the version preceding or following the versions to delete. In the figures below, a pricing macro has three versions A, B, and C (Fig. 1) as follows:

- Version C: From the beginning of time to d3
- Version B: From d3 to d2
- Version A: From d2 to d1

If you delete version B (Fig. 2), you can extend version A to d3 (Fig. 3), or you can extend version C to d2 (Fig. 4).

Fig. 1

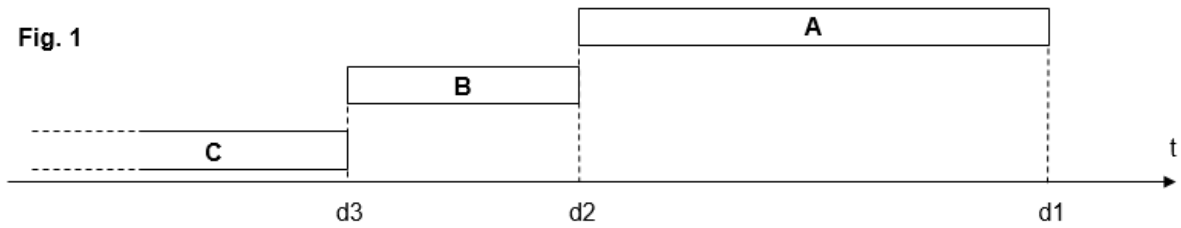


Fig. 2

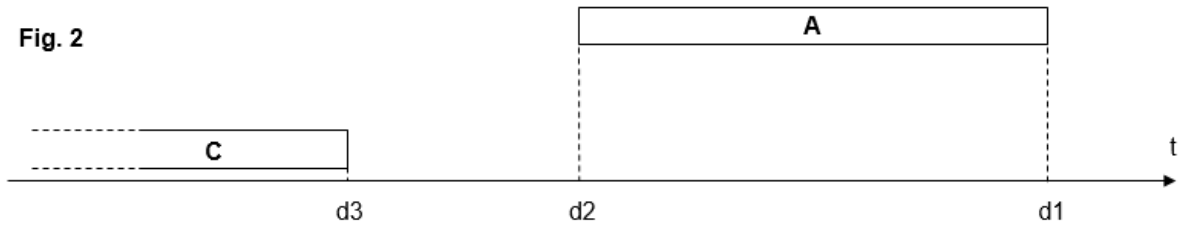


Fig. 3

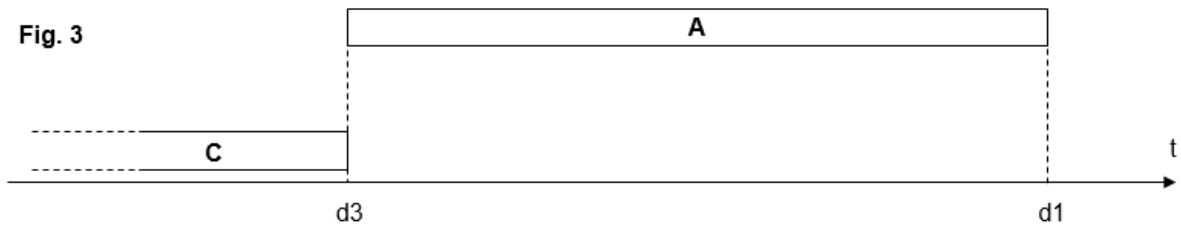
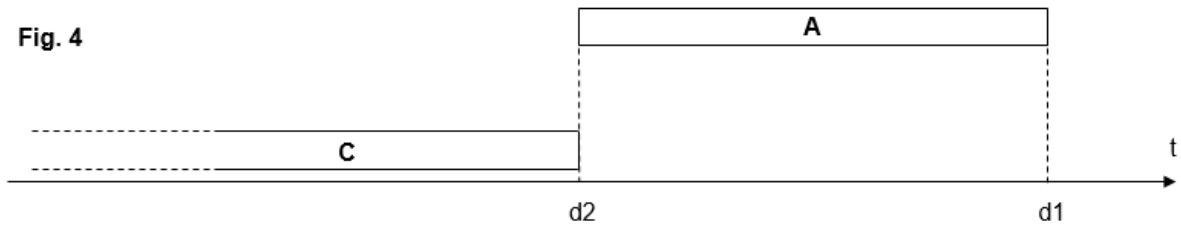


Fig. 4



Example

For example, you want to delete some versions of a pricing macro whose versions are ordered by date from the latest to the oldest:

Select versions to delete

Row	Version
1	From March 3, 2021 9:01:28 AM
2	Between February 3, 2021 9:00:49 AM and March 3, 2021 9:01:28 AM
3	Between January 3, 2021 9:00:04 AM and February 3, 2021 9:00:49 AM
4	Between December 3, 2020 8:59:19 AM and January 3, 2021 9:00:04 AM
5	Between November 3, 2020 8:58:30 AM and December 3, 2020 8:59:19 AM
6	Until November 3, 2020 8:58:30 AM

According to the previous table:

- If you delete the first version of the table, the second version (row 2) of the table is automatically extended.

- If you delete the last version of the table, the version (row 5) before the last one is automatically extended.
- If you delete consecutive versions of the table, you can extend the version that precedes or follows the versions to delete: If you delete three versions (rows 3, 4, and 5), you can extend two versions (row 2 or row 6).
- If you delete consecutive versions including the first version, the version that follows the versions to delete is extended: If you delete three versions (rows 1, 2, and 3), one version (row 4) is automatically extended.
- If you delete consecutive versions including the last version, the row that precedes the versions to delete is extended: If you delete three versions (rows 4, 5, and 6), one version (row 3) is automatically extended.

To delete the versions of a catalog object

1. [Open \[page 403\]](#) the catalog related to the object.
2. In the catalog, double-click the object whose versions you want to delete. The related object window opens.
3. Switch to the [editing mode \[page 390\]](#).
4. From the menu bar in the main window, select **Action** > **Delete Versions** ⁴¹. The *Delete Versions* dialog box opens.
5. In the *Select Versions to Delete* table, select the versions that you want to delete. The *Version to Extend* table displays the versions to extend⁴².
6. In the *Version to Extend* table, select the version that you want to extend. The selected version is in bold in the *Select Versions to Delete* table.
7. Click **Delete**. A message informs that you are about to delete the selected versions. The dialog box displays the number and the list of versions that you are to delete.
8. Click **Delete**. A message confirms that the versions have been successfully deleted.
9. Click **OK**⁴³.

2.4.8.4.4 Deleting a Catalog Object

You can only delete catalog objects that have been created outside the *All Objects* folder.

⁴¹ If the menu is not available, this means that you have already modified the open object. Save or close the object, and then start again this procedure.

⁴²

- If you select all the versions or no version in the *Select Versions to Delete* table, the *Version to Extend* table is empty and the **Delete** button is not available (dimmed).
- If you select the latest version or the oldest version in the *Select Versions to Delete* table, the version following the latest version or the version preceding the oldest version is in bold in this table, and this version is selected in the *Version to Extend* table.

⁴³ When you click **OK**, the window of the catalog object switches from the Edit mode to the Display Mode.

Delete a Catalog Object

1. [Open \[page 403\]](#) a pricing catalog.
2. In the catalog, select the object outside the [All Objects](#) folder that you want to delete.
3. Right-click the item selected in the previous step, and then select [Cut](#). The object is deleted.

2.4.8.4.5 Exporting an Object from a Catalog

You can export objects to a directory of your hard disk, where they are saved as XML files.

Export a Catalog Object

1. From the menu bar in the main window, select [Window](#) > [View Catalog](#) . The [Catalog](#) window opens.
2. In the [Owner](#) drop-down menu, select the owner of the pricing catalog that you want to open.
3. Select the object that you want to export.
4. Right-click the item selected in the previous step and select [Export](#). The [Save](#) dialog box opens.
5. Select a directory to export the object.
6. In the [File name](#) field, type the name of the file.
7. Click [Save](#).

2.4.9 Pricing Macros

When configuring the pricing logic for your chargeable service, service bundle, or product, SAP Convergent Charging provides you with an important reusable and shareable pricing element: the pricing macros.



A **pricing macro** in SAP Convergent Charging (SAP CC) is a small reusable module capable of retaining and applying a calculation formula. If your price plan, refill logic, or allowance logic has common calculation formulae, you can manage and maintain the price plan or the refill logic more easily by creating pricing macros.

A pricing macro looks like a price plan, and it is represented using the same multilevel tree structure. At runtime, the system executes this pricing macro. Using its own properties, the pricing macro calculates an amount and may generate output properties.

Once a pricing macro is [created \[page 413\]](#), you can then [add \[page 600\]](#) it to the price plan of a charge, to the refill logic of a refill plan, or to the allowance logic of an allowance plan. A pricing macro can be used in any charge or refill logic and may also be used within other pricing macros, resulting in cascading pricing macros.

Versions

You can modify and save different versions of a pricing macro: [Changing the Version of a Pricing Macro \[page 421\]](#).

Testing a Pricing Macro

Once your pricing macro is complete, SAP Convergent Charging provides you with the [Rating Trial Runs \[page 603\]](#) tool to test and verify your pricing macro and its logic configuration.

Transport

See: [Transporting Catalog and Data \[page 399\]](#)

Related Information

[Price Plans \[page 570\]](#)

[Refill Logic](#)

[Allowance Logic](#)

2.4.9.1 Working with Pricing Macros

Related Information

[Creating a Pricing Macro \[page 413\]](#)

[Opening an Existing Pricing Macro \[page 414\]](#)

[Modifying a Pricing Macro \[page 415\]](#)

[Setting Up a Pricing Macro \[page 416\]](#)

[Deleting a Pricing Macro \[page 419\]](#)

[Saving a Pricing Macro \[page 418\]](#)

[Exporting a Pricing Macro \[page 420\]](#)

[Importing a Pricing Macro \[page 420\]](#)

2.4.9.1.1 Creating a Pricing Macro

A pricing macro is like a section of a price plan that you can add to any price plan or refill logic. You can choose to define properties that input information into the macro or output information from it. Like a price plan, a pricing macro is graphically represented by a decision tree. The elements of the pricing macro window enable you to create a pricing macro.

To create a pricing macro

1. From the menu bar in the main window, select **File > New > Pricing Macro**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. Click *OK*. The *New Pricing Macro* window opens.
4. *Set up* the pricing macro.
5. Verify the pricing macro structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. *Save* the pricing macro.

You can create a pricing macro by opening an existing pricing macro and copying it.

To create a pricing macro from an existing pricing macro

1. From the menu bar in the main window, select **File > Open > Pricing Macro**. The *Open Pricing Macro* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. In the *Pricing Macros* folder of the catalog of the owner, select the pricing macro to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding pricing macro window opens.
5. *Set up* the pricing macro.
6. Verify the pricing macro structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. *Save* the pricing macro.

Related Information

[Setting Up a Pricing Macro \[page 416\]](#)

[Saving a Pricing Macro \[page 418\]](#)

2.4.9.1.2 Opening an Existing Pricing Macro

You can open:

- An existing pricing macro saved in the database
- A previous version of a pricing macro saved in the database
- An existing pricing macro saved in an XML file

To open an existing pricing macro saved in the database

1. From the menu bar in the main window, select **File > Open > Pricing Macro**. The *Open Pricing Macro* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. In the *Pricing Macros* folder of the catalog of the owner, select the pricing macro, and then click *Open*. The pricing macro window opens in display mode.

Pricing macros are managed chronologically. After you have saved a pricing macro, you can access previous versions of it that exist in the database. However, if you modify and save a previous version of a pricing macro, all later versions of it are deleted.

To open a previous version of a pricing macro saved in the database

1. From the menu bar in the main window, select **File > Open > Pricing Macro**. The *Open Pricing Macro* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. In the *Pricing Macros* folder of the catalog of the owner, select the pricing macro, and then click *Open*. The pricing macro window opens in display mode.
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the pricing macro from the list.
6. Click *View*.

To open an existing pricing macro saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File** . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.9.1.3 Modifying a Pricing Macro

You can modify a pricing macro by adding or deleting rating components. The modified pricing macro replaces the previous version in the database, though you can still access the previous version.

You cannot modify its name or its input and output properties once you have saved it.

To modify a pricing macro

1. *Open* a pricing macro.
2. Set the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The pricing macro may be reloaded if it has been modified since you have opened it.
3. *Set up* the pricing macro.
4. Verify the pricing macro structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
5. *Save* the pricing macro.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, and if there are unresolved prerating events for the subscription that uses your pricing macro,

modifying the pricing macro may lead to a postrating result that differs from its corresponding prerating result. In addition, do not save a new version of a pricing macro to a date before the last prerating operation because this will lead to a rating error. (The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying a pricing macro may result in errors.)

Related Information

[Opening an Existing Pricing Macro \[page 414\]](#)

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Pricing Macro \[page 416\]](#)

[Saving a Pricing Macro \[page 418\]](#)

2.4.9.1.4 Setting Up a Pricing Macro

Before setting up a Price Macro, make sure one of the tasks listed below is done:

- [Creating a Pricing Macro \[page 413\]](#)
- [Opening an Existing Pricing Macro \[page 414\]](#)
- [Modifying a Pricing Macro \[page 415\]](#)

Like a price plan (refer to [Price Plans \[page 570\]](#)), a pricing macro is graphically represented in the pricing macro window by a decision tree, which can consist of price plan components using counters, parameters and pricing macros depending on the requirements of the plan.

i Note

Before inserting components into the pricing macro, you need to create properties that you will use in the components.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, and if there are unresolved prerating events for the subscription that uses your pricing macro, modifying the pricing macro may lead to a postrating result that differs from its corresponding prerating result. In addition, do not save a new version of a pricing macro to a date before the last prerating operation because this will lead to a rating error. (The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying a pricing macro may result in errors.)

To set up a pricing macro

1. In the left pane of the pricing macro window, click the pricing macro icon .
2. In the right pane of the pricing macro window, identify the pricing macro. In the *Name* field, type the unique identifier of the pricing macro. In the *Description* field, describe the function of the pricing macro if necessary.
3. If necessary, add *Rating Context Properties* which contain the values that the pricing macro needs to make calculations. These values are passed to the pricing macro by the price plan or another pricing macro that contains the pricing macro that you are setting up.
4. If necessary, add *Generated Properties* which are the calculation results of the pricing macro. These values are retrieved by the price plan or another pricing macro that contains the pricing macro that you are setting up.
5. Add (see [Adding a Component \[page 600\]](#)) functions, comparisons, splitters or operators components to the pricing macro, and then set up the components (*).

i Note

(*) For more comprehensive details on using each component, refer to the primary help relating to components: [Working with Logic Components \[page 831\]](#)

To add a rating context property

1. In the *Rating Context Properties* area, click  to add a property. A new row is added to the table.
2. In the *Name* column, type the property name.
3. In the *Description* column, describe the function of the property if necessary.
4. In the *Type* column, select one of the following property types: *Number*, *String*, *Date*, *Counter*, *Multi-valued Number*⁴⁴ or *Multi-valued String*⁴⁵.
5. If you want to remove the property, click .

To add a generated property

1. In the *Generated Properties* area, click  to add a property. A new row is added to the table.
2. In the *Name* column, type the property name.
3. In the *Description* column, describe the function of the property if necessary.
4. In the *Type* column, select one of the following property types: *Number*, *String*, *Date*, *Multi-valued Number*⁴⁶ or *Multi-valued String*⁴⁷.
5. In the *Default Value* column, type a value corresponding to the property type.

⁴⁴ Represents a list of numerical values. For example, the multi-valued number ImageSize contains the following list: 5000, 10000, 15000, 20000.

⁴⁵ Represents a list of string values. For example, the multi-valued string ImageType contains the following list: image/jpeg: 5000, image/gif:10000, image/eps:25000 and image/pic:8000.

6. If you want to remove the property, click .

2.4.9.1.5 Saving a Pricing Macro

Once you have created or modified a pricing macro, and then verified its structure, you are ready to save it. You can save the pricing macro to either the database or as an XML file on your hard disk.

To save a new pricing macro to the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.
3. Click *Save*. The *Pricing Macro Creation* dialog box opens to inform you that the pricing macro has been successfully saved and released.
4. Click *OK*.

To save a new version of an existing pricing macro to the database

i Note

If a *Warning* dialog box opens to inform you that the pricing macro has been modified since you opened it, you can:

1. Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the pricing macro.
2. Click *Cancel* to come back to the pricing macro. See later in this chapter how to save the pricing macro as an XML file.

1. From the menu bar in the main window, select **File > Save > In the Database**. A dialog box opens to ask if you want to save the pricing macro.
2. Click *Yes*. The *Save Version* window opens.
3. In this window, select one of the following options:
 - *Create a new version*: The *Start Date* is automatically filled in with the current date/time while the *End Date* is automatically filled in with *No End Date*. You can however replace these dates/times by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates/times related to existing versions. In this list, *No Start Date* represents an undetermined date in

⁴⁶ Represents a list of numerical values. For example, the multi-valued number ImageSize contains the following list: 5000, 10000, 15000, 20000.

⁴⁷ Represents a list of string values. For example, the multi-valued string ImageType contains the following list: image/jpeg: 5000, image/gif:10000, image/eps:25000 and image/pic:8000.

the past while *No End Date* represents an undetermined date in the future. A message informs you when you overwrite versions.

- *Replace Versions*: The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click *Save*. The *Pricing Macro Modification* dialog box opens to inform you that the modified pricing macro has been successfully saved and released.
 5. Click *OK*.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, do not save a new version of a pricing macro to a date before the last prerating operation because this will lead to a rating error.

To save a pricing macro as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.
2. Select a directory to save the pricing macro.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The pricing macro is saved as an XML file in your selected directory.

2.4.9.1.6 Deleting a Pricing Macro

Before you delete a pricing macro, you must first delete all objects which reference it.

To delete a pricing macro

1. From the menu bar in the main window, select **File > Delete > Pricing Macro**. The *Delete Pricing Macro* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. In the *Pricing Macros* folder of the catalog of the owner, select the pricing macro.
4. Click *Delete*. A deletion dialog box asks if you want to delete the pricing macro.
5. Confirm the deletion of the pricing macro by clicking *Yes*:
 1. If a dialog box confirms your choice, the pricing macro has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the pricing macro is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking [Yes](#) at step 5, you must delete the object or objects that reference the pricing macro. The identifiers of these objects appear in the message.

2.4.9.1.7 Exporting a Pricing Macro

You can export pricing macros to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to import the pricing macro back into SAP Convergent Charging 5.0.

To export a pricing macro

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the pricing macro.
3. In the catalog of the owner, select the pricing macro.
4. Click *OK*. The Save dialog box opens.
5. Select a directory to export the pricing macro.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.9.1.8 Importing a Pricing Macro

You can import pricing macros in XML format from a directory in your database.

Several versions of a pricing macro can exist in a database, corresponding to their stages of modification. You can import all versions of an import into SAP CC *Core Tool*, or select only the versions you want.

To import a charge

1. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
2. Open the directory in which the charge is saved, and then select the charge file.
3. Click *Open*. The *Import Objects* dialog box opens.
4. Leave the default *All versions* option selected if you want to import all the versions of the imported objects, or do the following:
 - To select only one version as of a certain date, select the *One version per object* option.

- To replace all versions by the imported version, select the [Replace all versions](#) option.
 - To replace or not some existing versions by the imported version, select the [Use modification date as of](#) option and choose the date on which you save the imported version. Depending on this date, some existing versions will be replaced or not by the imported version.
5. In the [Import](#) column, clear the checkboxes of objects you do not wish to import.
 6. Click [Import](#).

i Note

SAP CC [Core Tool](#) can only import an object which has previously been exported and saved ([File](#) > [Export](#)), rather than saved directly to a file ([File](#) > [Save](#) > [In a File](#)).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.9.2 Using the Action Menu

Related Information

[Changing the Version of a Pricing Macro \[page 421\]](#)

[Deleting the Versions of a Pricing Macro \[page 422\]](#)

[Reading a Pricing Macro \[page 422\]](#)

[Doing a Trial Run of a Pricing Macro \[page 422\]](#)

2.4.9.2.1 Changing the Version of a Pricing Macro

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.9.2.2 Deleting the Versions of a Pricing Macro

The procedure is the same as [Deleting the Versions of a Catalog Object \[page 408\]](#).

2.4.9.2.3 Reading a Pricing Macro

Once you have created a pricing macro, you can generate a descriptive representation of it. This process is called reading a pricing macro.

To read a pricing macro

1. Open a pricing macro.
2. On the toolbar in the main window, click the *Read Pricing Macro* icon . The *Read Pricing Macro* dialog box opens.
3. Check the pricing macro description for accuracy, and then click *Close*.

Related Information

[Opening an Existing Pricing Macro \[page 414\]](#)

2.4.9.2.4 Doing a Trial Run of a Pricing Macro

The procedure is the same as [Doing a Trial Run of a Price Plan \[page 603\]](#).

2.4.10 Translation Tables

i Note

You cannot redefine a translation table at [Charge Plans](#), [Refill Plans](#) or [Allowance Plans](#) levels if your global charging services are based on [Provider Contracts](#). We recommend that you use [Mapping Tables \[page 469\]](#) and [Subscriber Mapping Tables](#).



A **translation table** is a multicolumn data table. It allows you to create new properties that can be used in [Price Plans \[page 570\]](#), [Charging Plans](#) the [Refill Logic](#), or the [Allowance Logic](#).

A translation table is an n-dimensional table that consists of:

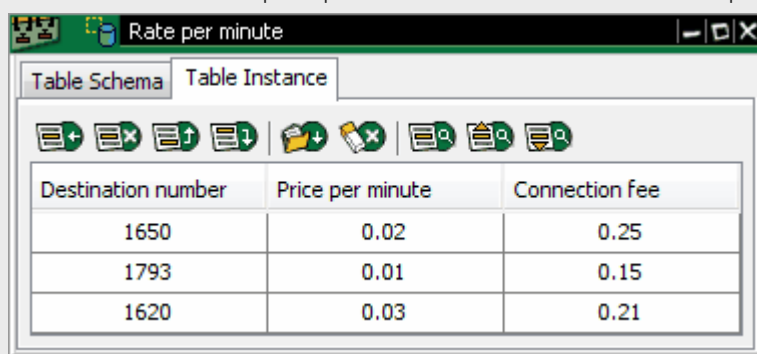
- A set of input columns (I1, I2, I3, ..., In) with n less than or equal to 5
- A set of output columns (O1, O2, O3, ..., Op) with p less than or equal to 15
- A set of rows

Each row of the table consists of a set of values of input columns (I1, I2, I3,..., In) to which corresponds a set of values of output columns (O1, O2, O3,..., Op).

After you have created a translation table, you can then add it to the price plan (see [Adding a Component \[page 600\]](#), the charging plan, the refill logic, or the allowance logic. You can use the same translation table more than once in any price plan, charging plan, or refill logic.

❖ Example

The rate per minute for the U.S. during weekdays (out of holidays) depends on the destination. To calculate the consumption price in US dollars, you create a table with the following inputs and outputs: Destination number (input), Price per minute (output) and Connection fee (output). The following translation table determines the related price per minute and connection fee for a specified destination number:



Destination number	Price per minute	Connection fee
1650	0.02	0.25
1793	0.01	0.15
1620	0.03	0.21

Versions

You can modify and save different versions of a translation table.

See the task [Changing the Version of a Translation Table \[page 436\]](#).

→ Remember

Read the notes about:

- The [order of the rows \[page 428\]](#) in translation table
- The [prerating and postrating \[page 362\]](#) features (applicable to offers and subscriptions but not applicable to charge plans, provider contracts and refill plans).

2.4.10.1 Working with Translation Tables

- [Creating a Translation Table \[page 424\]](#)
- [Opening an Existing Translation Table \[page 425\]](#)
- [Changing the Version of a Translation Table \[page 436\]](#)
- [Modifying a Translation Table \[page 427\]](#)
- [Setting Up a Translation Table \[page 428\]](#)
- [Saving a Translation Table \[page 433\]](#)
- [Deleting a Translation Table \[page 434\]](#)
- [Deleting the Versions of a Translation Table \[page 437\]](#)
- [Exporting a Translation Table \[page 435\]](#)
- [Importing a Translation Table \[page 435\]](#)

2.4.10.1.1 Creating a Translation Table

Use one of these procedures to create a translation table.

Create a Translation Table

1. From the menu bar in the main window, select **File > New > Translation Table**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. Click *OK*. The *New Translation Table* window opens.
4. [Set up \[page 428\]](#) the translation table.
5. Verify the translation table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 433\]](#) the new translation table.

i Note

Once you have saved a translation table, you can no longer modify its name or structure. You can only modify the *Table Instance* tab by adding content to it.

→ Tip

You can create a translation table by opening an existing translation table and copying it.

Create a Translation Table from an Existing Translation Table

1. From the menu bar in the main window, select **File > Open > Translation Table**. The *Open Translation Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. In the *Translation Tables* folder of the catalog of the owner, select the translation table to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding translation table window opens.
5. *Modify* the translation table if necessary.
6. Verify the translation table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. *Save* [page 433] the new translation table.

Related Information

[Setting Up a Translation Table \[page 428\]](#)

[Modifying a Translation Table \[page 427\]](#)

[Saving a Translation Table \[page 433\]](#)

2.4.10.1.2 Opening an Existing Translation Table

You can open:

- An existing translation table saved in the database
- A previous version of a translation table saved in the database
- An existing translation table saved in an XML file

To open an existing translation table saved in the database

1. From the menu bar in the main window, select **File > Open > Translation Table**. The *Open Translation Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. In the *Translation Tables* folder of the catalog of the owner, select the translation table. The translation table window opens in display mode.

Translation tables are managed chronologically. After you have saved a translation table, you can access the previous versions of it that exist in the database. However, if you modify and save a previous version of a translation table, all later versions are deleted.

To open a previous version of a translation table saved in the database

1. From the menu bar in the main window, select **File > Open > Translation Table**. The *Open Translation Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. In the *Translation Table* folder of the catalog of the owner, select the translation table, and then click *Open*. The translation table window opens in display mode.
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the translation table from the list.
6. Click *View*.

To open an existing translation table saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File**. The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.10.1.3 Modifying a Translation Table

You can modify a translation table by adding, modifying, or deleting content. When you save it in the database, you can modify its versions (see [Changing the Version of a Translation Table \[page 436\]](#)).

You cannot modify the name or the structure of a translation table once you have saved it.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, and if there are unresolved prerating events for the subscription that uses your translation table, modifying the translation table may lead to a postrating result that differs from its corresponding prerating result. In addition, do not save a new version of a translation table to a date before the last prerating operation because this will lead to a rating error. (The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying a translation table may result in errors.)

To modify a translation table

1. From the menu bar in the main window, select **File > Open > Translation Table** . The *Open Translation Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. In the *Translation Tables* folder of the catalog of the owner, select the translation table.
4. Click *Open*. The translation table window opens in display mode.
5. Set the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The translation table may be reloaded if it has been modified since you have opened it.
6. *Set up* the translation table.
7. Verify the translation table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. *Save* the translation table.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Translation Table \[page 428\]](#)

[Saving a Translation Table \[page 433\]](#)

2.4.10.1.4 Setting Up a Translation Table

Create, open, or modify a translation table before setting it up. A translation table window must be open.

→ Remember

When a translation table is used in [Price Plans \[page 570\]](#), [Charging Plans](#), [Pricing Macros \[page 411\]](#), or in the [Refill Logic](#), a *Table Operator component* compares row by row the input columns of the translation table with price plan properties. The comparison stops when the price plan properties match at least one row of the input columns of the translation table; therefore, the order of the rows in the translation table is important.

i Note

Once you have saved a translation table, you can no longer modify its name or structure. You can only modify the *Table Instance* tab by adding content to it.

Translation Table (Window)

To set up a translation table, you must fill in or modify the *Table Schema* tab and the *Table Instance* tab.

Table Schema (Tab)

This tab allows you to create the structure of your translation table, which can consist of one to five input columns and one to fifteen output columns. Use the icons to fill in the tab.

Name: Type the unique identifier of the table.

Description: Describe the translation table if necessary.

Start and end dates can be specified for each row: If selected, this option adds the columns *Start Date* and *End Date* to the table in the *Table Instance* tab. This option is used in combination with the field *Reference Date* of a table operator component. You use this option as an additional criterion to sort the items of the table. You can, for example, fix the price of phone calls depending on prefixes and call dates.

Disallow duplicate input values for the same time: If selected, this option prevent you from adding two rows containing the same input values. An error message is displayed when two rows containing the same values are added to the table. If the option *Start and end dates can be specified for each row* is selected, two rows are considered as duplicated if they contain the same input values and if the periods delimited by *Start date* and *End date* overlap.

❖ Example

Example of duplicate input values

I1	I2	I3	Start Date	End Date
John	Jane	Harry	null ⁴⁸	null
John	Jane	Harry	null	

I1	I2	I3	Start Date	End Date
John	null ⁴⁹	Harry	2007-01-01	2007-02-01
John	null	Harry	2007-01-15	2007-02-07

I1	I2	I3	Start Date	End Date
John	Peter	Harry	2007-01-01-10:48:05	null
John	Peter	Harry	null	2007-01-01-10:48-06 ⁵⁰

Input Columns

- **Name:** type the input column name.
- **Description:** Describe the input column if necessary.

Output Columns

- **Name:** Type the output column name.
- **Description:** Describe the output column if necessary.
- **Type:** Provides the list of types. Select Number or String.
- **Default value:** Assign a value to the output column. When the translation table is used in a price plan or a pricing macro, if no comparison is successful, a default value for each generated property is returned by the translation table.

Table Instance (Tab)

i Note

Double-clicking a column sorts the data in that column, and the entire table is updated accordingly. Double-click a second time the column sorts the column (and the table) in reverse order.

Once you have created the structure of your translation table in the [Table Schema](#) tab, you can add one or more rows to the table, and then fill in the cells of each row with appropriate values. When adding a new row to the table, each cell of the input columns is assigned the default value "Any" that represents any value. You can replace "Any" by any value of your choice.

⁴⁸ Null represents an unspecified date in the past or the future.

⁴⁹ Null represents an empty cell.

⁵⁰ An overlap of 1 second is enough.

If you have selected the *Start and end dates can be specified for each row* option, two additional columns Start Date and End Date appear in the table. After you add a row, click the cell of each column to open a calendar, and then select a date if necessary. Depending on your choice, the item of the table is defined as follows:

- If only the cell of the *Start Date* column is empty: The corresponding item of the table is defined by a time period ranging from an unspecified date to the selected date.
- If only the cell of the *End Date* column is empty: The corresponding item of the table is defined by a time period ranging from the selected date to an unspecified date.
- If the cell of both columns is left blank: The corresponding item of the table is defined by a time period ranging from an unspecified date to an unspecified date.

Use the icons to fill in the data:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.

Use the following icon...	To...
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

Note

Instead of manually typing all of the data in the columns, you can import existing data from external .CSV type files by clicking  (refer to the process described below).

(*) Importing Data from a CSV File

Before Importing

Make sure that the CSV file to import is compliant with the following rules:

Rule	Verifications
CSV File Structure	Note Make sure that the order of the columns in the CSV file is the same as the order in the Column Indexes in File area of the dialog box when you import this file into the table. Otherwise, change the CSV file or change the order of the columns through the dialog box. - The CSV file to import must not contain any empty field or empty column (except in the case of unbounded range tables, see later in this topic). - The CSV file has no header. - The input data file does not contain comment. - The format of the input data is compliant with the table.
Date/Time Format	In the CSV file to import, the items of the dates/times (months, days, minutes, and seconds) must have a fixed size. The format is the following: yyyy-MM-dd HH24:mm:ss. For example, instead of 2016-5-6 15:1:2 , the CSV file must contain 2016-05-06 15:01:02 .
Field Separator	By default, the field separator is a semicolon, a tabulation, a comma, a space, or a slash, but any printable character is suitable, except the double quote ("). In any case, a field separator must not exceed one character.
Specific Rules about Translation Tables	Each row in the CSV file consists of N inputs and M outputs: - Column 1 to column N: Input key - Column N+1 to column N+M: Output values

Rule	Verifications
Specific Rules about Tier Tables	i Note An empty field represents the infinite. Each row in the CSV file consists of a name, two bounds, and N outputs: • Column 1: Group name • Column 2: Lower bound • Column 3: Lower bound is included or not (the expression "true" means that the bound is included. Any other expression than "true" means that the bound is excluded. The expression "true" is case-insensitive.) • Column 4: Upper bound • Column 5: Upper bound is included or not (see above) • Column 6 to column 6+N+1: Output columns
Specific Rules about Range Tables	Only the upper bound must be represented by a CSV field because the lower bound is expected to be the previous upper bound of the range table (for the first range, 0 is expected). A bound can be null (0) but not negative. If the range table class is unbounded: • The last range in the CSV file can have an infinite upper bound. The infinite is represented by anything that is not a valid number. For example, an empty field, a space, or any string. • The last range in the CSV file can also have a finite upper bound. In this case, after you import the CSV file into the range table, you must manually define an unbounded range at the end of the range table to validate it. If the range table class is bounded, the last range in the CSV file must have a defined upper bound.

Import Data from a CSV File into a Table

To import some data into a table in your Core Tool user interface:

1. Click the button .
2. The *Open* dialog box is displayed to search for a file. When the file has been found, select the file, and then click the *Open* button.
3. The *CSV File Format Options* dialog box is displayed. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
4. In the *Number Format Parameters* area, select the *Decimal Separator* type (Dot, Comma) and the *Thousands Separator* type (No, Quote, Comma, Space, Dot) to format numbers. If there is no *Thousands Separator*, select No.
5. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns.
6. Click *OK* to import data into the table.

Related Information

[Creating a Translation Table \[page 424\]](#)

[Opening an Existing Translation Table \[page 425\]](#)

[Modifying a Translation Table \[page 427\]](#)

2.4.10.1.5 Saving a Translation Table

Once you have created or modified a translation table, and then verified its structure, you are ready to save it. You can save the translation table to either the database or as an XML file on your hard disk.

To save a new translation table to the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.
3. Click *Save*. The *Translation Table Creation* dialog box opens to inform you that the translation table has been successfully saved.
4. Click *OK*.

To save a new version of an existing translation table to the database

Note

If a *Warning* dialog box opens to inform you that the translation table has been modified since you opened it, you can:

1. Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the translation table.
2. Click *Cancel* to come back to the translation table. See later in this chapter how to save the translation table as an XML file.

1. From the menu bar in the main window, select **File > Save > In the Database**. A dialog box opens to ask if you want to save the translation table.
2. Click *Yes*. The *Save Version* window opens.
3. In this window, select one of the following options:
 - *Create a new version*: The *Start Date* is automatically filled in with the current date while the *End Date* is automatically filled in with *No End Date*. You can however replace these dates by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates related to existing versions. In this list, *No Start Date* represents an undetermined date in the past while *No End*

[Date](#) represents an undetermined date in the future. A message informs you when you overwrite versions.

- [Replace Versions](#): The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click [Save](#). The [Translation Table Modification](#) dialog box opens to inform you that the translation table has been successfully created.
 5. Click [OK](#).

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, do not save a new version of a translation table to a date before the last prerating operation because this will lead to a rating error.

To save a translation table as an XML file

1. From the menu bar in the main window, select [File](#) > [Save](#) > [In a File](#) . The [Save](#) dialog box opens.
2. Select a directory to save the translation table.
3. In the File name field, type the name of the file.
4. Click [Save](#). The translation table is saved as an XML file in your selected directory.

2.4.10.1.6 Deleting a Translation Table

Before you delete a translation table, you must first delete all objects which reference it.

To delete a translation table

1. From the menu bar in the main window, select [File](#) > [Delete](#) > [Translation Table](#) . The [Delete Translation Table](#) dialog box opens.
2. In the [Owner](#) drop-down menu, select the owner of the translation table.
3. In the [Translation Tables](#) folder of the catalog of the owner, select the translation table.
4. Click [Delete](#). A deletion dialog box asks if you want to delete the translation table
5. Confirm the deletion of the translation table by clicking [Yes](#):
 1. If a dialog box confirms your choice, the translation table has been successfully deleted.
 2. If a [Warning](#) dialog box opens to inform you that the translation table is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking [Yes](#) at step 5, you must delete the objects that reference the translation table. The identifiers of these objects appear in the message.

2.4.10.17 Exporting a Translation Table

You can export translation tables to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to import the translation table back into SAP Convergent Charging 5.0.

To export a translation table

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the translation table.
3. In the catalog of the owner, select the translation table.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the translation table.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.10.18 Importing a Translation Table

You can import translation tables in XML format from a directory in your database.

Several versions of a translation table can exist in a database, corresponding to their stages of modification. You can import all versions of a translation table into SAP CC *Core Tool*, or select only the versions you want.

To import a translation table

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the translation table is saved, and then select the translation table file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected, or do the following:
 - To select only one version as of a certain date, select the *One version per object* option.

- To replace all versions by the imported version, select the [Replace all versions](#) option.
 - To replace or not some existing versions by the imported version, select the [Use modification date as of](#) option and choose the date on which you save the imported version. Depending on this date, some existing versions will be replaced or not by the imported version.
6. In the [Import](#) column, clear the checkboxes of objects you do not wish to import.
 7. Click [Import](#).

i Note

SAP CC [Core Tool](#) can only import an object which has previously been exported and saved ([File](#) > [Export](#) ), rather than saved directly to a file ([File](#) > [Save](#) > [In a File](#) ).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.10.2 Using the Action Menu

Related Information

[Changing the Version of a Translation Table \[page 436\]](#)

[Deleting the Versions of a Translation Table \[page 437\]](#)

2.4.10.2.1 Changing the Version of a Translation Table

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.10.2.2 Deleting the Versions of a Translation Table

The procedure is the same as [Deleting the Versions of a Catalog Object \[page 408\]](#)

2.4.11 Tier Tables



A **tier table** in SAP Convergent Charging (SAP CC) is a table of correspondence for mapping an input column that contains value ranges to a set of output columns that contain string or number values. To compute final values, you can define some combinatorial rules to output columns.

A tier table is included in the [pricing catalog \[page 400\]](#) to implement subscription- and usage-based pricing models for your chargeable service or product.

❖ Example

You can configure the pricing logic with tier tables for different industries. See [Industry Examples of Tier Tables \[page 439\]](#).

i Note

You can redefine a tier table at [offer level \[page 611\]](#) (in the pricing catalog) but also at [subscription level \[page 700\]](#) for each end customer of the service provider.

Use

You use tier tables to configure the pricing logic that includes tiered pricing or scaled pricing with convergent charging services based on subscriptions because you can [redefine tier tables in an offer \[page 634\]](#) in the same pricing catalog and you can [redefine tier tables in the subscriptions \[page 725\]](#) (customer master data).

→ Recommendation

When you model and base your convergent charging services on [provider contracts](#), SAP recommends that you use some [range tables \[page 503\]](#) and [subscriber range tables](#) to design and configure the pricing logic that includes tiered or scaled pricing.

A tier table allows you to create new properties that can be used when designing the price plan, the charging plan, the refill logic, or the allowance logic.

A tier table is an n-dimensional data table that consists of:

- A [Group Name](#) column
- A [Range](#) column
- A set of one to five string or number output columns
- A set of rows

When creating a tier table, you use:

- The [Group Name](#) column to create groups of numerical intervals
- The [Range](#) column to represent the numerical intervals of each group
- The output columns to assign number or string values to each interval

i Note

- You can create as many groups as you want.
- You can create in each group ranging from $-\infty$ to $+\infty$ as many numerical intervals as you want.
- You can use negative or decimal numbers.
- You cannot create discontinuous or empty numerical intervals.
- You cannot delete or rename the default group.
- You must arrange the numerical intervals in increasing order.
- The numerical intervals cannot overlap.
- Each group of intervals is independent of the other ones.

→ Remember

These rules are different at [offer \[page 611\]](#) and [subscription \[page 700\]](#) levels.

After you have created a tier table, you can use it by [adding a dedicated logic component \[page 600\]](#) to the price plan, the charging plan, or the refill logic. You can use the same tier table more than once in any price plan, charging plan, or refill logic. You use the logic component: [Tier Table Introducer \(Operator\) \[page 986\]](#).

Redefinition

You can extend or redefine tier tables when creating [offers \[page 611\]](#):

- [Setting Up an Offer \[page 626\]](#)
- [Customizing charges in an offer \[page 654\]](#)

You can extend or redefine the content of tier tables in the master data related to the end customers ([subscriptions \[page 700\]](#)):

- At [subscription \[page 725\]](#) level
- At [sub-subscriptions \[page 735\]](#) level
- In [charges activated in a subscription \[page 745\]](#)

→ Remember

You cannot redefine a tier table at [charge plan](#) or [refill plan](#) levels if your global charging services are based on [provider contracts](#) in customer master data. We recommend that you use [Range Tables \[page 503\]](#) and [Subscriber Range Tables](#).

Versions

You can modify and save different [versions of a tier table \[page 457\]](#).

Related Information

[Tier Table Introducer \(Operator\) \[page 986\]](#)

[Working with Tier Tables \[page 441\]](#)

2.4.11.1 Industry Examples of Tier Tables

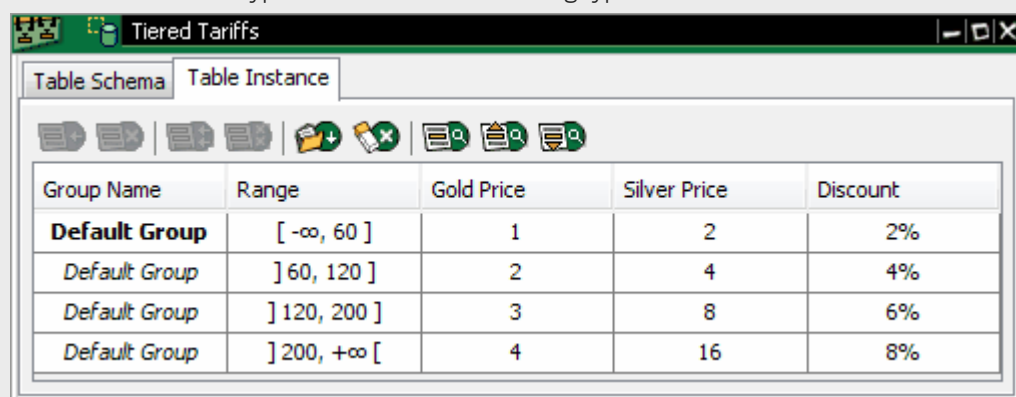
This topic presents some typical business use cases based on tier tables to model tiered pricing in the pricing logic:

Example	SAP Industry
Example of Tiered Pricing with Discounts [page 439]	<i>SAP for Media</i>
Transports Industry [page 441]	<i>SAP for Transportation and Logistics</i>

2.4.11.1.1 Example of Tiered Pricing with Discounts

❖ Example

The marketing team of your company has defined the following tariffs, in which "Gold Price" and "Silver Price" are of number type and "Discount" is of string type:



Group Name	Range	Gold Price	Silver Price	Discount
Default Group	[-∞, 60]	1	2	2%
Default Group	] 60, 120]	2	4	4%
Default Group	] 120, 200]	3	8	6%
Default Group	] 200, +∞ [	4	16	8%

The marketing team hesitates about the final pricing and billing policy.

As a pricing specialist, you design and configure the pricing catalog for these usage-based services.

Tiered pricing is a pricing and billing strategy used to define a price per unit within a range. Tiered pricing works so that the price per unit decreases once each quantity within a tier has been consumed.

You determined four possible pricing configurations based on the computation mode:

- Single, non-linear
- Single, linear

- Cumulative, non-linear
- Cumulative, linear

In this example, the final computed prices for different weights are:

Computation Mode	Description	Example: 110 kg	Example: 300 kg
<i>Single, non-linear</i>	The property value determines a row of the tier table. The output column values of this row are assigned to the generated properties.	Gold Price = 1 Silver Price = 2	Gold Price = 4 Silver Price = 16
<i>Single, linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row is recalculated according to the formula "a(b-c)" where "a" is the output column value, "b" is the property value, and "c" is the lower boundary of the range including the property value. The resulting values are then assigned to the generated properties.	100=2(110-60) 200=4(110-60)	400=4(300-200) 1,600=16(300-200)
<i>Cumulative, non-linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row and the values of the output column of the previous rows are added together. The resulting values are then assigned to the generated properties	3=2+1 6=4+2	6=4+2 10=4+3+2+1 30=16+8+4+2
<i>Cumulative, linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row and the values of the output column of the previous rows are recalculated according to the formula "a(b-c)" (refer to the mode single, linear) and added together (*). The resulting values are then assigned to the generated properties.	160 = (1(60-0)) + (2(110-60)) 320 = (2(60-0)) + (4(110-60))	820 = (1(60-0)) + (2(120-60)) + (3(200-120)) + (4(300-200)) 2,600 = (2(60-0)) + (4(120-60)) + (8(200-120)) + (16(300-200))

2.4.11.1.2 Transports Industry

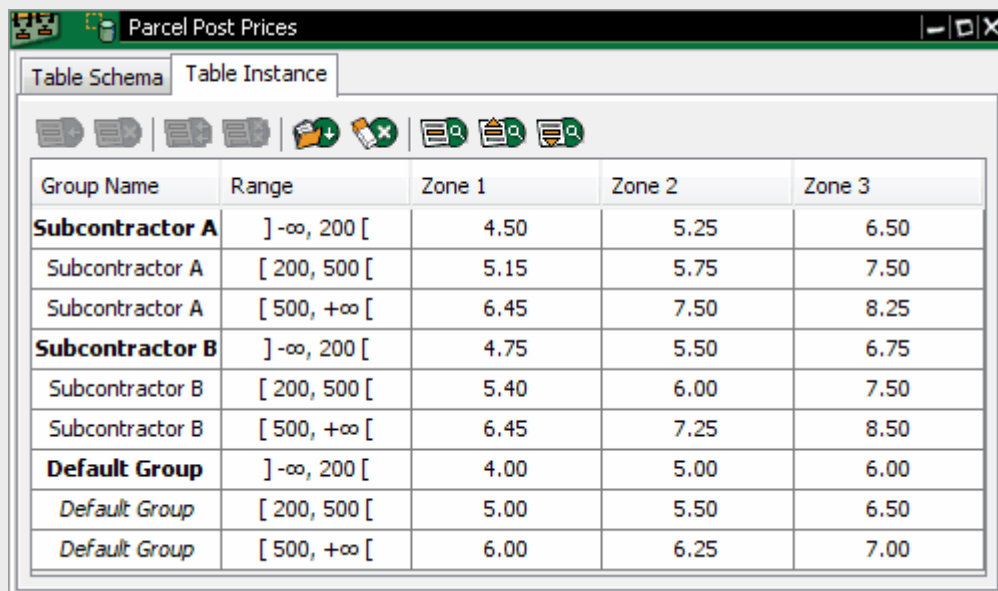
❖ Example

A company sells postal services which are delivered by subcontractors. The parcel postal tariffs are priced according to:

- The subcontractor
- The region of the world
- And the weight (in grams) of the parcel. There are three ranges (aka tiers):
 - $]-\infty, 200[$
 - $[200, 500[$
 - $[500, +\infty[$

All prices are calculated in USD.

As a pricing specialist, you design and configure the following tier table:



Group Name	Range	Zone 1	Zone 2	Zone 3
Subcontractor A	$]-\infty, 200[$	4.50	5.25	6.50
Subcontractor A	$[200, 500[$	5.15	5.75	7.50
Subcontractor A	$[500, +\infty[$	6.45	7.50	8.25
Subcontractor B	$]-\infty, 200[$	4.75	5.50	6.75
Subcontractor B	$[200, 500[$	5.40	6.00	7.50
Subcontractor B	$[500, +\infty[$	6.45	7.25	8.50
Default Group	$]-\infty, 200[$	4.00	5.00	6.00
Default Group	$[200, 500[$	5.00	5.50	6.50
Default Group	$[500, +\infty[$	6.00	6.25	7.00

In this example, if the subcontractor is unknown, the default group is used to determine the price of the postal service.

2.4.11.2 Working with Tier Tables

Related Information

[Creating a Tier Table \[page 442\]](#)
[Opening an Existing Tier Table \[page 443\]](#)
[Changing the Version of a Tier Table \[page 457\]](#)
[Modifying a Tier Table \[page 444\]](#)
[Setting Up a Tier Table \[page 445\]](#)
[Saving a Tier Table \[page 453\]](#)
[Deleting a Tier Table \[page 455\]](#)
[Deleting the Versions of a Tier Table \[page 457\]](#)
[Exporting a Tier Table \[page 455\]](#)
[Importing a Tier Table \[page 456\]](#)

2.4.11.2.1 Creating a Tier Table

Use one of these procedures to create a tier table.

To create a tier table

1. From the menu bar in the main window, select **File > New > Tier Table**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. Click *OK*. The *New Tier Table* window opens.
4. [Set up \[page 445\]](#) the tier table.
5. Verify the tier table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 453\]](#) the tier table.

You can create a tier table by opening an existing tier table and copying it.

i Note

Once you have saved a tier table, you can no longer modify its name or structure. You can only modify the *Table Instance* tab by adding content to it. See [Tab: Table Instance \[page 450\]](#).

To create a tier table from an existing tier table

1. From the menu bar in the main window, select **File > Open > tier Table**. The *Open tier Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. In the *Tier Tables* folder of the catalog of the owner, select the tier table to copy.

4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *Tier Table* window opens.
5. [Modify \[page 444\]](#) the tier table if necessary.
6. Verify the tier table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 453\]](#) the tier table.

Related Information

[Example of Tiered Pricing with Discounts \[page 439\]](#)

[Setting Up a Tier Table \[page 445\]](#)

[Saving a Tier Table \[page 453\]](#)

[Modifying a Tier Table \[page 444\]](#)

2.4.11.2.2 Opening an Existing Tier Table

You can open:

- An existing tier table saved in the database
- A previous version of a tier table saved in the database
- An existing tier table saved in an XML file

To open an existing tier table saved in the database

1. From the menu bar in the main window, select **File > Open > Tier Table** . The *Open tier Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. In the *Tier Tables* folder of the catalog of the owner, select the tier table. The *Tier Table* window opens in display mode.

tier tables are managed chronologically. After you have saved a tier table, you can access the previous versions of it that exist in the database. However, if you modify and save a previous version of a tier table, all later versions are deleted.

To open a previous version of a tier table saved in the database

1. From the menu bar in the main window, select **File > Open > Tier Table** . The *Open Tier Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.

3. In the *Tier Table* folder of the catalog of the owner, select the tier table, and then click *Open*. The *Tier Table* window opens in display mode.
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the tier table from the list.
6. Click *View*.

To open an existing tier table saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File** . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.11.2.3 Modifying a Tier Table

You can modify a tier table by adding, modifying, or deleting content. When you save it in the database, you can modify its [versions \[page 457\]](#).

You cannot modify the name or the data structure of a tier table once you have saved it.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#)

features, and if there are unresolved prerating events for the subscription that uses your pricing macro, modifying the pricing macro may lead to a postrating result that differs from its corresponding prerating result. In addition, do not save a new version of a pricing macro to a date before the last prerating operation because this will lead to a rating error. (The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying a pricing macro may result in errors.)

To modify a tier table

1. From the menu bar in the main window, select **File > Open > Tier Table**. The *Open Tier Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. In the *Tier Tables* folder of the catalog of the owner, select the tier table.
4. Click *Open*. The *Tier Table* window opens in display mode.
5. Set the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The tier table may be reloaded if it has been modified since you have opened it.
6. [Set up \[page 445\]](#) the tier table.
7. Verify the tier table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. [Save \[page 453\]](#) the tier table.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Tier Table \[page 445\]](#)

[Saving a Tier Table \[page 453\]](#)

2.4.11.2.4 Setting Up a Tier Table

[Create \[page 424\]](#), [open \[page 425\]](#) or [modify \[page 427\]](#) a tier table before setting it up. A *Tier Table* window must be open.

i Note

Once you have saved a tier table, you can no longer modify its name or structure. You can only modify the *Table Instance* tab by adding content to it.

All the examples described in this topic refer to the following illustration, in which "Gold Price" and "Silver Price" are of number type and "Discount" is of string type:

Group Name	Range	Gold Price	Silver Price	Discount
Default Group	[-∞, 60]	1	2	2%
Default Group	] 60, 120]	2	4	4%
Default Group	] 120, 200]	3	8	6%
Default Group	] 200, +∞ [	4	16	8%

Window: Tier Table

To set up a tier table, you must fill in or modify the following tabs:

- [Table Schema \[page 446\]](#)
- [Table Instance \[page 450\]](#)

2.4.11.2.4.1 Tab: Table Schema

This tab allows you to define the data structure for your tier table, which can consist of one to five output columns. Use the icons to fill in the tab:

Use the Configuration Icons

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)

Use the following icon...	To...
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

i Note

About tier tables and tier table operators.

You must use a [Tier Table Introducer operator component \[page 986\]](#) to insert a tier table in a price plan, a charging plan, or in the refill logic. You then choose a tier table and a property value.

The Tier Table Introducer operator component allows you to configure which numerical interval of the tier table includes the property value. When the numerical interval is determined, the output column values of the corresponding row are assigned to generated properties which can be used as new properties in the price plan, the charging plan, or in the refill logic.

For example, if the property value is equal to 140, the values of 3 (Gold Price) and 8 (Silver Price) and the string value "6%" (Discount) are assigned to the generated properties (Refer to the illustration above).

For more information about components, refer to the primary help relating to components: [Working with Logic Components \[page 831\]](#).

Table Schema (Tab)

Name: Type the unique identifier of the tier table.

Description: Describe the tier table if necessary.

Note

Whatever the computation mode, the output column values of string type are assigned to the corresponding generated properties if the output column values are related to the interval including the property value.

For example, if the property value is equal to 110, the string value "4%" is assigned to the generated property. If the property value is equal to 300, the string value "8%" is assigned to the generated property (Refer to the illustration above).

Output Columns:

- **Name:** Type the output column name.
- **Description:** Describe the output column if necessary.
- **Type:** Provides the list of types. Select *Number* or *String*.
- **Computation Mode:** Provides the list of computation modes. This list is available only for the output columns of number type. The computation modes are the following:

Computation Mode	Description	Example
<i>Single, non-linear</i>	The property value determines a row of the tier table. The output column values of this row are assigned to the generated properties.	For example, if the property value is equal to 110 (range]60, 120]), the values of 1 (Gold Price) and of 2 (Silver Price) are assigned to the generated properties. If the property value is equal to 300 (range]200, +∞]), the values of 4 (Gold Price) and of 16 (Silver Price) are assigned to the generated properties.

Computation Mode	Description	Example
<i>Single, linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row is recalculated according to the linear formula "A . (B - C)" Where: ◦ "A" is the output column value ◦ "B" is the property value ◦ And "C" is the lower boundary of the range including the property value. The resulting values are then assigned to the generated properties.	For example, if the property value is 110 (range]60, 120]), the values of $100=2(110-60)$ and of $200=4(110-60)$ are assigned to the generated properties. If the property value is 300 (range]200, + ∞]), the values of $400=4(300-200)$ and of $1,600=16(300-200)$ are assigned to the generated properties.
<i>Cumulative, non-linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row and the values of the output column of the previous rows are added together. The resulting values are then assigned to the generated properties.	For example, if the property value is 110 (range]60, 120]), the values of $3=2+1$ and of $6=4+2$ are assigned to the generated properties. If the property value is 300 (range]200, + ∞]), the values of $10=4+3+2+1$ and of $30=16+8+4+2$ are assigned to the generated properties.
<i>Cumulative, linear</i>	The property value determines a row of the tier table. For each output column, the output column value of this row and the values of the output column of the previous rows are recalculated according to the formula "a(b-c)" (refer to the mode single, linear) and added together⁵¹. The resulting values are then assigned to the generated properties.	For example, if the property value is 110 (range]60, 120]), the values of $160=(1(60-0))+(2(110-60))$ and of $320=(2(60-0))+(4(110-60))$ are assigned to the generated properties. If the property value is 300 (range]200, + ∞]), the values of $820=(1(60-0))+(2(120-60))+(3(200-120))+(4(300-200))$ and of $2600=(2(60-0))+(4(120-50))+(8(200-120))+(16(300-200))$ are assigned to the generated properties.

Related Information

[Tier Table Introducer \(Operator\) \[page 986\]](#)

⁵¹ Note that the computation is lightly different for the output column values of the previous rows. In the formula "a(b-c)", "b" refers to the upper boundary of the range while "c" refers to the lower boundary of the range. Furthermore, for a range such as $[-\infty, 60]$, the lower boundary "b" is equal to 0.

2.4.11.2.4.2 Tab: Table Instance

Table Instance tab

Once you have created the structure of the tier table in the [Table Schema tab \[page 446\]](#), you can add one or more groups of rows to the table, and then fill in the cells of each row with appropriate values. A tier table contains a default group that you cannot rename or delete. You can only name or rename the groups that you create. Each group is independent of the other ones. For example, you can duplicate any group to which you assign a new name and new values.

To add a group to the table, click , and to add a line to the group, click .

To set up or modify an interval, click the interval in the *Range* column to display the *Range* dialog box, and then type your interval values. Use the Included option to include a value in an interval. Do not use this option when you select the values $-\infty$ or $+\infty$.

→ Remember

Remember that the intervals must be arranged in increasing order. Pay attention to the characters that delimits the intervals⁵² when including or excluding the values of intervals.

Use the icons to fill in the data:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format. (*)
	Clear all the table.

⁵² Open, closed, or mixed intervals

Use the following icon...

To...



Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find

the next occurrence, use  or . When you click

, a *Search in table* dialog box is displayed. In the *Search* field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the *Match case* option. In the *Search in column(s)* check boxes, select the columns where you want to search for the numerical or string value.



Search for the next occurrence towards the top of the table if

the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time

that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.



Search for the next occurrence towards the bottom of the ta-

ble if the previous search with the icon  was successful. The search is performed from right to left, row by row.

Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

i Note

Instead of manually typing all of the data in the columns, you can import existing data from external CSV files by clicking  (refer to the process described below).

(*) Importing Data from a CSV File

Before Importing

Make sure that the CSV file to import is compliant with the following rules:

Rule	Verifications
CSV File Structure	i Note Make sure that the order of the columns in the CSV file is the same as the order in the Column Indexes in File area of the dialog box when you import this file into the table. Otherwise, change the CSV file or change the order of the columns through the dialog box. • The CSV file to import must not contain any empty field or empty column (except in the case of unbounded range tables, see later in this topic). • The CSV file has no header. • The input data file does not contain comment. • The format of the input data is compliant with the table.
Date/Time Format	In the CSV file to import, the items of the dates/times (months, days, minutes, and seconds) must have a fixed size. The format is the following: yyyy-MM-dd HH24:mm:ss. For example, instead of 2016-5-6 15:1:2 , the CSV file must contain 2016-05-06 15:01:02 .
Field Separator	By default, the field separator is a semicolon, a tabulation, a comma, a space, or a slash, but any printable character is suitable, except the double quote ("). In any case, a field separator must not exceed one character.
Specific Rules about Translation Tables	Each row in the CSV file consists of N inputs and M outputs: • Column 1 to column N: Input key • Column N+1 to column N+M: Output values
Specific Rules about Tier Tables	i Note An empty field represents the infinite. Each row in the CSV file consists of a name, two bounds, and N outputs: • Column 1: Group name • Column 2: Lower bound • Column 3: Lower bound is included or not (the expression "true" means that the bound is included. Any other expression than "true" means that the bound is excluded. The expression "true" is case-insensitive.) • Column 4: Upper bound • Column 5: Upper bound is included or not (see above) • Column 6 to column 6+N+1: Output columns

Rule	Verifications
Specific Rules about Range Tables	Only the upper bound must be represented by a CSV field because the lower bound is expected to be the previous upper bound of the range table (for the first range, 0 is expected). A bound can be null (0) but not negative. If the range table class is unbounded: - The last range in the CSV file can have an infinite upper bound. The infinite is represented by anything that is not a valid number. For example, an empty field, a space, or any string. - The last range in the CSV file can also have a finite upper bound. In this case, after you import the CSV file into the range table, you must manually define an unbounded range at the end of the range table to validate it. If the range table class is bounded, the last range in the CSV file must have a defined upper bound.

Import Data from a CSV File into a Table

To import some data into a table in your Core Tool user interface:

1. Click the button .
2. The *Open* dialog box is displayed to search for a file. When the file has been found, select the file, and then click the *Open* button.
3. The *CSV File Format Options* dialog box is displayed. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
4. In the *Number Format Parameters* area, select the *Decimal Separator* type (Dot, Comma) and the *Thousands Separator* type (No, Quote, Comma, Space, Dot) to format numbers. If there is no *Thousands Separator*, select No.
5. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns.
6. Click *OK* to import data into the table.

2.4.11.2.5 Saving a Tier Table

Once you have created or modified a tier table, and then verified its structure, you are ready to save it. You can save the tier table to either the database or as an XML file on your hard disk.

To save a new tier table to the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.

3. Click [Save](#). The *Tier Table Creation* dialog box opens to inform you that the tier table has been successfully saved.
4. Click [OK](#).

To save a new version of an existing tier table to the database

i Note

If a [Warning](#) dialog box opens to inform you that the tier table has been modified since you opened it, you can:

1. Click [Overwrite](#) and then [Yes](#) to overwrite the changes performed by another user. Clicking [No](#) enables you to come back to the tier table.
2. Click [Cancel](#) to come back to the tier table. See later in this chapter how to save the tier table as an XML file.

1. From the menu bar in the main window, select **File > Save > In the Database**. A dialog box opens to ask if you want to save the tier table.
2. Click [Yes](#). The *Save Version* window opens.
3. In this window, select one of the following options:
 - [Create a new version](#): The [Start Date](#) is automatically filled in with the current date while the [End Date](#) is automatically filled in with [No End Date](#). You can however replace these dates by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates related to existing versions. In this list, [No Start Date](#) represents an undetermined date in the past while [No End Date](#) represents an undetermined date in the future. A message informs you when you overwrite versions.
 - [Replace Versions](#): The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click [Save](#). The *Tier Table Modification* dialog box opens to inform you that the tier table has been successfully created.
5. Click [OK](#).

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, do not save a new version of a pricing macro to a date before the last prerating operation because this will lead to a rating error.

To save a tier table as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.

2. Select a directory to save the tier table.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The tier table is saved as an XML file in your selected directory.

2.4.11.2.6 Deleting a Tier Table

Before you delete a tier table, you must first delete all objects which reference it.

To delete a tier table

1. From the menu bar in the main window, select **File > Delete > Tier Table**. The *Delete Tier Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. In the *Tier Tables* folder of the catalog of the owner, select the tier table.
4. Click *Delete*. A deletion dialog box asks if you want to delete the tier table
5. Confirm the deletion of the tier table by clicking *Yes*:
 1. If a dialog box confirms your choice, the tier table has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the tier table is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking *Yes* at step 5, you must delete the objects that reference the tier table. The identifiers of these objects appear in the message.

2.4.11.2.7 Exporting a Tier Table

You can export tier tables to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to [import \[page 456\]](#) the tier table back into SAP Convergent Charging 5.0.

To export a tier table

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the tier table.
3. In the catalog of the owner, select the tier table.

4. Click [OK](#). The [Save](#) dialog box opens.
5. Select a directory to export the tier table.
6. In the [File name](#) field, type the name of the file.
7. Click [Save](#).

2.4.11.2.8 Importing a Tier Table

You can import tier tables in XML format from a directory in your database.

Several versions of a tier table can exist in a database, corresponding to their stages of modification. You can import all versions of a tier table into SAP CC [Core Tool](#), or select only the versions you want.

To import a tier table

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The [Open](#) dialog box opens.
3. Open the directory in which the tier table is saved, and then select the tier table file.
4. Click [Open](#). The [Import Objects](#) dialog box opens.
5. Leave the default [All versions](#) option selected, or do the following:
 - To select only one version as of a certain date, select the [One version per object](#) option.
 - To replace all versions by the imported version, select the [Replace all versions](#) option.
 - To replace or not some existing versions by the imported version, select the [Use modification date as of](#) option and choose the date on which you save the imported version. Depending on this date, some existing versions will be replaced or not by the imported version.
6. In the [Import](#) column, clear the checkboxes of objects you do not wish to import.
7. Click [Import](#).

i Note

SAP CC [Core Tool](#) can only import an object which has previously been [exported \[page 455\]](#) and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.11.3 Using the Action Menu

Related Information

[Changing the Version of a Tier Table \[page 457\]](#)

[Deleting the Versions of a Tier Table \[page 457\]](#)

2.4.11.3.1 Changing the Version of a Tier Table

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

Related Information

[Opening an Existing Tier Table \[page 443\]](#)

2.4.11.3.2 Deleting the Versions of a Tier Table

The procedure is the same as [Deleting the Versions of a Catalog Object \[page 408\]](#)

2.4.12 Mapping Table Classes



A **mapping table class** allows you to define a **common data structure for some mapping tables** (in your pricing catalog) and subscriber mapping tables (in customer master data). When you model and design some pricing logic based on these data tables, a mapping table class is required.

A mapping table class defines the following characteristics for the corresponding mapping tables (and subscriber mapping tables):

- Number of input columns (I1, I2, I3, ..., In) with n less than or equal to 20
- Number of output columns (O1, O2, O3, ..., Op) with p less than or equal to 30

A mapping table class is included in the [pricing catalog \[page 400\]](#) for the provider company that monetizes a chargeable service or product.

See how to [create \[page 463\]](#), [set up \[page 465\]](#), [save \[page 467\]](#), and [delete \[page 468\]](#) a mapping table class.

i Note

Once you have saved a mapping table class, you can no longer modify it with Core Tool. Therefore, you cannot have several versions of a mapping table class.

Use

You use mapping table classes when you want to base some pricing logic on data available in mapping tables or subscriber mapping tables. A corresponding class is expected.

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

SAP Solution

In an integrated [SAP Solution](#) scenario, there are some specific mapping table classes and corresponding mapping tables. Refer to the integration guide that relates to your SAP system landscape.

Allowance Definition Table Class

If you want to use the concept of allowances in provider contracts, see [Allowance Definition Table Class \[page 459\]](#).

Price Table

If you want to configure periodic fees (see [recurring rates \[page 573\]](#)) in charge plans that are combined in SAP CRM, you must [import a special mapping table class \[page 462\]](#) named *"price table"*.

Refer to the topic [Using SAP CRM Prices in Recurring Charges](#) for more information on how to use the price table for synchronizing recurring fees with SAP CRM prices.

Note that SAP CRM creates and maintains in SAP CC a mapping table for each commercial product.

Versions

SAP Convergent Charging 5.0 does not manage several versions of a mapping table class.

Transport

You can use the Catalog and Data Transport feature to transport a consistent subset of data from a source system to target systems (as destinations). See [Transporting Catalog and Data \[page 399\]](#).

Otherwise, you can [export \[page 468\]](#) and [import \[page 469\]](#) some mapping table classes between different SAP CC systems.

Related Information

[Working with Mapping Table Classes \[page 463\]](#)

2.4.12.1 Allowance Definition Table Class

→ Remember

These topics are relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

In your integrated *SAP Solution*, the SAP CRM system manages the allowance definitions as [mapping tables \[page 469\]](#) stored in SAP CC. The structure of the allowance definition tables is thus defined by using [mapping table classes \[page 457\]](#) that must contain:

- One input column of string type and named **ALLOW_DEF_ID** (this column must contain the identifier of the allowance definition)
- One output column of string type and named **ALLOW_DEF_DESC**
- Some other main output columns that depend on your business case: **BucketQuantity**, **Validity**
- An additional information item of string type, named **SAP_DATA_TYPE** and set to **AllowanceDefinition**

As an SAP CC pricing specialist, you [configure and maintain \[page 460\]](#) this class.

❖ Example

The following table shows an example of an allowance definition table class when you implement the allowance feature to model the management of end-customer service credits:

Input Column	Name	Type	Description
#1	ALLOW_DEF_ID	<i>String</i>	The identifier of the allowance definition

Output Column	Name	Type	Description
#1	ALLOW_DEF_DESC	<i>String</i>	A human readable short description of the allowance definition
#2	BucketQuantity	<i>Number</i>	The quantity of the allowance
#3	Validity	<i>Number</i>	The validity period in days of the allowance

This example shows that the purpose of an allowance definition is to define the quantity and the validity period of an allowance limited in quantity and in time.

Your Core Tool user interface provides you with a template to create an allowance definition table class in SAP CC.

Related Information

[Creating an Allowance Definition Table Class \[page 460\]](#)

[Allowance Definition Tables \[page 472\]](#)

2.4.12.1.1 Creating an Allowance Definition Table Class

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated [SAP Solution](#) scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

To create an allowance definition table class

1. Open the `allowance_definition_table_class.xml` XML file located in the installation directory of your Core Tool user interface in the templates folder.
2. Replace `${catalog}` by the name of your service pricing catalog.
3. Save and close the XML file.
4. [Launch and log on \[page 379\]](#) to the Core Tool user interface of SAP CC.
5. [Open \[page 464\]](#) the mapping table class from the XML file.
6. Rename the name of the displayed mapping table.
7. Set up the description of the mapping table.
8. Declare necessary input and output columns.

9. [Save \[page 467\]](#) the mapping table class into the back-end database system.

Next Step

[Creating an Allowance Definition Table \[page 473\]](#)

Related Information

[Managing Allowances for Integrating SAP CRM with SAP CC](#)

2.4.12.2 Price Table

→ Remember

These topics are relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

In your integrated *SAP Solution*, the **price table** is a specific and predefined [mapping table class \[page 457\]](#).

A price table specifies the data structure for [price table instances \[page 474\]](#) as mapping tables.

- Input column:
 - #1: type=*String* name=**price.key** description=**The Price Table price key**
- Output columns:
 - #1: type=*Currency* name=**currency** description=**The Price Table currency**
 - #2: type=*Number* name=**amount** description=**Recurring charged amount**

As an SAP CC pricing specialist, you [configure and maintain \[page 462\]](#) this particular mapping table class.

Related Information

[Importing a Price Table as a Mapping Table Class \[page 462\]](#)

[Using SAP CRM Prices in Recurring Charges](#)

[Price Table Instances \[page 474\]](#)

2.4.12.2.1 Importing a Price Table as a Mapping Table Class

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

If you want to use recurring fees defined in an SAP CRM system, you must import the mapping table class called "[price table \[page 461\]](#)" from the installation directory to your back-end database system (Core Database). The format of the price table is XML.

Note that only one version of a mapping table class exists in the database because a mapping table class cannot be modified once it has been saved to the database. You can import the unique version of the price table with the *Core Tool* user interface.

Use the following procedures to customize the template of the price table and then import your price table as a new [mapping table class \[page 457\]](#).

Customize the Template of the Price Table

An XML template is provided to help you to create your price table.

1. Open the XML file `price_table.xml` from the installation directory of your *Core Tool* (`core_tool_install\templates`).
2. Replace `${owner}` by the name of your pricing catalog.
3. Save and then close the XML file.

Import the Price Table

1. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
2. Open the directory in which the price table is saved, and then select the modified `price_table.xml` file.
3. Click *Open*. The *Import Objects* dialog box opens.
4. Leave the default *All versions* option selected because there is only one version for the price table.
5. Click *Import*.

i Note

- You can import a price table only once because one price table at most can be stored in the Core Database. If you want to change your price table, you must delete it and then import another price table.
- The price table is a mapping table class. To [open \[page 464\]](#), [export \[page 468\]](#), [delete \[page 468\]](#) a price table, and so on, refer to the related topics listed in the mapping table class section.

Related Information

[Using SAP CRM Prices in Recurring Charges](#)

2.4.12.3 Working with Mapping Table Classes

Specific tasks:

- [Creating an Allowance Definition Table Class \[page 460\]](#)
- [Importing a Price Table as a Mapping Table Class \[page 462\]](#)

Related Information

[Creating a Mapping Table Class \[page 463\]](#)

[Setting Up a Mapping Table Class \[page 465\]](#)

[Opening an Existing Mapping Table Class \[page 464\]](#)

[Saving a Mapping Table Class \[page 467\]](#)

[Deleting a Mapping Table Class \[page 468\]](#)

[Exporting a Mapping Table Class \[page 468\]](#)

[Importing a Mapping Table Class \[page 469\]](#)

2.4.12.3.1 Creating a Mapping Table Class

Use one of these procedures to create a mapping table class.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Create a Mapping Table Class

1. From the menu bar in the main window, select **File > New > Mapping Table Class**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table class.
3. Click **OK**. The *New Mapping Table Class* window opens.
4. [Set up \[page 465\]](#) the mapping table class.

5. Verify the mapping table class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 467\]](#) the new mapping table class.

i Note

Once you have saved a mapping table class into the database, you can no longer modify it with the *Core Tool* user interface.

→ Tip

You can create a mapping table class by opening an existing mapping table class and copying it.

Create a Mapping Table Class from an Existing Mapping Table Class

1. From the menu bar in the main window, select **File > Open > Mapping Table Class** . The *Open Mapping Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table class.
3. In the *Mapping Table Classes* folder of the catalog of the owner, select the mapping table class to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding mapping table class window opens.
5. Modify the mapping table class if necessary.
6. Verify the mapping table class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 467\]](#) the new mapping table class.

Related Information

[Setting Up a Mapping Table Class \[page 465\]](#)

[Saving a Mapping Table Class \[page 467\]](#)

2.4.12.3.2 Opening an Existing Mapping Table Class

You can open:

- An existing mapping table class saved in the database
- An existing mapping table class saved in an XML file

To open an existing mapping table class saved in the database

1. From the menu bar in the main window, select **File > Open > Mapping Table Class**. The *Open Mapping Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table class.
3. In the *Mapping Table Classes* folder of the catalog of the owner, select the mapping table class. The *Mapping Table Class* window opens in display mode.

To open an existing mapping table class saved in an XML file

- Use the procedure for [Importing a Mapping Table Class \[page 469\]](#)

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.12.3.3 Setting Up a Mapping Table Class

[Create \[page 463\]](#) a mapping table class before setting it up. A *Mapping Table Class* window must be open.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

The mapping table class allows you to define the structure of your [Mapping Tables \[page 469\]](#) (and [Subscriber Mapping Tables](#)).

i Note

Once you have saved and released a mapping table class, you can no longer modify it with your Core Tool user interface. You can only create or modify mapping tables and subscriber mapping tables.

Window: Mapping Table Class

To set up a mapping table class, you must fill in or modify the *Table Schema* tab and the *Additional Information* tab.

Related Information

[Setting Up a Mapping Table \[page 480\]](#)

2.4.12.3.3.1 Tab: Definition

Name: Type the unique identifier of the mapping table class.

Description: Describe the mapping table class. This description is mandatory.

2.4.12.3.3.2 Tab: Table Schema

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

To set up your mapping table class, use the following icons to fill in the two configuration tables *Input Columns* and *Output Columns*:



Add a new row to the configuration table. A row in this table, defines an input column or an output column in the mapping tables that are based on this class



Delete a row from the table.



Move a row up. The order in this table, specifies the order of the input columns (output columns) in the corresponding mapping tables.



Move a row down.

i Note

In the table *Input Columns*, you can only add one input column of *Currency* type.

Input Columns

- **Name:** Type the input column name. This name must be unique within the set of input columns.
- **Description:** Describe the input column. This description is mandatory.
- **Type:** Provides the list of types. Select *String* or *Currency*.

Output Columns

- **Name:** Type the output column name. This name must be unique within the set of output columns.
- **Description:** Describe the output column. This description is mandatory.

- **Type**: Provides the list of types. Select Number or String.

2.4.12.3.3.3 Tab: Additional Information

Use the configuration table and its icons to define some additional information items.



: Click to add a row to the configuration table.



: Click to delete a row from the table.

Fill in each row that you add to the configuration table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String*, or *Date/Time*.

Value: Type the additional information according to the selected type.

Description: Type the description of the additional information.

2.4.12.3.4 Saving a Mapping Table Class

Once you have created a mapping table class and then verified its configuration, you are ready to save it. You can save the mapping table class either into the back-end database or to an XML file on your hard disk.

i Note

Once you have saved a mapping table class into the database, you can no longer modify it with the *Core Tool* user interface.

Save and Release a Mapping Table Class into the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.
3. Click **Save**. The *Mapping Table Class Creation* dialog box opens to inform you that the mapping table class has been successfully saved and released.
4. Click **OK**.

Save a Mapping Table Class to an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.
2. Select a directory to save the mapping table class.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The mapping table class is saved as an XML file in your selected directory.

2.4.12.3.5 Deleting a Mapping Table Class

Before you delete a mapping table class, you must first delete all objects which reference it.

To delete a mapping table class

1. From the menu bar in the main window, select **File > Delete > Mapping Table Class**. The *Delete Mapping Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table class.
3. In the *Mapping Table Classes* folder of the catalog of the owner, select the mapping table class.
4. Click *Delete*. A deletion dialog box asks if you want to delete the mapping table class.
5. Confirm the deletion of the mapping table class by clicking *Yes*. A dialog box opens to inform you that the mapping table class has been successfully deleted.

i Note

If an error message appears after clicking *Yes* at step 5, you must delete the master data objects that reference the mapping table class. The identifiers of these objects appear in the message.

2.4.12.3.6 Exporting a Mapping Table Class

You can export mapping table classes to a directory of your hard disk, where they are saved as XML files. After exporting mapping table classes, you can [import \[page 469\]](#) them back into SAP Convergent Charging 5.0.

To export a mapping table class

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table class.
3. In the catalog of the owner, select the mapping table class.

4. Click [OK](#). The [Save](#) dialog box opens.
5. Select a directory to export the mapping table class.
6. In the [File name](#) field, type the name of the file.
7. Click [Save](#).

2.4.12.3.7 Importing a Mapping Table Class

You can import mapping table classes in XML format from a directory to your database.

Note that there is only one version of a mapping table class in the database, as a mapping table class cannot be modified once it has been saved into the database. You can import the unique version of a mapping table class into SAP CC [Core Tool](#).

To import a mapping table class

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select [File](#) > [Import](#) . The [Open](#) dialog box opens.
3. Open the directory in which the mapping table class is saved, and then select the mapping table file.
4. Click [Open](#). The [Import Objects](#) dialog box opens.
5. Leave the default [All versions](#) option selected, as there is only one version for each mapping table class.
6. In the [Import](#) column, clear the checkboxes of objects you do not wish to import.
7. Click [Import](#).

2.4.13 Mapping Tables

⚠ Caution

Do not modify or delete mapping tables with Core Tool when SAP Convergent Charging 5.0 is integrated and interfaced with a Customer Relationship Management (CRM) application or a provisioning system.

Modifying or deleting mapping tables may result in inconsistencies between the two systems because of data replication and synchronization mechanisms. To modify a mapping table, you must use this CRM or provisioning system in your SAP system landscape.

- Consult the [Application Help](#) for more information about the product modeling process.
- Consult the [Web Services Documentation \[page 383\]](#) if you need to integrate your CRM or provisioning system by implementing the [Web Services](#) technical interface provided by SAP Convergent Charging to manage this master data in the pricing catalog of a the service provider for its subscription- and usage-based services.

The manual procedures detailed in this section are relevant in:

- A production system landscape with few contracts directly managed with the Core Tool user interface (no CRM interfaced with SAP CC)

- A test, demo, or training system landscape



A **mapping table** allows you to create new properties that you can use in the price plan, in the refill logic, or in the allowance logic.

A mapping table is a multicolumn table of business data. The data table is composed of a set of rows.

Each row of the mapping table consists of a set of values of input columns (I1, I2, I3, ..., In) to which corresponds a set of values of output columns (O1, O2, O3, ..., Op). For each row, you have to specify the period during which the row is valid. At runtime, SAP Convergent Charging uses mapping tables to compare a subset of information from rating context with data in the input columns in a selected mapping table and determines a subset of values from the output columns in the table. You must however configure the pricing logic that defines the computation algorithm of the final values. See the logic component [Mapping Table Introducer \(Comparator\)](#) [page 912].

A mapping table is included in the pricing catalog of the service provider and is part of its master data. It is available for all the end customers of this service provider.

You define the data structure of your mapping table in a [mapping table class](#) [page 457].

Use

You use mapping tables to configure the pricing logic with convergent charging services based on provider contracts.

Redefinition

You can redefine this data table for a specific end customer or for a group of end customers by managing the configuration of some [subscriber mapping tables](#).

Sizing and Performances

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Mapping Table Step by Step

Before creating a mapping table, you must [create](#) [page 463], [set up](#) [page 465], and [save](#) [page 467] a mapping table class. You must perform the following steps to use mapping tables:

1. [Create](#) [page 477] a mapping table.
2. [Set up](#) [page 480] the mapping table.
3. [Save](#) [page 486] the mapping table.
4. Use the mapping table in the refill logic or in one or several price plans by setting up a dedicated logic component: [Mapping Table Introducer \(Comparator\)](#) [page 912]. We recommend that you [determine the](#)

appropriate customization level of the mapping table [\[page 475\]](#) that must be processed by the SAP CC system.

5. [Delete \[page 487\]](#) the mapping table.

→ Tip

You can use the same mapping table class to configure different mapping tables.

After you have created a mapping table, you can then [add \[page 600\]](#) it to the price plan of a [charge \[page 560\]](#) or to the refill logic. You can use the same mapping table more than once in any price plan or refill logic.

SAP Solution

In an integrated *SAP Solution* scenario, there are some specific mapping tables and classes.

Allowance Definition Tables

If you want to use the concept of allowances in provider contracts, see [Allowance Definition Tables \[page 472\]](#).

Price Table Instances

See [Price Table Instances \[page 474\]](#).

Integration

This master data may be created and maintained by an external system connected to the SAP CC system during the provisioning process.

❖ Example

In an integrated *SAP Solution* scenario, SAP CRM manages some mapping tables stored in SAP Convergent Charging.

Versions

You cannot modify and save different versions of a mapping table.

Transport

You can:

- [Export a mapping table \[page 488\]](#) and [export its class \[page 468\]](#)

- [Import a mapping table \[page 488\]](#) and [its class \[page 469\]](#)

Maintenance

The only mapping table which is available is the last modified one. You can modify and delete the rows of a mapping table, but you cannot change the name of a mapping table or the related mapping table class.

Related Information

[Working with Mapping Tables \[page 476\]](#)

2.4.13.1 Allowance Definition Tables

→ Remember

These topics are relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

In SAP Convergent Charging 5.0, *allowance definitions* are stored in the *allowance definition table* that is a specialized and dedicated [mapping table \[page 469\]](#) with:

- A predefined data structure (one input column ALLOW_DEF_ID, three output columns (ALLOW_DEF_DESC, BucketQuantity, and Validity))
- An additional information item of string type, named **SAP_DATA_TYPE**, and set to **AllowanceDefinition**

This mapping table relates to a specific class that is named [allowance definition table class \[page 459\]](#).

As a pricing specialist, you [configure and maintain \[page 473\]](#) this data tables.

i Note

To be used by SAP CRM, the allowance definition table must be previously created in SAP CC.

See Also

- [Allowance Definition Table Class \[page 459\]](#)
- [Managing Allowances for Integrating SAP CRM with SAP CC](#)

Related Information

[Example of Allowance Definition Table \[page 473\]](#)

[Creating an Allowance Definition Table \[page 473\]](#)

2.4.13.1.1 Example of Allowance Definition Table

❖ Example

The following table shows an example of an allowance definition table:

<i>ALLOW_DEF_ID</i>	<i>Start</i>	<i>End</i>	<i>AL- LOW_DEF_DESC</i>	<i>BucketQuantity</i>	<i>Validity</i>
A01	201x	201x		100	30
A02	201x	201x		600	60
A03	201x	201x		1000	60

A01 defines a credit allowance limited in quantity and in time of 100 units valid for a period of 30 days. The allowance definition is valid for a period of one year.

→ Tip

Your Core Tool user interface provides you with a template to [create \[page 473\]](#) an allowance definition table in SAP Convergent Charging.

2.4.13.1.2 Creating an Allowance Definition Table

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

Create an Allowance Definition Table

1. Open the `allowance_definition_table.xml` XML file located in the installation directory of your Core Tool in the templates folder.
2. Replace `${catalog}` by the name of your service pricing catalog.

3. Replace `{mappingTableClass}` by the identifier of an allowance definition table class.
4. Save and close the XML file.
5. [Launch and log on \[page 379\]](#) to the Core Tool user interface of SAP CC.
6. [Open \[page 478\]](#) the mapping table from the XML file.
7. Change the name of the displayed mapping table.
8. Add allowance definitions as mapping table rows if necessary.
9. [Save \[page 486\]](#) the mapping table into the back-end database system.

Next Steps

- [Creating an Allowance Event Class](#)
- [Configuring the Creation of Allowances in Charge Plans](#)

Related Information

[Managing Allowances for Integrating SAP CRM with SAP CC](#)

2.4.13.2 Price Table Instances

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

In your integrated *SAP Solution*, we call **price table instance** a typical [mapping table \[page 469\]](#) that references a [price table \[page 461\]](#) as a mapping table class. Note that only the SAP CRM system creates price table instances.

⚠ Caution

The SAP CRM system automatically creates and maintains the price table instances. Creating, modifying, or deleting price table instances may result in inconsistencies between these two systems. We strongly recommend that you do not modify or delete existing price table instances except under supervision of a support expert from your SAP Support Team.

❖ Example

Row ID	Validity Start Date/Time	Validity End Date/Time	price.key	currency	amount
..			..	.	.
...			...	..	.
.			.	.	.

Related Information

[Using SAP CRM Prices in Recurring Charges](#)

2.4.13.3 Customized Use of Mapping Tables in the Charges and Refill Logic

You may want to create the charges or refill logic that can be used with different mapping tables during the charging or refilling operations.

The procedure below describes how to create a [charge \[page 560\]](#) containing a price plan with a [Mapping Table Introducer as Comparator component \[page 912\]](#) without specifying the name of the mapping table to be used. The concept is to use a [parameter \[page 574\]](#) as the name of a mapping table and to set up this parameter later on during:

- The manual configuration of a charge plan or refill plan in the pricing catalog
- Or the creation of a provider contract in customer master data

You can easily use different mapping tables or subscriber mapping tables.

i Note

You can use the same procedure in the [refill logic](#).

Configuration in the pricing catalog (master data related to a service provider)

Configuration at charge or refill logic level

- Create a charge with a logic component [Mapping Table Introducer \(Comparator\) \[page 912\]](#).
- [Add a parameter \[page 585\]](#) with the type string to the charge.
- Set up the visibility [External](#).

- In the [Mapping Table](#) field of the Mapping Table Introducer component, select this parameter as the name of the mapping table.

Configuration at charge plan level

- Create a charge plan which contains the previously created charge. Note that the parameter is now assigned the type [Mapping Table ID](#).
- [Add a parameter](#) to the charge plan
 - Set up the type to [Mapping Table ID](#).
 - Set up the visibility [External](#) if you want to set the name of the mapping table at provider contract level or from a connected Customer Relationship Management application.
 - Link this parameter to the parameter of the charge.

The parameter created in the charge plan can be used to set the name of the mapping table or to make the parameter available at provider contract level (parameter of a contract item).

Configuration of the customer master data

Configuration at provider contract level

If the visibility of a parameter in a charge plan is set to [External](#), a Customer Relationship Management (CRM) application or an external provisioning system can redefine the value of this parameter in a [contract item](#) (this contract item enables to activate the charge plan in a provider contract).

The value of the parameter in the contract item can be:

- The name of a mapping table from the pricing catalog of the service provider
- The name of a subscriber mapping table of the subscriber account

i Note

You can use the same procedure to dynamically set a value in the mapping table. In that case, use a parameter with the special type [Mapping Table Key](#).

2.4.13.4 Working with Mapping Tables

Related Information

[Creating a Mapping Table \[page 477\]](#)

[Opening an Existing Mapping Table \[page 478\]](#)

[Modifying a Mapping Table \[page 479\]](#)

[Setting Up a Mapping Table \[page 480\]](#)

[Saving a Mapping Table \[page 486\]](#)

[Deleting a Mapping Table \[page 487\]](#)

[Exporting a Mapping Table \[page 488\]](#)

[Importing a Mapping Table \[page 488\]](#)

2.4.13.4.1 Creating a Mapping Table

Prerequisites

Before creating a mapping table, you must design and [create a mapping table class \[page 463\]](#) that defines its data structure and suits your business requirements.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Create a Mapping Table

1. From the menu bar in the main window, select **File > New > Mapping Table**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table.
3. Click *OK*. The *New Mapping Table* window opens.
4. [Set up \[page 480\]](#) the mapping table.
5. Verify the mapping table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 486\]](#) your new mapping table.

You can create a mapping table by opening an existing mapping table and copying it.

i Note

Once you have saved a mapping table, you can no longer modify its name or mapping table class. You can only modify the rows of the mapping table.

Create a Mapping Table from an Existing Mapping Table

1. From the menu bar in the main window, select **File > Open > Mapping table**. The *Open Mapping Table* dialog box opens.

2. In the *Owner* drop-down menu, select the owner of the mapping table.
3. In the *Mapping Tables* folder of the catalog of the owner, select the mapping table to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *Mapping Table* window opens.
5. [Modify \[page 479\]](#) the mapping table if necessary.
6. Verify the mapping table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 486\]](#) your new mapping table.

Related Information

[Setting Up a Mapping Table \[page 480\]](#)

[Saving a Mapping Table \[page 486\]](#)

[Modifying a Mapping Table \[page 479\]](#)

2.4.13.4.2 Opening an Existing Mapping Table

You can open:

- An existing mapping table saved in the database
- A previous version of a mapping table saved in the database
- An existing mapping table saved in an XML file

To open an existing mapping table saved in the database

1. From the menu bar in the main window, select **File > Open > Mapping Table** . The *Open Mapping Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table.
3. In the *Mapping Tables* folder of the catalog of the owner, select the mapping table. The *Mapping Table* window opens in display mode.

To open an existing mapping table saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select  *File* > *Open* > *From File* . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

2.4.13.4.3 Modifying a Mapping Table

Caution

Do not modify a mapping table created by a Customer Relationship Management or another provisioning system interfaced with SAP Convergent Charging. Refer to the caution about [Mapping Tables \[page 469\]](#).

You can modify a mapping table by adding, modifying, or deleting content, but you cannot modify the name or the mapping table class of a mapping table once you have saved it.

To modify a mapping table

1. From the menu bar in the main window, select  *File* > *Open* > *Mapping Table* . The *Open Mapping Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table.
3. In the *Mapping Tables* folder of the catalog of the owner, select the mapping table.
4. Click *Open*. The *Mapping Table* window opens in display mode.
5. Set the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The mapping table may be reloaded if it has been modified since you have opened it.
6. [Set up](#) the rows of the mapping table.

Note

When verifying the mapping table, you verify that the edited page contains no error. However, this check does not apply to the other pages of the mapping table. Therefore, when you save the mapping table, a message is displayed for each found error and asks you to correct this error.

7. Verify the mapping table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.

8. [Save](#) the mapping table.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Mapping Table \[page 480\]](#)

[Saving a Mapping Table \[page 486\]](#)

2.4.13.4.4 Setting Up a Mapping Table

[Create \[page 477\]](#), [open \[page 478\]](#), or [modify \[page 479\]](#) a mapping table before setting it up. A *Mapping Table* window must be open.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Window: Mapping Table

To set up a mapping table, you must:

1. Type the identification name of the mapping table, select the appropriate [mapping table class \[page 457\]](#) that defines its data structure, and fill in the [Definition \[page 480\]](#) tab.
2. Depending on the selected class and the business requirements, fill in or modify the following tabs:
 - [Table Instance \[page 481\]](#)
 - [Additional Information \[page 485\]](#)

→ Tip

You can import already-existing data from a CSV file.

2.4.13.4.4.1 Tab: Definition

Fill in or modify the *Definition* tab:

Name: Type the unique identifier of this [mapping table \[page 469\]](#).

Description: Describe the mapping table.

Mapping Table Class: Select the [mapping table class \[page 457\]](#) that defines the data structure for your mapping table.

Agreement ID: Type the identification code of the related *master agreement*, if any. This ID is useful in an integrated *SAP Solution* scenario with **SAP S/4HANA for Customer Management** as of release 2.0. The mapping table is an *agreement table*. Consult [Subscription Order Management](#) in the [Product Assistance for SAP S/4HANA for Customer Management](#) for more information and user assistance about:

- Master data
- Master agreement
- Available functions

See also the integration guides at help.sap.com/brim.

2.4.13.4.4.2 Tab: Table Instance

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

The *Table Instance* tab consists of two parts:

- The top part of the tab is the filter area, which allows you to find rows in the mapping table by using filter criteria.
- The bottom part of the tab is the result area, which displays the search results that you perform.

→ Tip

Use the arrows  if you want to hide or show the filter area or the result area.

Setting up the filter

i Note

When you add, remove, or change one or more rows in the result area, the filter area is no more available (dimmed) until you save your changes.

Use the following icons:



: To start a new search. Every time you add, remove, or change one or more criteria, this button allows you to start a new search and display the results.



: To reset the filter. After one or more searches, this button allows you to re-initialize the filter and display all the rows of the mapping table according to the number of results per page and the selected order.



: To move to the previous page. This button is available when the result list is large.



: To move to the next page. This button is available when the result list is large.



: To add a criterion to the filter.



: To remove a criterion from the filter.

Use the following fields:

Results per Page: Select the number of results that are displayed in the result area.

Identifier Sorted By: Select the order in which you want to display the results.

Found Rows: Displays the number of rows that are found by the search.

Total Number of Rows: Displays the total number of rows of the mapping table that is stored in the database.

Creating, modifying, or removing rows

Use the following icons:



: To add a row to the mapping table. The new row is added after the selected row in the current page of the result area. Otherwise, the new row is added to the end of the table in the current page of the result area. When you click this button, the filter area is no more available (dimmed) until you save your changes.



: To remove a row from the table. Select a row in the current page of the result area, and then click this button to remove the row from the table. When you click this button, the filter area is no more available (dimmed) until you save your changes.



: To import data into the mapping table according to the CSV format (see *).



: To export data of the mapping table into a CSV file (see **). This button is not available (dimmed):

- If you are modifying the mapping table
- If the mapping table contains no row



: To remove the added and filtered rows from the mapping table. This button allows you to remove the rows that you have added to the mapping table and the rows that have been found by the last search. When you click this button, a message displays the number of added and filtered rows and asks if you want to remove the rows. The added and filtered rows are removed from the result area but are not deleted from the database until you save the mapping table.

Use the following fields:

Identifier: Type an identifier for the row. This identifier must be unique in the mapping table.

Input Columns: Type the input values for this row. You are allowed to enter duplicate input values. In that case, the selection of a row depends on the *Start Date* and the *End Date*. Note that the number of input columns is the same as the number of input columns defined in the related mapping table class.

Start Date: Click the cell of the *Start Date* column to open a calendar, and then select a date and a time. It is the start date/time of the validity period for this row in the mapping table.

End Date: Click the cell of the *End Date* column to open a calendar, and then select a date and a time. The *Start Date* and the *End Date* settings define the period when the row is valid.

Output Columns: Type the output values for this row. Note that the number of output columns is the same as the number of output columns defined in the related mapping table class.

→ Tip

Instead of manually typing all of the data in the columns, you can import existing data from external CSV files by clicking  (refer to the process described below).

(*) Importing Data from a CSV File

Before Importing

Make sure that the CSV file to import is compliant with the following rules:

Rule	Verifications
CSV File Structure	i Note Make sure that the order of the columns in the CSV file is the same as the order in the Column Indexes in File area of the dialog box when you import this file into the table. Otherwise, change the CSV file or change the order of the columns through the dialog box. • The CSV file to import must not contain any empty field or empty column (except in the case of unbounded range tables, see later in this topic). • The CSV file has no header. • The input data file does not contain comment. • The format of the input data is compliant with the table.
Date/Time Format	In the CSV file to import, the items of the dates/times (months, days, minutes, and seconds) must have a fixed size. The format is the following: yyyy-MM-dd HH24:mm:ss. For example, instead of 2016-5-6 15:1:2 , the CSV file must contain 2016-05-06 15:01:02 .
Field Separator	By default, the field separator is a semicolon, a tabulation, a comma, a space, or a slash, but any printable character is suitable, except the double quote ("). In any case, a field separator must not exceed one character.
Specific Rules about Translation Tables	Each row in the CSV file consists of N inputs and M outputs: • Column 1 to column N: Input key • Column N+1 to column N+M: Output values

Rule	Verifications
Specific Rules about Tier Tables	i Note An empty field represents the infinite. Each row in the CSV file consists of a name, two bounds, and N outputs: • Column 1: Group name • Column 2: Lower bound • Column 3: Lower bound is included or not (the expression "true" means that the bound is included. Any other expression than "true" means that the bound is excluded. The expression "true" is case-insensitive.) • Column 4: Upper bound • Column 5: Upper bound is included or not (see above) • Column 6 to column 6+N+1: Output columns
Specific Rules about Range Tables	Only the upper bound must be represented by a CSV field because the lower bound is expected to be the previous upper bound of the range table (for the first range, 0 is expected). A bound can be null (0) but not negative. If the range table class is unbounded: • The last range in the CSV file can have an infinite upper bound. The infinite is represented by anything that is not a valid number. For example, an empty field, a space, or any string. • The last range in the CSV file can also have a finite upper bound. In this case, after you import the CSV file into the range table, you must manually define an unbounded range at the end of the range table to validate it. If the range table class is bounded, the last range in the CSV file must have a defined upper bound.

Import Data from a CSV File into a Table

To import some data into a table in your Core Tool user interface:

1. Click the button .
2. The *Open* dialog box is displayed to search for a file. When the file has been found, select the file, and then click the *Open* button.
3. The *CSV File Format Options* dialog box is displayed. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
4. In the *Number Format Parameters* area, select the *Decimal Separator* type (Dot, Comma) and the *Thousands Separator* type (No, Quote, Comma, Space, Dot) to format numbers. If there is no *Thousands Separator*, select No.
5. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns.
6. Click *OK* to import data into the table.

(**) Exporting Data to a CSV File

This procedure allows you to export data from mapping tables or subscriber mapping tables into a CSV file.

Export Data to a CSV File

1. Click the button . The *CSV File Format Options* dialog box is displayed.
2. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
3. In the *Number Format Parameters* area, select the *Decimal Separator* type (*Point*, *Comma*) and the *Thousands Separator* type (*No*, *Quote*, *Comma*, *Space*, *Point*) to format numbers. If there is no *Thousands Separator*, select *No*.
4. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns (not editable for mapping tables).
5. Click *OK* to export data. The *Save* dialog box is displayed.
6. In the *Save in* field, select the directory where you want to export data.
7. In the *File name* field, type the name of the file, and then click *Save*. If the file already exists, a message asks you if you want to overwrite it.

Restrictions on input values and dates

You are not allowed to put the same input values, the same start date, and the same end date for two distinct rows.

❖ Example

The following table shows you an example of duplicate input value:

Identifier	First input column	Start Date	End Date	First output column
Row 1	A	July, 18th	October, 4th	12
Row 2	A	July, 18th	October, 5th	19
Row 3	A	July, 17th	October, 4th	16

For example, an event occurs on the 20th of July with the input value A. You use the following rules to determine which row of the mapping table applies to the example.

Rule 1: When more than one period correspond to an input value (A) at a date (the 20th of July), the rows whose start date is closest to the reference date applies. In our example, Row 1 and Row 2 are selected because their start date (July, 18th) is closer to the reference date (July, 20th) than the start date of Row 3 (July, 17th).

Rule 2: If two rows have the same start date, the one that has the shortest period applies. In the previous example, Row 1 applies.

2.4.13.4.4.3 Tab: Additional Information

Use the configuration table and its icons to set up some additional information.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the configuration table:

Name: Type the name of the additional information item that characterizes your mapping table.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String*, or *Date*.

Value: Type the additional information according to the selected type.

Description: Type the description of the additional information. This description is visible from the SAP ERP system or the external provisioning system that is connected to SAP Convergent Charging 5.0.

2.4.13.4.5 Saving a Mapping Table

Once you have created or modified a mapping table, and then verified its structure, you are ready to save it. You can save the mapping table either into the back-end database or to an XML file on your hard disk.

Save and Release a New Mapping Table into the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.
3. Click *Save*. The *Mapping Table Creation* dialog box opens to inform you that the mapping table has been successfully saved and released.
4. Click *OK*.

Save and Release a New Version of an Existing Mapping Table into the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Choose date* dialog box opens.
2. Select a date from which the modified mapping table will be effective, and then click *OK*.
3. If the *Mapping Table Modification* dialog box opens to inform you that the mapping table has been successfully modified and released, click *OK*.
4. If a *Warning* dialog box opens to inform you that the mapping table has been modified since you opened it, you can:
 1. Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the mapping table.

2. Click [Cancel](#) to come back to the mapping table. See later in this chapter how to save the mapping table as an XML file.

Save a Mapping Table as an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. The [Save](#) dialog box opens.
2. Select a directory to save the mapping table.
3. In the [File name](#) field, type the name of the file.
4. Click [Save](#). The mapping table is saved as an XML file in your selected directory.

2.4.13.4.6 Deleting a Mapping Table

Caution

Do not delete a mapping table created by a CRM or another provisioning system interfaced with SAP CC. Refer to the caution about [mapping tables](#) [page 469].

Before you delete a mapping table, you must first delete all master data objects which reference it.

To delete a mapping table

1. From the menu bar in the main window, select **File > Delete > Mapping Table**. The [Delete Mapping Table](#) dialog box opens.
2. In the [Owner](#) drop-down menu, select the owner of the mapping table.
3. In the [Mapping Tables](#) folder of the catalog of the owner, select the mapping table.
4. Click [Delete](#). A deletion dialog box asks if you want to delete the mapping table
5. Confirm the deletion of the mapping table by clicking [Yes](#):
 1. If a dialog box confirms your choice, the mapping table has been successfully deleted.
 2. If a [Warning](#) dialog box opens to inform you that the mapping table is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management](#) [page 391] for more information.

Note

If an error message appears after clicking [Yes](#) at step 5, you must delete the objects that reference the mapping table. The identifiers of these master data objects appear in the message.

2.4.13.4.7 Exporting a Mapping Table

You can export mapping tables to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to [import \[page 488\]](#) the mapping table back into SAP Convergent Charging 5.0.

To export a mapping table

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the mapping table.
3. In the catalog of the owner, select the mapping table.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the mapping table.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.13.4.8 Importing a Mapping Table

You can import mapping tables in XML format from a directory in your database.

Note that only one version of a mapping table can exist in a database. You can import the unique version of a mapping table class into SAP CC *Core Tool*.

To import a mapping table

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the mapping table is saved, and then select the mapping table file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected.
6. In the *Import* column, clear the checkboxes of objects you do not wish to import.
7. Click *Import*.

i Note

SAP CC *Core Tool* can only import an object which has previously been [exported \[page 488\]](#) and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.14 Range Table Classes



A **range table class** allows you to define a **common data structure for some range tables** (in your pricing catalog) and subscriber range tables (in customer master data). When you model and design some pricing logic based on these data tables, a range table class is required. A range table class defines the following characteristics for the corresponding data tables:

- Number (0 to 5) of input columns (string values as keys for comparisons)
- Number (1 to 15) and [types \[page 498\]](#) of output columns (string or number values)
- Some options to define if:
 - The upper bound of the ranges (intervals) is inclusive (default) or exclusive.
 - The last interval of the ranges is bounded (default) or not (+ Infinite).

These settings depend on your pricing modeling and design.

A range table class is included in the [pricing catalog \[page 400\]](#) of the service provider and is part of its master data.

See how to [create \[page 494\]](#), [set up \[page 498\]](#), [save \[page 501\]](#), and [delete \[page 502\]](#) a range table class.

i Note

Once you have saved a range table class, you can no longer modify its table schema when the class is referred by a range table or a subscriber range table. You can always change the [description \[page 499\]](#) and the [additional information items \[page 500\]](#).

Use

You use range table classes when you want to base some pricing logic on data available in range tables or subscriber range tables. A corresponding class is expected.

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

SAP Solution

In an integrated [SAP Solution](#) scenario, the master data includes some range tables and corresponding classes. Refer to the integration guide that relates to your SAP system landscape.

Versions

SAP Convergent Charging 5.0 does not manage several versions of a range table class.

Transport

You can use the Catalog and Data Transport feature to transport a consistent subset of data from a source system to target systems (as destinations). See [Transporting Catalog and Data \[page 399\]](#).

Otherwise, you can:

- [Export \[page 502\]](#) a range table class
- [Import \[page 503\]](#) a range table class

Maintenance

You can [conditionally change \[page 497\]](#) a range table class.

Related Information

[Working with Range Table Classes \[page 494\]](#)

2.4.14.1 Industry Examples of Range Table Classes

This topic presents some typical business use cases for different industries.

Note

This section details the range table classes that are necessary to set up the [examples of corresponding range tables \[page 506\]](#).

Telecommunications Industry

Example #1: Tiered Pricing

Example

A company sells voice services that apply decreasing tariffs according to the duration of the phone calls.

You translate this marketing and pricing policy by modeling and designing some range tables and classes in SAP Convergent Charging.

You design a range table class that defines range tables whose last ranges are unbounded. The class specifies an output column that is named Price for numerical values.

The computation mode for the values of this column is "range size cumulative" to add up the prices of each selected range.

As a pricing specialist, you design and configure the following range table class:

- Upper bounds of ranges: inclusive
- Upper bound of the last range: unbounded (+Infinite)
- You set up the "Price" output column, type of number.

The class defines no input columns.

See next: [Example of Tiered Pricing with a Range Table \[page 507\]](#)

Example #2: Mutlidimensional Pricing

❖ Example

A company sends threshold notifications to end customers depending on their consumption of services.

You set up a range table class with input columns (prepaid or postpaid and service type), one output column (notification to be sent), and you define the Upper Bound of Range as inclusive and the Upper Bound of Last Range as Unbounded. You also define the type of the output column as String.

See next: [Example of Multidimensional Pricing with a Range Table \[page 509\]](#)

Transports Industry

❖ Example

A company sells postal services whose parcel postal tariffs are priced according to the weight of the parcel (weight in kilogram) that is limited to 20 kg.

As a pricing specialist, you design and configure the following range table class:

- Upper bounds of ranges: inclusive
- Upper bound for the last range: bounded
- Computation mode: single (none)
- You set up the 'Gold Price' output column, type of number.

See next: [Transports Industry \[page 510\]](#)

Example of Range Table Class Dedicated to Spending Status Monitoring

❖ Example

You implement policy control in your system landscape to ensure fair usage and to optimize the network bandwidth allocation with predefined policy rules.

The appropriate 'DATA_FAIR_USAGE' [spending status description](#) exists in the SAP CC system.

You must configure a range table and its class to be able to customize the necessary monitoring plans and set up the generation of a spending status that is based on this range table.

You configure the 'RTC dedicated to data monitoring' range table class that defines a particular structure that is relevant for configuring range tables that can be used to configure monitoring plans and to set up the generation of spending statuses.

You set up the following range table class:

- Codename: RTC dedicated to data monitoring
- Upper bounds of ranges: inclusive
- Upper bound for the last range: unbounded (+Infinite)
- You set up a unique **LABEL** output column; The [type must be string \[page 496\]](#).

i Note

In this example, spending thresholds are included in the spending limits.

You can set up the "RT dedicated to data monitoring" range table in SAP CC. See in the [Industry Examples of Range Tables \[page 506\]](#).

See next: [Example of a Range Table Dedicated to Spending Status Monitoring \[page 512\]](#)

Related Information

[Industry Examples of Range Tables \[page 506\]](#)

[Example of a Monitoring Plan](#)

2.4.14.1.1 Pricing for National and International Shipping

❖ Example

A company sells postal services. The business model is based on the format of the letters and parcels, the weight, and shipping options. The marketing team defines some different pricing and discounting rules. For letters, the shipping options are economy, green, and priority mail. For parcel posts, the shipping options are the destination zones (national or international zone).

As the pricing specialist for this company, you translate this pricing policy to SAP Convergent Charging concepts and capabilities. You decide to implement range tables with two input columns for multidimensional pricing.

You design and configure the following range table class *Postal Services - National/International Letter and Parcel Pricing Structure*:

- Class Options:
 - Range upper bounds: included (aka inclusive)
 - Last range: bounded
- Input Columns:
 - **Format** (letter or parcel)
 - **Shipment Class** (economy/green/priority for letters and national/zoneA/zoneB/zoneC for parcels)
- Output Columns:
 - **Number of Stamps** (Number / no computation mode)
 - **Total Price** (Number / no computation mode)

Input columns:			Output columns:	
Format	Shipment	Range	Total Stamps	Total Price
"letter"	"economy"	] 0 , 20]	1	0.8
"letter"	"economy"	] 20 , 100]	2	1.72
"letter"	"economy"	] 100 , 250]	4	3.44
"letter"	"green"	] 0 , 20]	1	0.88
"letter"	"green"	] 20 , 100]	2	1.76
"letter"	"green"	] 100 , 250]	4	3.52
"letter"	"green"	] 250 , 500]	6	5.28
"letter"	"green"	] 500 , 3,000]	8	7.04
"letter"	"priority"	] 0 , 100]	2	2.1
"letter"	"priority"	] 100 , 250]	4	4.2
"letter"	"priority"	] 250 , 500]	6	6.3
"letter"	"priority"	] 500 , 3,000]	8	8.4
"parcel"	"national"	] 0 , 250]	0	4.95
"parcel"	"national"	] 250 , 500]	0	6.25
"parcel"	"national"	] 500 , 750]	0	7.1
"parcel"	"national"	] 750 , 1,000]	0	7.8
"parcel"	"zoneA"	] 0 , 500]	0	12.3
"parcel"	"zoneA"	] 500 , 1,000]	0	15.2
"parcel"	"zoneA"	] 5,000 , 10,000]	0	36.3
"parcel"	"zoneA"	] 10,000 , 20,000]	0	60.3

Input columns:			Output columns:	
Format	Shipment	Range	Total Stamps	Total Price
"parcel"	"zoneA"	] 20,000 , 30,000]	0	60.3
"parcel"	"zoneB"	] 0 , 500]	0	16.65
"parcel"	"zoneB"	] 500 , 1,000]	0	19.9
"parcel"	"zoneB"	] 5,000 , 10,000]	0	46.25
"parcel"	"zoneB"	] 10,000 , 20,000]	0	72.15
"parcel"	"zoneC"	] 0 , 500]	0	24.35
"parcel"	"zoneC"	] 500 , 1,000]	0	27.1
"parcel"	"zoneC"	] 10,000 , 20,000]	0	164.6

2.4.14.2 Working with Range Table Classes

Related Information

- [Creating a Range Table Class \[page 494\]](#)
- [Using a Range Table Class with the Spending Status Monitoring Function \[page 496\]](#)
- [Opening an Existing Range Table Class \[page 496\]](#)
- [Modifying a Range Table Class \[page 497\]](#)
- [Setting Up a Range Table Class \[page 498\]](#)
- [Saving a Range Table Class \[page 501\]](#)
- [Deleting a Range Table Class \[page 502\]](#)
- [Exporting a Range Table Class \[page 502\]](#)
- [Importing a Range Table Class \[page 503\]](#)

2.4.14.2.1 Creating a Range Table Class

Use one of these procedures to create a range table class.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Create a Range Table Class

1. From the menu bar in the main window, select **File > New > Range Table Class**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. Click *OK*. The *New Range Table Class* window opens.
4. [Set up \[page 498\]](#) the range table class.
5. Verify the range table class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 501\]](#) your new range table class.

→ Tip

You can create a range table class by opening an existing range table class and copying it.

i Note

Once you have saved a range table class, you can no longer modify its table schema as soon as the class is referred by a [Range Table \[page 503\]](#) or a [Subscriber Range Table](#). You can always modify the description and the additional information.

Create a Range Table Class from an Existing Range Table Class

1. From the menu bar in the main window, select **File > Open > Range Table Class**. The *Open range table class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. In the *Range Table Classes* folder of the catalog of the owner, select the range table class to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding range table class window opens.
5. [Modify \[page 497\]](#) the range table class if necessary.
6. Verify the range table class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 501\]](#) your new range table class.

Related Information

[Setting Up a Range Table Class \[page 498\]](#)

[Saving a Range Table Class \[page 501\]](#)

[Modifying a Range Table Class \[page 497\]](#)

2.4.14.2.2 Using a Range Table Class with the Spending Status Monitoring Function

→ Remember

This feature is available only if you use monitoring plans and [provider contracts](#). It is not available for offers and [subscriptions](#) [page 700].

When designing [Monitoring Plans](#), you must design and configure a [particular range table](#) [page 516] and its class to set up the generation of spending statuses.

❖ Example

See the topic [Industry Examples of Range Table Classes](#) [page 490].

To create a range table class for a monitoring plan

This procedure consists in creating a particular range table class for configuring dedicated range tables that are used in monitoring plans.

1. [Create](#) [page 494] a range table class.
2. [Set up](#) [page 498] the following:
 - Set *Upper Bound of Range* to *Inclusive* or *Exclusive* depending on the business requirements
 - Set *Upper Bound of Last Range* to *Unbounded* so that when the SAP CC system executes the related range table, this determines an output value.
 - Add a unique output column with the string type.

Next Task

You can [configure a range table that relates to this class](#) [page 516].

2.4.14.2.3 Opening an Existing Range Table Class

You can open:

- An existing range table class saved in the database
- An existing range table class saved in an XML file

To open an existing range table class saved in the database

1. From the menu bar in the main window, select **File > Open > Range Table Class** . The *Open Range Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. In the *Range Table Classes* folder of the catalog of the owner, select the range table class. The *Range Table Class* window opens in display mode.

To open an existing range table class saved in an XML file

- Use the procedure for [Importing a Range Table Class \[page 503\]](#)

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.14.2.4 Modifying a Range Table Class

You can modify a range table class by adding, modifying, or deleting content. The modified range table class replaces the previous class in the database. Only one version is stored.

- You cannot modify the name of a range table class.
- You can always modify the description and the additional information.
- You can modify the table schema (ranges, upper bound inclusion, input and output columns) as long as no [range table \[page 503\]](#) or [subscriber range table](#) relates to this class.

To modify a range table class

1. From the menu bar in the main window, select **File > Open > Range Table Class** . The *Open Range Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. In the *Range Table Classes* folder of the catalog of the owner, select the range table class.
4. Click *Open*. The *Range Table Class* window opens in display mode.
5. Set the editing mode by clicking the *Edit Mode* icon  on the main toolbar. The range table class may be reloaded if it has been modified since you have opened it.
6. [Set up \[page 498\]](#) the range table class.

7. Verify the range table class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. [Save \[page 501\]](#) the range table class.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Range Table Class \[page 498\]](#)

[Saving a Range Table Class \[page 501\]](#)

2.4.14.2.5 Setting Up a Range Table Class

[Create \[page 494\]](#) a range table class before setting it up. A *Range Table Class* window must be open.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#) . Refer to the provided guidance.

The range table class allows you to create the structure of your [range tables \[page 503\]](#) (and [subscriber range tables](#) for end customers), which can consist of 0 to 5 input columns maximum of type string and 15 output columns maximum.

i Note

Once you have saved a range table class, you can no longer modify its table schema if the class is referenced by a range table or a subscriber range table.

You can always modify the description and the additional information.

Window: Range Table Class

To set up a range table class, you must fill in or modify the following tabs:

- [Definition \[page 499\]](#)
- [Table Schema \[page 499\]](#)
- [Additional Information \[page 500\]](#)

Related Information

[Setting Up a Range Table \[page 519\]](#)

2.4.14.2.5.1 Tab: Definition

Name: Type the unique identifier of the [range table class \[page 489\]](#).

Description: Describe the range table class. This description is mandatory.

2.4.14.2.5.2 Tab: Table Schema

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

You set up the number of input columns and output columns, and the characteristics of all the numerical intervals of all the business data tables (range tables, subscriber range tables) that are based on this class:

Upper Bound of Range: Set up if the upper bounds of the ranges are inclusive (default) or exclusive.

Upper Bound of Last Range: Set up if the upper bound of a last range of a table is bounded (default) or not.

Use the following icons to fill in the table *Input Columns* and *Output Columns* with at least one row:



Add a new row to the table.



Delete a row from the table.



Move a row up.



Move a row down.

Input Columns

- *Name:* Type the input column name. This name must be unique within the set of input columns.
- *Description:* Describe the input column. This description is mandatory.

Output Columns

- *Name:* Type the output column name. This name must be unique within the set of output columns.
- *Description:* Describe the output column. This description is mandatory.
- *Type:* Select the type of the output column and the associated computation mode (see the [Industry Examples of Range Tables \[page 506\]](#)):

- **String**: The input property value determines a row of the range table. The output column values of this row are assigned to the generated properties.
- **Single Number**: The input property value determines a row of the range table. The output column values of this row are assigned to the generated properties.
- **Cumulative Number**: This type is useful when you want to design pricing based on the cumulativeness of prices defined by ranges. The input property value determines a row of the range table. The output column values of this row are assigned to the generated properties. For each output column, the output column value of this row and the values of the output column of the previous rows are added together. The resulting values of these sums are then assigned to another generated properties.
- **Range Size Cumulative Number**: This type is useful when you want to design cumulative tiered pricing that is based on a quantity (time) multiplied by a unit price. The property value determines a row of the range table. The output column values of this row are assigned to the generated properties. For each output column, the output column value of this row and the values in the output column of the previous rows are processed according to the linear formula $a \cdot (b - c)$ or $a \cdot \text{size}$ (where "a" is the output column value, "b" is the property value, and "c" is the lower boundary of the range that includes the property value, and "size" is the size of the range (difference between the lower boundary and the upper boundary) and added together. Each value is multiplied by the size of the range. The resulting values are then assigned to another generated properties.

→ Tip

For more information, see [Range Table Introducer \(Comparator\) \[page 919\]](#).

Related Information

[Range Table Introducer \(Comparator\) \[page 919\]](#)

2.4.14.2.5.3 Tab: Additional Information

Use the configuration table and its icons to set up some additional information items for your range table class.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Name: Type the name of the additional information item.

Type: Provides the list of the additional information types. Select one of the following types: [Number](#), [String](#), or [Date](#).

Value: Type the additional information according to the selected type.

Description: Type the description of the additional information. This description is visible from the CRM application or the external provisioning system that is connected to SAP Convergent Charging 5.0.

2.4.14.2.6 Saving a Range Table Class

Once you have created a range table class and then verified its configuration, you are ready to save it. You can save the range table class either into the back-end database or to an XML file on your hard disk.

To save and release a new range table class into the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.
3. Click *Save*. The *Range Table Class Creation* dialog box opens to inform you that the range table class has been successfully saved and released.
4. Click *OK*.

To save and release an existing range table class into the database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. If the *Range Table Class Modification* dialog box opens to inform you that the range table class has been successfully modified and released, click *OK*. The new version of the range table class is saved as the only current version.
3. If a *Warning* dialog box opens to inform you that the range table class has been modified since you opened it, you can:
 - Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the range table class.
 - Click *Cancel* to come back to the range table class. See below how to save the range table class as an XML file.
4. Click *Save*. The *Range Table Class Modification* dialog box opens to inform you that the range table class has been successfully created.
5. Click *OK*.

To save a range table class as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.
2. Select a directory to save the range table class.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The range table class is saved as an XML file in your selected directory.

2.4.14.2.7 Deleting a Range Table Class

Before you delete a range table class, you must first delete all objects which reference it.

To delete a range table class

1. From the menu bar in the main window, select **File > Delete > Range Table Class**. The *Delete Range Table Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. In the *Range Table Classes* folder of the catalog of the owner, select the range table class.
4. Click *Delete*. A deletion dialog box asks if you want to delete the range table class.
5. Confirm the deletion of the range table class by clicking *Yes*:
 1. If a dialog box confirms your choice, the range table class has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the range table class is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking *Yes* at step 5, you must delete the objects that reference the range table class. The identifiers of these objects appear in the message.

2.4.14.2.8 Exporting a Range Table Class

You can export range table classes to a directory of your hard disk, where they are saved as XML files. After exporting range table classes, you can [import \[page 503\]](#) them back into another SAP CC system.

To export a range table class

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table class.
3. In the catalog of the owner, select the range table class.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the range table class.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.14.2.9 Importing a Range Table Class

You can import range table classes in XML format from a directory to your database.

Note that there is only one version of a range table class in the database because a range table class cannot be modified once it has been referenced in a range table or a subscriber range table.

To import a range table class

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the range table class is saved, and then select the range table file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected, as there is only one version for each range table class.
6. In the *Import* column, clear the checkboxes of objects you do not wish to import.
7. Click *Import*.

2.4.15 Range Tables

⚠ Caution

Do not modify or delete range tables with Core Tool when SAP Convergent Charging 5.0 is integrated and interfaced with a Customer Relationship Management (CRM) application or a provisioning system.

Modifying or deleting range tables may result in inconsistencies between the two systems because of data replication and synchronization mechanisms. To modify a range table, you must use this CRM or provisioning system in your SAP system landscape.

- Consult the [Application Help](#) for more information about the product modeling process.
- Consult the [Web Services Documentation \[page 383\]](#) if you need to integrate your CRM or provisioning system by implementing the [Web Services](#) technical interface provided by SAP Convergent Charging to manage this master data in the pricing catalog of a the service provider for its subscription- and usage-based services.

The manual procedures detailed in this section are relevant in:

- A production system landscape with few contracts directly managed with the Core Tool user interface (no CRM interfaced with SAP CC)
- A test, demo, or training system landscape



A **range table** is a multicolumn table of business/technical data that consists of a set of 0 to 5 input columns of type string, a range definition column, and a set of 1 to 15 output columns. Each row of output columns is defined by a range (numerical interval) to which corresponds a set of values in the related output columns (string or number).

At runtime, SAP Convergent Charging uses range tables to compare a quantity of services with ranges (aka tiers) in a selected range table. When the range table contains some input columns, the system initially operates a preliminary comparison between information from the rating context with data in the input columns.

Range Table	Input Columns	Service Quantity Comparison	Multidimensional Pricing
Basic Table	None	Yes	No
Advanced Table	1 to 5 for comparison keys	Yes	Yes

The input columns contain comparison keys. The output columns represent prices, unit prices, or credits. You can also apply combinatorial rules (cumulative, range size cumulative) to numerical output columns to compute supplementary values. You must however configure the pricing logic that defines the computation algorithm of the final values. See the logic component [Range Table Introducer \(Comparator\)](#) [page 919].

A range table is included in the [pricing catalog](#) [page 400] of the service provider and is part of its master data. A range table allows you to create new *properties* (in the [rating context](#) [page 357]) that you can use in the [price plan](#) [page 570], in the [monitoring plan](#), in the [refill logic](#), or in the [allowance logic](#).

You define the data structure of your range tables in a [range table class](#) [page 489].

Use

You use range tables to configure the pricing logic that includes tiered pricing with convergent charging services that are based on provider contracts. If the tiered pricing is based on customer data, you must use [subscriber range tables](#) that belong to a [subscriber account](#) [page 668].

For industry-specific examples, see [Industry Examples of Range Tables](#) [page 506].

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

i Note

You can easily use and directly select an existing range table or select the appropriate table in an [offer](#) [page 611]. It is also possible to redefine this selection in each [provider contract](#) by referring to a range table or a subscriber range table.

Range Table Step by Step

Before creating a range table, you must [create](#) [page 494], [set up](#) [page 498], and [save](#) [page 501] a range table class. You perform the following steps to use the range tables:

1. [Create](#) [page 514] a range table.

2. [Set up \[page 519\]](#) the range table.
3. [Save \[page 526\]](#) the range table.
4. Use the range table in one or several price plans (or in the refill logic) by setting up a dedicated logic component: [Range Table Introducer \(Comparator\) \[page 919\]](#). We recommend that you [determine the appropriate customization level of the range table \[page 513\]](#) that must be processed by the SAP CC system.
5. [Delete \[page 528\]](#) the range table.

→ Tip

You can use the same range table class for configuring different range tables.

After you have created a range table, you can then [add \[page 600\]](#) it to the price plan of a [charge \[page 560\]](#) or to the refill logic. You can use the same range table more than once in any price plan or refill logic.

SAP Solution

In an integrated [SAP Solution](#) scenario, the master data includes some range tables and corresponding classes. Refer to the integration guide that relates to your SAP system landscape.

Integration

This master data may be created and maintained by an external system connected to the SAP CC system during the product modeling process.

❖ Example

In an integrated [SAP Solution](#) scenario, SAP CRM manages some range tables that are stored in SAP Convergent Charging.

Versions

You can modify and save different [versions of a range table \[page 530\]](#).

Transport

You can use the Catalog and Data Transport feature to transport a consistent subset of data from a source system to target systems (as destinations). See [Transporting Catalog and Data \[page 399\]](#).

Otherwise, you can:

- [Export \[page 528\]](#) a range table and [export \[page 502\]](#) its class
- [Import \[page 529\]](#) a range table

Maintenance

You can modify and delete the rows of a range table, but you will save a new version of the range table. You cannot change the name of the range table or the name of the related range table class.

Related Information

[Industry Examples of Range Tables \[page 506\]](#)

[Customized Use of Range Tables in the Charges and Refill Logic \[page 513\]](#)

[Working with Range Tables \[page 514\]](#)

2.4.15.1 Industry Examples of Range Tables

This topic presents some typical business use cases based on range tables and classes to model tiered pricing in the pricing logic:

Example	SAP Industry	Boundary	Computation Mode
Example of Tiered Pricing with a Range Table [page 507]	<i>SAP for Telecommunications</i>	Last range is unbounded	Range Size Cumulative
Transports Industry [page 510]	<i>SAP for Transportation and Logistics</i>	Last range is bounded	None (aka single)
Loyalty Management [page 511]		Last range is bounded	Cumulative
Spending status monitoring [page 512]		Last range is unbounded	n/a

You can configure the pricing logic by [creating a range table \[page 514\]](#) or a set of range tables that is added to the [pricing catalog \[page 400\]](#) of a service provider or by creating [subscriber range tables](#) that are assigned to a [subscriber account \[page 668\]](#) and are dedicated to some [provider contracts](#) that belong to this account.

Related Information

[Industry Examples of Range Table Classes \[page 490\]](#)

[Example of a Monitoring Plan](#)

2.4.15.1.1 Telecommunications Industry

Related Information

[Example of Tiered Pricing with a Range Table \[page 507\]](#)

[Example of Multidimensional Pricing with a Range Table \[page 509\]](#)

2.4.15.1.1.1 Example of Tiered Pricing with a Range Table

❖ Example

A company sells voice services that apply decreasing tariffs according to the duration of the phone calls.

- The first 2 minutes are charged at €0.20 per minute.
- The following 4 minutes are charged at €0.1 per mn.
- The following 24 minutes are charged at €0.05 per mn.
- The following minutes are charged at €0.01 per mn.

The pricing specialist for this company decides to model this marketing and pricing policy by using range tables in SAP CC. The specialist designs and configures the following range table and its class:

Range (in mn)	Unit Price (defined per mn)
]0, 2]	0.2
]2, 6]	0.1
]6, 30]	0.05
]30, +∞[	0.01

The following configuration applies:

- Choice of a range table class that defines range tables whose last ranges are unbounded. The class specifies an output column that is named **Unit Price** for numerical values. The computation mode for the values of this column is **range size cumulative** to add up the prices of each selected range.
- Pricing logic concept, in which the final price is the sum of the cumulative price and the unit tariff multiplied by the position in the range that includes the input quantity value (call duration).
- [Linear Function component \[page 901\]](#) to set up the final price: Final price = cumulative price + unit price (input quantity value - lower bound of the current range)

In this example, the final prices are computed by the SAP CC system:

Call Duration	1 mn	2 mn	3 mn	4 mn	5 mn	10 mn	20 mn	40 mn
Generated properties								
Unit price	0.2	0.2	0.1	0.1	0.1	0.05	0.05	0.01
Price (cumulative)	0	0	= 0.2 (2-0)	= 0.4	= 0.4	= 0.2 (2-0) + 0.1 (6-2) = 0.4 + 0.4 = 0.8	= 0.7	= 0.7 + 1.2 = 1.9
Introduced properties								
Lower bound of the range	0	0	2	2	2	6	6	30
Beyond lower bound	= 1 - 0 = 1	= 2-0 = 2	= 3-2 = 1	= 4-2 = 2	= 5-2 = 3	= 10-6 = 4	= 20-6 = 14	= 40-3 = 10
Final prices	= sum of price (cumulative) and prorated unit price							
Computed by a component function added to the branch "Is in a range"	= 0 + 0.2 (1-0) = 0 + 0.2 = 0.2	= 0.4	= 0.4 + 0.1 (3-2) = 0.4 + 0.1 = 0.5	= 0.6	= 0.4 + 0.1 (5-2) = 0.4 + 0.3 = 0.7	= 0.8 + 0.05 (10-6) = 0.8 + 0.2 = 1.0	= 1.4	= 1.9 + 0.1 = 2.0

i Note

The previous range table replaces a long price list such as:

Call duration	Total price
1 mn	0.20
2 mn	0.40
3 mn	0.50
4 mn	0.60
5 mn	0.70
6 mn	0.80
7 mn	0.85
8 mn	0.90

Call duration	Total price
9 mn	0.95
10 mn	1.00
11 mn	1.00
12 mn	1.00
13 mn	1.00
...	...

2.4.15.1.1.2 Example of Multidimensional Pricing with a Range Table

❖ Example

This example demonstrates the use of **input columns** for range tables.

A company sends threshold notifications to end customers depending on their consumption of services.

The pricing specialist for this company translates the marketing and pricing policy and decides to model, design, and configure a range table and its associated class.

- Two input columns determine whether the service is:
 - Prepaid or postpaid
 - Of type LTE (Long-Term Evolution) or not
- The ranges (or tiers) define percentages of consumption.
- And an output column (of type string) determines whether a notification is sent to end customers depending on their consumption of services.

Input Columns		Ranges		Output Column
Key 1	Key 2	Lower Bound	Upper Bound	Notification to Be Sent
PREPAID	LTE	0	50	No
PREPAID	LTE	51	90	Yes
PREPAID	LTE	91	100	Yes
PREPAID	LTE	100	+Infinity	Yes
POSTPAID	LTE	0	80	No
POSTPAID	LTE	81	100	Yes
POSTPAID	LTE	100	+Infinity	Yes

2.4.15.1.2 Transports Industry

❖ Example

A company sells postal services whose parcel postal tariffs are priced according to the weight of the parcel (weight in kilogram) limited to 20 kg.

Range	Gold Price
]0 , 2.5]	65
]2.5 , 8]	102
]8 , 20]	139

The following configuration applies:

- Computation mode: none (aka single mode)
- Pricing logic: a [Flat Function component \[page 897\]](#) to set up the final price

In this example, the final computed prices for different weights are:

Parcel Weight	-1	0	2.5	3	8	10	50
Total Price	Denied	65	65	102	102	139	Denied

See also:

- [Flat Function \[page 897\]](#)
- [Working with Logic Components \[page 831\]](#)

2.4.15.1.3 Pricing for Pay as You Grow Offering - Monthly or Annually

❖ Example

A company loans some builds to other companies and must charge them for the usage.

As the pricing specialist for this company, you translate this pricing policy to SAP Convergent Charging concepts and capabilities. You decide to implement range tables.

You design and configure the following range table class "*Pay as you Grow - Monthly and Annual Fee Structure*":

- Class Options:
 - Range upper bounds: excluded (aka exclusive)
 - Last range: unbounded - The last bound is +Infinity (+∞).
- Input Columns:
 - None

- Output Columns:
 - **Pay as You Grow** (String)
 - **Annual Fees** (Number, no computation mode)
 - **Monthly Fees** (Number, no computation mode)

This class defines the structure for basic range tables with no input columns.

The pricing specialist configures the following range table *Pay as you Grow - Monthly and Annual Fees*:

Range	Pay as You Grow	Annual Fees	Monthly Fees
[0, 1,000 [	"Start"	12.3	15
[1,000, 2,500 [	"Plus"	20.5	25
[2,500, 10,000 [	"Max"	53.3	65
[10,000, +∞ [	"Ultimate"	95.5	110

2.4.15.1.4 Loyalty Management

❖ Example

A company provides end customer value-added services and want to manage a loyalty program based on the usage of services, for which cumulative bonus points are attributed to some end customers according to the level of price that is computed for the consumption of the services.

The marketing team defines the following bonus rules:

- For silver customers, a bonus is credited each time the service price reaches another tier in the following table:

Price Range	Bonus Point
]0, 2]	1
]2, 4]	10
]4, 6]	20

It is similar than tiered pricing.

- For gold customers, an extra bonus (+5 points) is credited when the upper bound for a price range is reached
- For platinum customers, a mega bonus (+50 points) is credited when the last price range is exceeded

The following example provides a second option, for which special bonus that are attributed under certain conditions are granted to end customers (the upper bound of a price range is reached or the last range is exceeded).

The following configuration applies:

- Computation mode: cumulative

- Pricing logic: [Flat Function component \[page 897\]](#) to add up the single price and the cumulative price

In this example, the following result table shows granted bonus points according to different service consumptions and silver/gold/platinum levels:

Service Consumption Level (Charged Price)	1	2	3	4	5	6	10
Total bonus points (silver)	0	0	1	1	11	11	31
Total bonus points (gold)	1	1	11	11	31	31	31
Total bonus points (platinum)	1	6	11	16	31	36	81

See also:

- [Flat Function \[page 897\]](#)
- [Working with Logic Components \[page 831\]](#)

2.4.15.1.5 Example of a Range Table Dedicated to Spending Status Monitoring

❖ Example

You implement policy control in your system landscape to ensure fair usage and to optimize the network bandwidth allocation with predefined policy rules.

You must configure a range table and its class to be able to customize the necessary monitoring plans and set up the generation of a spending status that is based on this range table.

You configure the "RT dedicated to data monitoring" range table that defines the spending thresholds to be associated to a status label that is defined in the '[Data fair usage' spending status description](#). The range table is based on the '[RTC dedicated to data monitoring' range table class \[page 490\]](#).

The range table is defined by the numerical intervals (ranges):

Range (Spending Thresholds)	LABEL (Spending Status Labels)
]0 -- 2,000]	QUOTA_OK
]2,000 -- 2,500]	QUOTA_WARNING
]2,500 -- +∞[	QUOTA_REACHED

2.4.15.2 Customized Use of Range Tables in the Charges and Refill Logic

This topic allows you to create the charges or the refill logic that can be used with different range tables during the charging or refilling operations.

The procedure below describes how to create a [charge \[page 560\]](#) that contains a price plan with a [Range Table Introducer \[page 919\]](#) (Comparator component) without directly specifying the name of the range table to be used. The idea is to use a parameter as the name of a range table and set this parameter later on at [charge plan](#) or [provider contract](#) level. You can easily use different range tables or [subscriber range tables](#).

i Note

You can use the same procedure as that of the refill logic.

Configuration in the pricing catalog (master data related to a service provider)

Configuring at charge or refill logic level

1. Create a charge with a [Range Table Introducer \(Comparator\) \[page 919\]](#) component (See [Working with Logic Components \[page 831\]](#) for more information on this price plan component).
2. [Add a parameter \[page 585\]](#) with the type string to the charge.
3. Set the visibility to *External*.
4. In the *Range Table* field of the Range Table Introducer component, select this parameter as the name of the range table.

Configuring at charge plan level

1. Create a charge plan that contains the previously created charge. Note that the parameter is now assigned the type *Range Table ID*.
2. [Add a parameter](#) to the charge plan:
 1. Set the type to *Range Table ID*
 2. Set the visibility to *External* if you want to set the name of the range table at provider contract level or from a connected CRM application
 3. Link this parameter to the parameter of the charge

The parameter that is created in the charge plan can be used to set the name of the range table or to make the parameter available at provider contract level (parameter of a contract item).

Configuration of the customer master data

Configuring at provider contract level

If the visibility of a parameter in a charge plan is set to *External*, a CRM application or an external provisioning system can redefine the value of this parameter in a contract item (this contract item enables to activate the charge plan in a provider contract).

The value of the [parameter in the contract item](#) can be:

- The name of a range table from the pricing catalog of the service provider
- The name of a [subscriber range table](#) of the subscriber account that represents an end customer of the service provider

2.4.15.3 Working with Range Tables

Related Information

[Creating a Range Table \[page 514\]](#)

[Using a Range Table in Monitoring Plans \[page 516\]](#)

[Opening an Existing Range Table \[page 517\]](#)

[Changing the Version of a Range Table \[page 530\]](#)

[Modifying a Range Table \[page 518\]](#)

[Setting Up a Range Table \[page 519\]](#)

[Filling In a Range Table \[page 523\]](#)

[Saving a Range Table \[page 526\]](#)

[Deleting a Range Table \[page 528\]](#)

[Exporting a Range Table \[page 528\]](#)

[Importing a Range Table \[page 529\]](#)

2.4.15.3.1 Creating a Range Table

Prerequisites

Before creating a range table, you must design and [create a range table class \[page 494\]](#) that suits your business requirements.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Create a Range Table

1. From the menu bar in the main window, select **File > New > Range Table**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. Click *OK*. The *New Range Table* window opens.
4. [Set up \[page 519\]](#) the range table.
5. Verify the range table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 526\]](#) your new range table.

You can create a range table by opening an existing range table and copying it.

i Note

Once you have saved a range table, you can no longer modify its name or the related range table class. You can only add rows or modify the rows of the range table.

Create a Range Table from an Existing Range Table

1. From the menu bar in the main window, select **File > Open > range table**. The *Open Range Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the *Range Tables* folder of the catalog of the owner, select the range table to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *Range Table* window opens.
5. [Modify \[page 518\]](#) the range table if necessary.
6. Verify the range table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 526\]](#) your new range table.

Related Information

[Industry Examples of Range Tables \[page 506\]](#)

[Setting Up a Range Table \[page 519\]](#)

[Saving a Range Table \[page 526\]](#)

2.4.15.3.2 Using a Range Table in Monitoring Plans

→ Remember

This feature is available only if you use monitoring plans and [provider contracts](#). It is not available for offers and [subscriptions \[page 700\]](#).

When designing [monitoring plans](#), you must design and configure a particular range table (and its [class \[page 496\]](#)).

❖ Example

You can configure the following range table:

Range	Output
]0, 10]	LOW
]0, 30]	MEDIUM
]30, +∞[	HIGH

Prerequisites

You must at least:

- [Configure one spending status description](#) in the SAP CC system
- [Configure a range table class to define the conversion logic between monitored counters and reported spending statuses \[page 496\]](#)

Task

To create a range table for a monitoring plan

This procedure consists in creating a range table for configuring the logic to convert at runtime a counter value (in a contract) to a label value of a spending status (in a report).

1. [Create \[page 514\]](#) a range table
2. [Set up \[page 519\]](#) the following elements:
 - Select the appropriate range table class that is dedicated to the configuration of monitoring plans
 - In the [Table Instance](#) tab, add a row for each label value that is configured in the spending status description, which this range table relates to. You can configure more rows depending on your business requirements.

- Set up the ranges and the output values for each threshold according to the configuration of the spending status description and according to your business requirements. An output value must strictly be equal to one label that is configured in the spending status description. If the upper bound of the last defined range is bounded (and not $+\infty$), the SAP CC system cannot convert a counter value to a label value in the related spending status. The reported spending status is undefined.

i Note

If the texts configured in these dedicated range tables are not the same as the labels that are configured in the related spending status descriptions, the SAP CC system will not report the spending statuses that are based on these range tables.

Next Task

You can [configure a monitoring plan and set up the generation of some spending statuses](#) based on this range table.

2.4.15.3.3 Opening an Existing Range Table

You can open:

- An existing range table saved in the database
- A previous version of a range table saved in the database
- An existing range table saved in an XML file

To open an existing range table saved in the database

1. From the menu bar in the main window, select **File > Open > Range Table**. The *Open Range Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the *Range Tables* folder of the catalog of the owner, select the range table. The *Range Table* window opens in display mode.

Range tables are managed chronologically. After you have saved a range table, you can access the previous versions of it that exist in the database. However, if you modify and save a previous version of a range table, all later versions are deleted.

To open a previous version of a range table saved in the database

1. From the menu bar in the main window, select **File > Open > Range Table**. The *Open Range Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the *Range Table* folder of the catalog of the owner, select the range table, and then click *Open*. The *Range Table* window opens in display mode.
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the range table from the list.
6. Click *View*.

To open an existing range table saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File**. The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

2.4.15.3.4 Modifying a Range Table

⚠ Caution

Do not modify a range table created by a CRM application or a provisioning system interfaced with SAP CC. Refer to the caution about [Range Tables \[page 503\]](#).

You can modify a range table by adding, modifying, or deleting content. When you save it in the database, you can modify its [versions \[page 457\]](#).

You cannot modify the name of a range table or the related range table class once you have saved the range table.

To modify a range table

1. From the menu bar in the main window, select **File > Open > Range Table**. The *Open Range Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the *Range Tables* folder of the catalog of the owner, select the range table.
4. Click *Open*. The *Range Table* window opens in display mode.
5. Set the editing mode by clicking the *Edit Mode* icon  on the main toolbar. The range table may be reloaded if it has been modified since you have opened it.
6. [Set up \[page 519\]](#) the range table.
7. Verify the range table structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. [Save \[page 526\]](#) the range table.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Range Table \[page 519\]](#)

[Saving a Range Table \[page 526\]](#)

2.4.15.3.5 Setting Up a Range Table

[Create \[page 514\]](#), [open \[page 517\]](#), or [modify \[page 518\]](#) a range table before setting it up. A *Range Table* window must be open.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Window: Range Table

To set up a range table, you must:

1. Type the identification name of the range table, select the appropriate [range table class \[page 489\]](#) that defines its data structure, and fill in the [Definition \[page 520\]](#) tab.

2. Depending on the selected class and the business requirements, fill in or modify the following tabs:
 - [Table Instance \[page 520\]](#)
 - [Additional Information \[page 523\]](#)

→ Tip

You can import already-existing data from a CSV file.

Related Information

[Setting Up a Range Table Class \[page 498\]](#)

2.4.15.3.5.1 Tab: Definition

Fill in or modify the *Definition* tab:

Name: Type the unique identifier of this [range table \[page 503\]](#).

Description: Describe the range table.

Range Table Class: Select the range table class that defines the data structure for this range table.

Agreement ID: Type the identification code of the related *master agreement*, if any. This ID is useful in an integrated *SAP Solution* scenario with **SAP S/4HANA for Customer Management**. The range table is an *agreement table*. Consult [Subscription Order Management](#) in the [Product Assistance for SAP S/4HANA for Customer Management](#) for more information and user assistance about:

- Master data
- Master agreement
- Available functions

See also the integration guides at help.sap.com/brim.

2.4.15.3.5.2 Tab: Table Instance

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

Setting Up the Rows of the Range Table

Once you have selected the range table class for your range table, you can [add one or more rows \[page 523\]](#) to the table, and then fill in the cells of each row with relevant data values (business, technical).

i Note

In the *Output Values* area, the rows are always sorted by intervals and you cannot change the order of these rows.

After adding a row, you have to set it up.

Input Values: Type the input values for each row as specified in the input columns of the related [range table class \[page 489\]](#).

Output Values: Type the output values for this row as specified in the output columns of the related [range table class \[page 489\]](#).

Range: Double-click to set up the upper bound of the range that is specified in this row. The boundary is inclusive or exclusive according to the configuration of the related range table class.

i Note

Instead of manually typing all of the data in the columns, you can import existing data from external .CSV type files by clicking  (refer to the process described below).

(*) Importing Data from a CSV File

Before Importing

Make sure that the CSV file to import is compliant with the following rules:

Rule	Verifications
CSV File Structure	i Note Make sure that the order of the columns in the CSV file is the same as the order in the Column Indexes in File area of the dialog box when you import this file into the table. Otherwise, change the CSV file or change the order of the columns through the dialog box. • The CSV file to import must not contain any empty field or empty column (except in the case of unbounded range tables, see later in this topic). • The CSV file has no header. • The input data file does not contain comment. • The format of the input data is compliant with the table.

Rule	Verifications
Date/Time Format	In the CSV file to import, the items of the dates/times (months, days, minutes, and seconds) must have a fixed size. The format is the following: yyyy-MM-dd HH24:mm:ss. For example, instead of 2016-5-6 15:1:2 , the CSV file must contain 2016-05-06 15:01:02 .
Field Separator	By default, the field separator is a semicolon, a tabulation, a comma, a space, or a slash, but any printable character is suitable, except the double quote ("). In any case, a field separator must not exceed one character.
Specific Rules about Translation Tables	Each row in the CSV file consists of N inputs and M outputs: • Column 1 to column N: Input key • Column N+1 to column N+M: Output values
Specific Rules about Tier Tables	i Note An empty field represents the infinite. Each row in the CSV file consists of a name, two bounds, and N outputs: • Column 1: Group name • Column 2: Lower bound • Column 3: Lower bound is included or not (the expression "true" means that the bound is included. Any other expression than "true" means that the bound is excluded. The expression "true" is case-insensitive.) • Column 4: Upper bound • Column 5: Upper bound is included or not (see above) • Column 6 to column 6+N+1: Output columns
Specific Rules about Range Tables	Only the upper bound must be represented by a CSV field because the lower bound is expected to be the previous upper bound of the range table (for the first range, 0 is expected). A bound can be null (0) but not negative. If the range table class is unbounded: • The last range in the CSV file can have an infinite upper bound. The infinite is represented by anything that is not a valid number. For example, an empty field, a space, or any string. • The last range in the CSV file can also have a finite upper bound. In this case, after you import the CSV file into the range table, you must manually define an unbounded range at the end of the range table to validate it. If the range table class is bounded, the last range in the CSV file must have a defined upper bound.

Import Data from a CSV File into a Table

To import some data into a table in your Core Tool user interface:

1. Click the button .
2. The [Open](#) dialog box is displayed to search for a file. When the file has been found, select the file, and then click the [Open](#) button.

3. The *CSV File Format Options* dialog box is displayed. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
4. In the *Number Format Parameters* area, select the *Decimal Separator* type (Dot, Comma) and the *Thousands Separator* type (No, Quote, Comma, Space, Dot) to format numbers. If there is no *Thousands Separator*, select No.
5. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns.
6. Click *OK* to import data into the table.

2.4.15.3.5.3 Tab: Additional Information

Use the configuration table and its icons to create some additional information items.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the configuration table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String*, or *Date*.

Value: Type the additional information according to the selected type.

Description: Type the description of the additional information. This description is visible from the CRM application or the external provisioning system that is connected to SAP Convergent Charging 5.0.

2.4.15.3.6 Filling In a Range Table

Use the icons below to fill in the range table

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.

Use the following icon...	To...
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format. (*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

(*) Importing Data from a CSV File

Before Importing

Make sure that the CSV file to import is compliant with the following rules:

Rule	Verifications
CSV File Structure	Note Make sure that the order of the columns in the CSV file is the same as the order in the Column Indexes in File area of the dialog box when you import this file into the table. Otherwise, change the CSV file or change the order of the columns through the dialog box. • The CSV file to import must not contain any empty field or empty column (except in the case of unbounded range tables, see later in this topic). • The CSV file has no header. • The input data file does not contain comment. • The format of the input data is compliant with the table.
Date/Time Format	In the CSV file to import, the items of the dates/times (months, days, minutes, and seconds) must have a fixed size. The format is the following: yyyy-MM-dd HH24:mm:ss. For example, instead of 2016-5-6 15:1:2 , the CSV file must contain 2016-05-06 15:01:02 .
Field Separator	By default, the field separator is a semicolon, a tabulation, a comma, a space, or a slash, but any printable character is suitable, except the double quote ("). In any case, a field separator must not exceed one character.
Specific Rules about Translation Tables	Each row in the CSV file consists of N inputs and M outputs: • Column 1 to column N: Input key • Column N+1 to column N+M: Output values
Specific Rules about Tier Tables	Note An empty field represents the infinite. Each row in the CSV file consists of a name, two bounds, and N outputs: • Column 1: Group name • Column 2: Lower bound • Column 3: Lower bound is included or not (the expression "true" means that the bound is included. Any other expression than "true" means that the bound is excluded. The expression "true" is case-insensitive.) • Column 4: Upper bound • Column 5: Upper bound is included or not (see above) • Column 6 to column 6+N+1: Output columns

Rule	Verifications
Specific Rules about Range Tables	Only the upper bound must be represented by a CSV field because the lower bound is expected to be the previous upper bound of the range table (for the first range, 0 is expected). A bound can be null (0) but not negative. If the range table class is unbounded: • The last range in the CSV file can have an infinite upper bound. The infinite is represented by anything that is not a valid number. For example, an empty field, a space, or any string. • The last range in the CSV file can also have a finite upper bound. In this case, after you import the CSV file into the range table, you must manually define an unbounded range at the end of the range table to validate it. If the range table class is bounded, the last range in the CSV file must have a defined upper bound.

Import Data from a CSV File into a Table

To import some data into a table in your Core Tool user interface:

1. Click the button .
2. The *Open* dialog box is displayed to search for a file. When the file has been found, select the file, and then click the *Open* button.
3. The *CSV File Format Options* dialog box is displayed. In the *Field Separator* area, click the separator that is used in your CSV file to separate the numerical or string values, or type a specific separator.
4. In the *Number Format Parameters* area, select the *Decimal Separator* type (Dot, Comma) and the *Thousands Separator* type (No, Quote, Comma, Space, Dot) to format numbers. If there is no *Thousands Separator*, select No.
5. In the *Column Indexes in File* area, you can type the order in which the numerical or string values of the CSV file are imported into the table columns.
6. Click *OK* to import data into the table.

2.4.15.3.7 Saving a Range Table

Once you have created or modified a range table, and then verified its structure, you are ready to save it. You can save the range table to either the database or as an XML file on your hard disk.

To save a new range table to the database

1. From the menu bar in the main window, select **File** > **Save** > **In the Database** . The *Save in the catalog* dialog box opens.
2. Select the name of the catalog.

3. Click [Save](#). The [Range Table Creation](#) dialog box opens to inform you that the range table has been successfully saved.
4. Click [OK](#).

To save a new version of an existing range table to the database

i Note

If a [Warning](#) dialog box opens to inform you that the range table has been modified since you opened it, you can:

1. Click [Overwrite](#) and then [Yes](#) to overwrite the changes performed by another user. Clicking [No](#) enables you to come back to the range table.
2. Click [Cancel](#) to come back to the range table. See later in this chapter how to save the range table as an XML file.

1. From the menu bar in the main window, select [File](#) [Save](#) [In the Database](#). A dialog box opens to ask if you want to save the range table.
2. Click [Yes](#). The [Save Version](#) window opens.
3. In this window, select one of the following options:
 - [Create a new version](#): The [Start Date](#) is automatically filled in with the current date while the [End Date](#) is automatically filled in with [No End Date](#). You can however replace these dates by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates related to existing versions. In this list, [No Start Date](#) represents an undetermined date in the past while [No End Date](#) represents an undetermined date in the future. A message informs you when you overwrite versions.
 - [Replace Versions](#): The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click [Save](#). The [Range Table Modification](#) dialog box opens to inform you that the range table has been successfully created.
5. Click [OK](#).

To save a range table as an XML file

1. From the menu bar in the main window, select [File](#) [Save](#) [In a File](#). The [Save](#) dialog box opens.
2. Select a directory to save the range table.
3. In the [File name](#) field, type the name of the file.
4. Click [Save](#). The range table is saved as an XML file in your selected directory.

2.4.15.3.8 Deleting a Range Table

⚠ Caution

Do not delete a range table created by a CRM or another provisioning system interfaced with SAP CC. Refer to the caution about [range tables](#) [page 503].

Before you delete a range table, you must first delete all master data objects which reference it.

To delete a range table

1. From the menu bar in the main window, select **File > Delete > Range Table**. The *Delete Range Table* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the *Range Tables* folder of the catalog of the owner, select the range table.
4. Click *Delete*. A deletion dialog box asks if you want to delete the range table
5. Confirm the deletion of the range table by clicking *Yes*:
 1. If a dialog box confirms your choice, the range table has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the range table is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management](#) [page 391] for more information.

i Note

If an error message appears after clicking *Yes* at step 5, you must delete the objects that reference the range table. The identifiers of these master data objects appear in the message.

2.4.15.3.9 Exporting a Range Table

You can export range tables to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to [import](#) [page 529] the range table back into SAP CC Core Tool.

To export a range table

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the range table.
3. In the catalog of the owner, select the range table.
4. Click *OK*. The *Save* dialog box opens.

5. Select a directory to export the range table.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.15.3.10 Importing a Range Table

You can import range tables in XML format from a directory in your database.

Note that only one version of a range table can exist in a database. You can import the unique version of a range table class into SAP CC Core Tool.

To import a range table

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the range table is saved, and then select the range table file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected.
6. In the *Import* column, clear the checkboxes of objects you do not wish to import.
7. Click *Import*.

i Note

SAP CC Core Tool can only import an object which has previously been [exported \[page 528\]](#) and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.15.4 Using the Action Menu

Related Information

[Changing the Version of a Range Table \[page 530\]](#)

[Deleting the Versions of a Range Table \[page 530\]](#)

2.4.15.4.1 Changing the Version of a Range Table

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.15.4.2 Deleting the Versions of a Range Table

The procedure is the same as [Deleting the Versions of a Catalog Object \[page 408\]](#).

2.4.16 Chargeable Item Packages (Revoked)

i Note

From SAP Convergent Charging release 4.0 onwards:

- You can no longer create, set up, or modify a [chargeable item package](#) and add some [chargeable item classes](#) to it. As an object, the chargeable item package is no longer displayed in the [Core Tool user interface](#) of SAP CC.
- You must use and configure some [chargeable item classes \[page 531\]](#) to build your [offer \[page 530\]](#) to be able to price and monetize the usage (consumption) of a service by the end customers of the service provider company.

→ Tip

If you have some chargeable item packages in your master data for the service pricing configuration, contact your application administrator in order to migrate this data with the Setup Tool user interface and the [migration generateCIPackageReport](#) and [migration executeCIPackageReport](#) commands. See [Setup Tool \[page 1005\]](#).

2.4.17 Chargeable Item Classes

⚠ Caution

Read the [caution](#) about the *consumption item mapping* before deleting a *chargeable item class*.

i Note

Do not forget that you can configure a [reusable charge \[page 560\]](#) with or without a chargeable item class.

- If you create a charge without a chargeable item class, you cannot configure a [usage rate \[page 854\]](#) in the price plan of the charge because only the chargeable item classes allow rating and charging some usage for the end-customer service.

In SAP Convergent Charging 5.0, a **chargeable item class** represents the common characteristics of high-volume usage events that relate to the mass consumptions of a marketable service by end customers. SAP CC receives these events called *chargeable items*, rates these items to dynamically compute a price and charges the amounts to identified postpaid/prepaid accounts and other balances.

♣ Example

For example, a chargeable item class can represent the usage events for a mobile phone service, a telephone call service, or an Internet service. See [other industry-specific examples \[page 532\]](#).

A chargeable item class **consists of a set of properties [page 533]** and characterizes the way a **usage-based service is consumed by end customers**. See [Properties \(Default and Custom\) \[page 533\]](#). In a price plan, you can describe the rating parameters by configuring the properties that make up a chargeable item class.

A chargeable item class belongs to the [pricing catalog \[page 400\]](#) for the subscription- and usage-based services to monetize. [Creating \[page 537\]](#) a chargeable item class is thus the first step to build your [offer \[page 611\]](#).

Converting Chargeable Items into Consumption Items

If you work with SAP ERP/FI-CA, you may need to convert chargeable items into *consumption items* through billable items and according to the [consumption item mapping](#). To convert chargeable items into consumption items, you must [create](#) the consumption item mapping between a consumption item class defined in the SAP ERP/FI-CA reference system and a chargeable item class.

Refer to the [Consumption Item Mapping](#) topic for more information when working with SAP ERP/FI-CA.

Managing Allowances When SAP CRM is Integrated with SAP CC

When SAP CRM is integrated with SAP Convergent Charging, SAP CRM creates [allowances](#) in SAP CC on demand or automatically when the provider contract is activated or changed. To create allowances, SAP CRM

uses a predefined chargeable item containing specific information on the allowance (activation date, for example). SAP CC uses this information when executing the related charge for creating and initializing the allowance. Therefore, you need to create a predefined chargeable item class in SAP CC as a prerequisite for processing the chargeable items of allowances. See [Managing Allowances for Integrating SAP CRM with SAP CC](#).

Related Information

[Working with Chargeable Item Classes \[page 537\]](#)

[Properties \(Default and Custom\) \[page 533\]](#)

2.4.17.1 Examples

❖ Example

A service provider *Learn.com* offers lessons through an Internet portal. The end customers of this company can consume the service by reading online or downloading a lesson.

To model and translate this marketing and pricing policy, two chargeable item classes can represent these services and how to price and monetize the service consumptions:

- The first chargeable item class is called **Read Online**.
- And the second one is called **Download**.

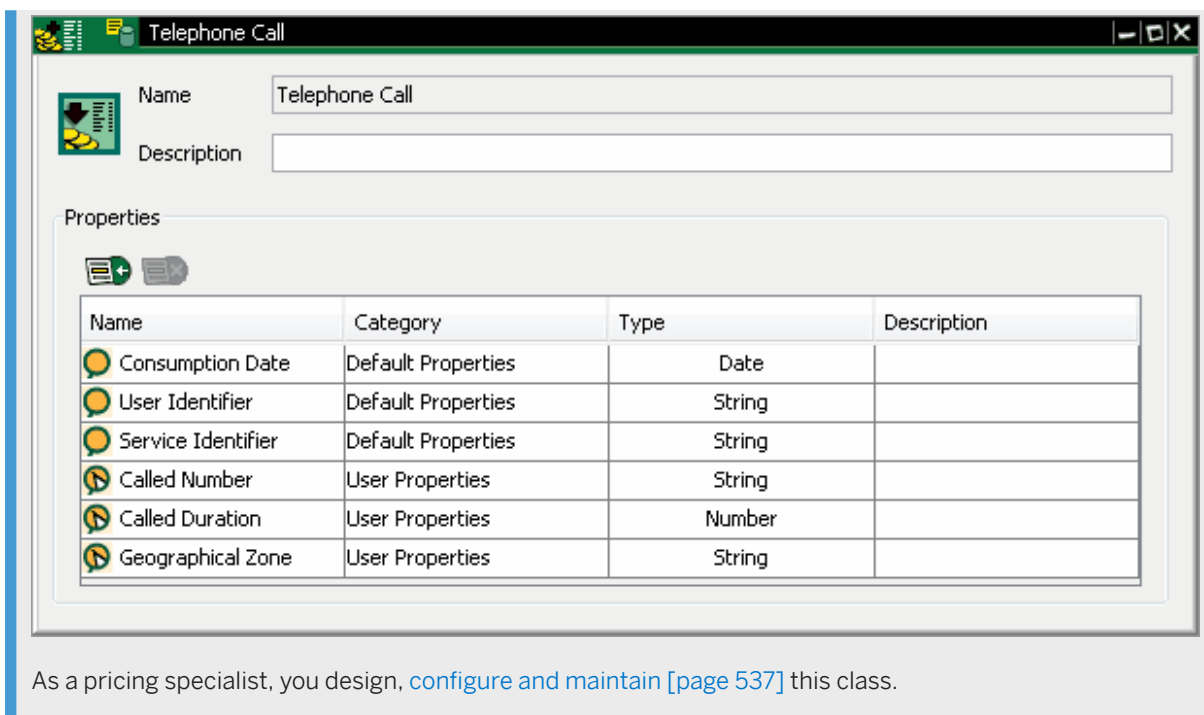
As a pricing specialist, you design, [configure and maintain \[page 537\]](#) these classes.

❖ Example

The telephone operator *TelcoServ* sells telephone calls to its end customers. The company decides to bill these calls based on call duration but wants to apply different rates (prices) depending on geographical zones.

In SAP Convergent Charging, you can model and design the following related chargeable item class named **Telephone Call**. The class defines three custom properties:

- **Called Number** (String)
- **Call Duration** (Number)
- **Geographical Zone** (String)



2.4.17.2 Properties (Default and Custom)

Properties of a Chargeable Item Class

A [chargeable item class \[page 531\]](#) contains several properties that describe each usage event for rating (dynamic pricing) purposes. All chargeable item classes define default properties, but you can define your own user properties (or custom properties) that are needed to design your price plan or that are needed by the final billing system.

❖ Example

These basics examples illustrate the concept of chargeable item class:

- An Internet press service supplier prices article downloads depending on the document size. The chargeable item class **Article Download** will contain the custom property **Document Size**.
- A telecommunications operator chooses to bill telephone calls depending on the called number. The chargeable item class **Telephone Call** will contain the custom property **Called Number**.
- A press supplier charges the viewing of online articles depending on article categories such as daily newspaper, weekly review, and specialist review. The custom property **Article Category** is then added to the chargeable item class **Viewed Article**. The property type of this user property is defined as a character string.

As a pricing specialist, you design and configure this data in SAP CC.

Default Properties

Default properties provide basic information about the consumption of a chargeable item class for rating purposes. Each chargeable item class contains the same default properties:

- *Consumption Date*: this property describes the date and time when the service is consumed by the end customer
- *User Identifier*: this property describes the identifier of the end customer consuming the service
- *Service Identifier*: this property describes the identifier of the service consumed by the end customer

User-Defined Properties

In addition to default properties, you [set up \[page 540\]](#) some **custom properties** in a chargeable item class to be able to configure the price plans with calculation algorithms based on information included in these properties. At runtime, all the chargeable items sent by the connected mediation systems must include these custom properties with data values.

In your class, you set up these properties by assigning the following to them:

- Name
- Type (character string, number, or date/time)
- Description

Note

You can identify some properties that are not used by the SAP CC system, but that are used by the billing system. Define these custom properties in your chargeable item class to be able to configure the output of this data in the generated charged items.

This configuration is also possible if you base the charging services on subscriptions:

- See the [configuration of the generation of charged items as defined in a charge from an offer. \[page 656\]](#)
- See the [configuration of the generation of postpaid charged transactions as defined in a charge from an offer. \[page 657\]](#)

Related Information

[Working with Chargeable Item Classes \[page 537\]](#)

2.4.17.3 ALLO Chargeable Item Class

→ Remember

These topics are relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

In your integrated *SAP Solution*, the SAP CRM system drives and triggers the creations for *allowances* in *provider contracts* stored in SAP Convergent Charging (SAP CC) by sending charging requests with dedicated and specialized *chargeable items*. The SAP CC system (Core Server) handles and uses each chargeable item to identify the provider contract that will contain the new allowance.

These chargeable items must contain:

- A specific *user service identifier (USID)* that conforms to the syntax: **ALLOW_*** (where * matches 0 to 6 characters). For example, **ALLOW_** is a valid USID.
- The identifiers of the *allowance definition* used to initialize the allowance

As a prerequisite, a dedicated *chargeable item class* [page 531] must exist in SAP CC. This ALLO class contains the following predefined custom properties:

Custom Property	Property Description
ALLOW_DEF_ID	The identifier of the allowance definition used to create the allowance in the provider contract relating to the received chargeable items.
ALLOW_START_DATE	The date/time at which the allowance must be activated.

As an SAP CC pricing specialist, you *configure and maintain* [page 536] this class. Use these definitions to fill in the fields in the user interface.

You must then configure a particular *charge plan* and a *reusable charge* that use this chargeable item class and that define the allowance creation based on allowance definitions identified in the incoming chargeable items. The created allowance must be active at the specified date/time.

i Note

A corresponding **ALLO consumption item class** must be created in SAP Convergent Invoicing (in SAP ERP/FI-CA) to enable the loading of the *consumption items* into SAP Convergent Invoicing.

Related Information

[Creating the Predefined ALLO Chargeable Item Class \[page 536\]](#)

[Managing Allowances for Integrating SAP CRM with SAP CC](#)

2.4.17.3.1 Creating the Predefined ALLO Chargeable Item Class

→ Remember

This topic is relevant only if you use SAP Convergent Charging 5.0 in an integrated *SAP Solution* scenario with SAP CRM and with SAP Convergent Invoicing in SAP ERP/FI-CA. For more information and user assistance, see the integration guides at help.sap.com/brim.

Your Core Tool user interface provides you with a useful template to create an [ALLO chargeable item class \[page 535\]](#) in SAP CC.

To create the predefined ALLO chargeable item class

1. Make a copy of the `ALLO_chargeable_item_class.xml` XML file located in the installation directory of your Core Tool user interface in the templates folder.
2. Open the copied file and replace `${catalog}` by the name of your service pricing catalog.
3. Save and close the XML file.
4. [Launch and log on \[page 379\]](#) to your Core Tool user interface for SAP Convergent Charging.
5. Create the **ALLO** chargeable item class by [importing \[page 543\]](#) the modified file.
6. (Optional step) In the SAP ERP/FI-CA system, create the ALLO consumption item class for SAP Convergent Invoicing. For more information on SAP Convergent Invoicing, refer to the [Help Resources \[page 383\]](#).
7. (Optional step) Back in the Core Tool user interface, [create](#) the corresponding [consumption item mapping](#).

i Note

You perform step 6 and step 7 only if the *Consumption Item Management* feature of SAP Convergent Invoicing is enabled for the storage of consumption items.

Next Step

[Customizing the Allowance Interface for SAP CRM](#)

Related Information

[Managing Allowances for Integrating SAP CRM with SAP CC](#)

2.4.17.4 Working with Chargeable Item Classes

Related Information

[Creating a Chargeable Item Class \[page 537\]](#)

[Opening an Existing Chargeable Item Class \[page 538\]](#)

[Modifying a Chargeable Item Class \[page 539\]](#)

[Setting Up a Chargeable Item Class \[page 540\]](#)

[Saving a Chargeable Item Class \[page 540\]](#)

[Deleting a Chargeable Item Class \[page 541\]](#)

[Exporting a Chargeable Item Class \[page 542\]](#)

[Importing a Chargeable Item Class \[page 543\]](#)

2.4.17.4.1 Creating a Chargeable Item Class

Use one of these procedures to create a chargeable item class.

Create a Chargeable Item Class

1. From the menu bar in the main window, select **File > New > Chargeable Item Class**. The *Choose Owner* window opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. Click *OK*. The *New Chargeable Item Class* window opens.
4. [Set up \[page 540\]](#) the chargeable item class.
5. Verify the chargeable item class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save and release \[page 540\]](#) your new chargeable item class.

→ Tip

You can create a chargeable item class by opening an existing chargeable item class and copying it.

Create a Chargeable Item Class from an Existing Chargeable Item Class

1. From the menu bar in the main window, select **File > Open > Chargeable Item Class**. The *Open Chargeable Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. In the *Chargeable Item Classes* folder of the catalog of the owner, select the chargeable item class to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding chargeable item class window opens.
5. **Rename the new chargeable item class** in the *Name* field, and then [set up \[page 540\]](#) it.
6. Verify the chargeable item class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save and release \[page 540\]](#) your chargeable item class.

Related Information

[Setting Up a Chargeable Item Class \[page 540\]](#)

[Saving a Chargeable Item Class \[page 540\]](#)

2.4.17.4.2 Opening an Existing Chargeable Item Class

You can open:

- An existing chargeable item class saved in the database
- An existing chargeable item class saved in an XML file

Open an Existing Chargeable Item Class Saved in the Database

1. From the menu bar in the main window, select **File > Open > Chargeable Item Class**. The *Open Chargeable Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. In the *Chargeable Item Classes* folder of the catalog of the owner, select the chargeable item class.
4. Click the *Open* button. The *Chargeable Item Class* window opens in display mode.

Open an Existing Chargeable Item Class Saved in an XML File

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File** . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.17.4.3 Modifying a Chargeable Item Class

i Note

You cannot modify the default properties, the existing user properties, and the name of a chargeable item class. You can however add new user properties to the chargeable item class.

Modify a Chargeable Item Class

1. [Open \[page 538\]](#) the chargeable item class.
2. Switch to the editing mode by clicking the *Edit Mode* icon  on the main toolbar. The chargeable item class may be reloaded if it has been modified since you have opened it.
3. [Set up \[page 540\]](#) the chargeable item class.
4. Verify the structure of a chargeable item class by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.

5. [Save and release \[page 540\]](#) the chargeable item class.

2.4.17.4.4 Setting Up a Chargeable Item Class

[Create \[page 537\]](#), [open \[page 538\]](#), or [modify \[page 539\]](#) a chargeable item class before setting it up. A *Chargeable Item Class* window must be open.

i Note

- After saving a chargeable item class, you cannot modify the default properties, the existing user properties (custom properties), and the name of a chargeable item class. You can however add new user-defined properties to the chargeable item class.
- If necessary, you can modify a chargeable item class at charge level when inserting a [Usage Rate \[page 573\]](#) component in the price plan of your charge.

To set up a chargeable item class, you first identify it, and then you add user properties to the table, or you modify the user properties of the table.

Name: Type the unique identifier of the chargeable item class.

Description: Describe the function of the chargeable item class.



: Click to add a new row to the table.



: Click to delete a row from the table.

Properties: Fill in or modify the columns of the table.

- *Name*: Type the identifier of the user property
- *Category*: Displays the category (default or user) of the property
- *Type*: Select the type of the property (number, string, or date)
- *Description*: Describe the function of the property

2.4.17.4.5 Saving a Chargeable Item Class

Once you have created a chargeable item class and then verified its configuration, you are ready to save it. You can save the chargeable item class to either the database or as an XML file on your hard disk.

i Note

After saving a chargeable item class, you cannot modify the default properties, the existing user properties, and the name of a chargeable item class. You can however add new user properties to the chargeable item class.

Save and Release a New Chargeable Item Class to the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. Click *Save*. The *Chargeable Item Class Creation* dialog box opens to inform you that the chargeable item class has been successfully created and released.
4. Click *OK*.

Save and Release an Existing Chargeable Item Class to the Database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. If the *Chargeable Item Class Modification* dialog box opens to inform you that the chargeable item class has been successfully modified, click *OK*. The new version of the chargeable item class is saved and released as the only current version.
3. If a *Warning* dialog box opens to inform you that the chargeable item class has been modified since you opened it, you can:
 - Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the chargeable item class.
 - Click *Cancel* to come back to the chargeable item class. See below how to save the chargeable item class as an XML file.

Save a Chargeable Item Class as an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click *OK*. The *Save* dialog box opens.
3. Select a directory to save the chargeable item class.
4. In the *File name* field, type the name of the file.
5. Click *Save*. The chargeable item class is saved as an XML file in your selected directory.

2.4.17.4.6 Deleting a Chargeable Item Class

⚠ Caution

- Read the [caution](#) about the consumption item mapping before deleting a chargeable item class.
- There is no undo function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

Before you delete a chargeable item class, you must first delete all objects which reference it.

For example, you can not delete a chargeable item class that is part of an offer in the database. You must first delete the offer and the charge that contain this chargeable item class, and then you can delete the chargeable item class.

Delete a Chargeable Item Class

1. From the menu bar in the main window, select **File > Delete > Chargeable Item Class**. The *Delete Chargeable Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. In the *Chargeable Item Classes* folder of the catalog of the owner, select the chargeable item class.
4. Click *Delete*. A deletion dialog box asks if you want to delete the chargeable item class.
5. Confirm the deletion of the chargeable item class by clicking *Yes*:
 1. If a dialog box confirms your choice, the chargeable item class has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the chargeable item class is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking *Yes* at step 5, you must delete the object or objects that reference the chargeable item class. The identifiers of these objects appear in the message.

2.4.17.4.7 Exporting a Chargeable Item Class

You can export chargeable item classes to a directory of your hard disk, where they are saved as XML files.

i Note

If you export a chargeable item class belonging to a [chargeable item package \[page 530\]](#), SAP Convergent Charging exports the chargeable item package with all its chargeable item classes.

Export a Chargeable Item Class to an XML File

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the chargeable item class.
3. In the catalog of the owner, select the chargeable item class.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the chargeable item class.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

Related Information

[Importing a Chargeable Item Class \[page 543\]](#)

2.4.17.4.8 Importing a Chargeable Item Class

You can import chargeable item classes in XML format from a directory of your hard disk.

i Note

If you import a [chargeable item package \[page 530\]](#), SAP CC Core Tool imports the chargeable item package with all its chargeable item classes. But you can individually use the chargeable item classes in your different price plans.

Import a Chargeable Item Class

1. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
2. Open the directory in which the chargeable item class is saved, and then select the file of the chargeable item class.
3. Click *Open*. The *Import Objects* dialog box opens. The options for importing versions of an object do not apply to objects because there is only one version of a chargeable item class.
4. In the *Import* column, clear the checkboxes of objects you do not wish to import.
5. Click *Import*.

i Note

SAP CC Core Tool can only import an object which has previously been exported and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available for import.

2.4.18 Charged Item Classes

⚠ Caution

As of SP 5 for release 5.0, the behavior of this master data is modified in case of an integrated *SAP Solution* scenario with SAP S/4HANA Cloud. **Every reference or operation related to prepaid accounts is no more available.** For more information and user assistance, refer to SAP Note [2772452](#).

⚠ Caution

Read the [caution](#) about the billable item mapping before deleting a charged item class.

In SAP Convergent Charging 5.0, you use the **charged item classes** to configure the information included in the [charged items](#), which are the resulting business transactions of the processing of the charging operations by the system. You also use the charged item classes to describe and filter the details of business transactions returned to the caller of the charging operation.

i Note

After creating charged item classes, you can redefine them at [offer level \[page 656\]](#).

In your Core Tool user interface, a charged item class is graphically represented by a tree that consists of nodes representing custom data fields. Each node represents an output data field whose type can be a string , a number , a date , or a boolean . The tree allows you to configure how these fields are computed by the system in the high-volume charged items that will be based on your current class.

You can create and use charged item classes for different charges customized in an [offer \[page 611\]](#).

If you use an external billing system

If you want to send charged item classes to an external billing system or any other external system, you must create the charged item classes from scratch, and then [set them up \[page 548\]](#).

Setting up your charged item classes

Because you know the contents of the transactions resulting from the rating and charging processes, you can define and set up the data of your charged item classes accordingly to retrieve information from the transactions. Your system billing or another system receives and uses this information.

If you use an SAP ERP/FI-CA system

SAP Convergent Charging is integrated with SAP ERP/FI-CA for managing high-volume data. SAP Convergent Charging can:

- Produce billable items asynchronously from the converted charged items.
- Send the billable items to SAP Convergent Invoicing in the SAP ERP/FI-CA or SAP S/4HANA system.

Setting up your charged item classes

You must map charged item classes onto billable item classes defined in SAP Convergent Invoicing. SAP Convergent Invoicing generates automatically. To do that, you create a charged item class from the mapping of a billable item class. Refer to [Billable Item Mapping](#) topic for more information when using SAP Convergent Invoicing and SAP ERP/FI-CA.

i Note

For more information, consult the SAP CC [Tuning Guide](#)

Related Information

[Working with Charged Item Classes \[page 545\]](#)

2.4.18.1 Working with Charged Item Classes

Related Information

[Creating a Charged Item Class \[page 545\]](#)

[Opening an Existing Charged Item Class \[page 546\]](#)

[Modifying a Charged Item Class \[page 547\]](#)

[Setting Up a Charged Item Class \[page 548\]](#)

[Deleting a Charged Item Class \[page 550\]](#)

[Saving a Charged Item Class \[page 549\]](#)

[Exporting a Charged Item Class \[page 551\]](#)

[Importing a Charged Item Class \[page 552\]](#)

2.4.18.1.1 Creating a Charged Item Class

Use this procedure to configure a new charged item class in the service pricing catalog.

Create a Charged Item Class

1. From the menu bar in the main window, select **File > New > Charged Item Class**. The *New Charged Item Class* window opens.
2. [Set up \[page 548\]](#) the charged item class.
3. Verify the charged item class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save and release \[page 549\]](#) your new charged item class.

→ Tip

You can create a charged item class by opening an existing charged item class and [copying \[page 546\]](#) it.

Related Information

[Setting Up a Charged Item Class \[page 548\]](#)

[Saving a Charged Item Class \[page 549\]](#)

2.4.18.1.2 Copying a Charged Item Class

Use this procedure to configure a new charged item class by copying an existing one.

Create a Charged Item Class from an Existing Charged Item Class

1. From the menu bar in the main window, select **File > Open > Charged Item Class**. The *Choose a Charged Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charged item class.
3. In the *Charged Item Classes* folder of the catalog of the owner, select the charged item class to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding charged item class window opens.
5. Rename the charged item class in the *Name* field, and then [set up \[page 548\]](#) this new charged item class.
6. Verify the charged item class structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save and release \[page 549\]](#) your new charged item class.

Related Information

[Setting Up a Charged Item Class \[page 548\]](#)

[Saving a Charged Item Class \[page 549\]](#)

2.4.18.1.3 Opening an Existing Charged Item Class

You can open:

- An existing charged item class saved in the database
- An existing charged item class saved in an XML file

To open an existing charged item class saved in the database

1. From the menu bar in the main window, select **File > Open > Charged Item Class**. The *Open Charged Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charged item class.
3. In the *Charged Item Classes* folder of the catalog of the owner, select the charged item class.
4. Click the *Open* button. The *Charged Item Class* window opens in display mode.

To open an existing charged item class saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File**. The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.18.1.4 Modifying a Charged Item Class

When modifying a charged item class, you can:

- Add new nodes (📄 string, 📊 number, 📅 date, 📌 boolean) to a charged item class.
- Assign a new property to a node.

The modified charged item class replaces the previous version in the back-end database.

i Note

You cannot modify the name of the charged item class and the name of nodes.

Modify a Charged Item Class

1. [Open \[page 546\]](#) the charged item class.
2. Switch to the editing mode by clicking the [Edit Mode](#) icon  on the main toolbar. The charged item class may be reloaded if it has been modified since you have opened it.
3. [Set up \[page 548\]](#) the charged item class.
4. Verify the structure of a charged item class by clicking the [Verify](#) icon  on the main window toolbar. Correct all elements underlined in red.
5. [Save and release \[page 549\]](#) the charged item class.

2.4.18.15 Setting Up a Charged Item Class

[Create \[page 545\]](#), [open \[page 546\]](#), or [modify \[page 547\]](#) a charged item class before setting it up. A [Charged Item Class](#) window must be open.

A charged item class is graphically represented by a tree that consists of nodes ( string,  number,  date/time,  boolean). Each node represents a data field that is generated by the system in corresponding charged items.

i Note

If necessary, you can **redefine** the node values set in your charged item class when configuring a charge plan, an allowance plan or an offer. See here:

- [Customized Charge: Output Item](#)
- [Allowance Logic: Output Item](#)
- [Offer Charge: Charged Item \[page 656\]](#)

Set Up a Charged Item Class

1. In the [Name](#) field of the identification area, type the unique identifier of the charged item class. For example: **Telephone Service**.
2. If necessary, describe the charged item class in the [Description](#) field.
3. In the tree display area, click the  root node to activate the charged item class.

4. On the elements toolbar (left), click the icon relating to the node that you want to add to the charged item class.
5. In the *Name* field of the identification area, type the identifier of the node. For example: **Call**. It is the name for the data field that will be set at runtime in a charged item based on this class.
6. If necessary, describe the node in the *Description* field. It facilitates the redefinition of the data field generation.
7. In the *Value* list of the *Definition* tab, select one of the following list items:
 - *Type a value*: Allows you to type any constant value except an empty string (no spaces and no characters).
 - *Undefined*: Allows you to select a system property that has no assigned value. You can change this property at offer level.
 - *Empty*: Allows you to select a system property that has no assigned value. You cannot change this property at offer level.
 - Any other property of the list. The rest of the list depends on the type of the node (string, number, date/time, boolean).
8. If you want to define a new output data field in your class, continue the procedure at step 3 by **clicking the root node** in the displayed tree.

i Note

- If you set up a boolean node with a source property, the value is converted by SAP Convergent Charging during the charging process. It converts the strings "0" and "false" and the number 0 to `FALSE`. It converts the strings "1" and "true" and the number 1 to `TRUE`. Otherwise the charging process fails because it cannot convert the source value.
- If you use SAP Convergent Charging with an SAP ERP system and if no value is assigned to the SUBPROCESS and BITTYPE nodes, you may need to assign these nodes the values which are defined in the related billable item mapping (Refer to [the note describing these values](#)).

Change the Value of a Node

1. In the tree display area of the charged item class, click a node.
2. In the *Value* field of the *Definition* tab, type a new constant value or change the property.

2.4.18.16 Saving a Charged Item Class

Once you have created a charged item class and then verified its configuration, you are ready to save it. You can save the charged item class to either the database or as an XML file on your hard disk.

i Note

After saving a charged item class, you can no longer remove nodes and modify the node names. However, you can change the values of the existing nodes and add new nodes to the tree.

Save and Release a New Charged Item Class to the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the Catalog* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charged item class.
3. Click *Save*. The *Charged Item Class Creation* dialog box opens to inform you that the charged item class has been successfully created and released.
4. Click *OK*.

Save and Release an Existing Charged Item Class to the Database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. If the *Charged Item Class Modification* dialog box opens to inform you that the charged item class has been successfully modified, click *OK*. The new version of the charged item class is saved and released as the only current version.
3. If a *Warning* dialog box opens to inform you that the charged item class has been modified since you opened it, you can:
 - Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the charged item class.
 - Click *Cancel* to come back to the charged item class. See below how to save the charged item class as an XML file.

Save a Charged Item Class to an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click *OK*. The *Save* dialog box opens.
3. Select a directory to save the charged item class.
4. In the *File name* field, type the name of the file.
5. Click *Save*. The charged item class is saved as an XML file in your selected directory.

→ Remember

You cannot use this file to import the charged item class in another SAP system landscape.

2.4.18.17 Deleting a Charged Item Class

⚠ Caution

- Read the [caution](#) about the billable item mapping before deleting a charged item class.

- There is no “undo” function in SAP Convergent Charging. Before deleting an object, make sure that this operation is necessary.

Delete a Charged Item Class

1. From the menu bar in the main window, select **File > Delete > Charged Item Class**. The *Delete Charged Item Class* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charged item class.
3. In the *Charged Item Classes* folder of the catalog of the owner, select the charged item class.
4. Click *Delete*. A deletion dialog box asks if you want to delete the charged item class.
5. Confirm the deletion of the charged item class by clicking *Yes*:
 1. If a dialog box confirms your choice, the charged item class has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the charged item class is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

Note

If an error message appears after clicking *Yes* at step 5, you must delete the object or objects that reference the charged item class. The identifiers of these objects appear in the message.

2.4.18.1.8 Exporting a Charged Item Class

You can export charged item classes to a directory of your hard disk, where they are saved as XML files.

Export a Charged Item Class to an XML File

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charged item class.
3. In the catalog of the owner, select the charged item class.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the charged item class.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

Related Information

[Importing a Charged Item Class \[page 552\]](#)

2.4.18.1.9 Importing a Charged Item Class

You can import charged item classes in XML format from a directory of your hard disk.

i Note

SAP CC Core Tool can only import an object that has previously been [exported \[page 551\]](#) (► [File](#) ► [Export](#) ►), rather than saved directly to a file (► [File](#) ► [Save](#) ► [In a File](#) ►).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available for import.

Import a Charged Item Class

1. From the menu bar in the main window, select ► [File](#) ► [Import](#) ►. The [Open](#) dialog box opens.
2. Open the directory in which the charged item class is saved, and then select the file of the charged item class.
3. Click [Open](#). The [Import Objects](#) dialog box opens. The options for importing versions of an object do not apply to objects because there is only one version of a charged item class.
4. In the [Import](#) column, clear the checkboxes of objects you do not wish to import.
5. Click [Import](#).
6. Work with the imported objects.
7. When necessary, save your data objects to the back-end database system.

Related Information

[Exporting a Charged Item Class \[page 551\]](#)

2.4.19 Aggregation Policies

In SAP Convergent Charging 5.0, an **aggregation policy** defines the rules that are applied to the different properties of a charged item during a charging operation performed in the [session-based execution mode \[page 364\]](#). The aggregation policies force the SAP CC system to merge multiple charged items into a single one.

→ Remember

In an integrated [SAP Solution](#) scenario, these business settings decrease the number of consumption items that SAP Convergent Charging sends (bulk loads) to SAP Convergent Invoicing.

An aggregation policy consists of:

- Aggregation rules that can be applied to one or more properties of the charged item class associated to the aggregation policy
- Expiration parameters used to configure the duration of an aggregation period

Before [creating \[page 553\]](#) and [setting up \[page 556\]](#) an aggregation policy, you must be familiar with [charged item classes \[page 543\]](#) because the aggregation rules are related to the properties of these classes.

For more information about aggregation policies, consult the technical guides. Refer to the chapters *Charged Item Aggregation* and *Charging Processes*. See [Help Resources \[page 383\]](#).

2.4.19.1 Working with Aggregation Policies

Related Information

[Creating an Aggregation Policy \[page 553\]](#)

[Opening an Existing Aggregation Policy \[page 554\]](#)

[Modifying an Aggregation Policy \[page 555\]](#)

[Setting Up an Aggregation Policy \[page 556\]](#)

[Deleting an Aggregation Policy \[page 559\]](#)

[Saving an Aggregation Policy \[page 558\]](#)

[Exporting an Aggregation Policy \[page 559\]](#)

[Importing an Aggregation Policy \[page 560\]](#)

2.4.19.1.1 Creating an Aggregation Policy

Use one of these procedures to create an aggregation policy.

Create an Aggregation Policy

To configure a new aggregation policy from scratch:

1. From the menu bar in the main window of the user interface, select **File > New > Aggregation Policy**.
The *Choose Owner* dialog box opens.
2. In the *Owner of Object* drop-down menu, select the owner of the aggregation policy.
3. Click **OK**. The *New Aggregation Policy* window opens.
4. [Set up \[page 556\]](#) the aggregation policy.

5. Verify the aggregation policy structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 558\]](#) the aggregation policy.

→ Tip

You can create a aggregation policy by opening an existing aggregation policy and copying it.

To create a aggregation policy from an existing aggregation policy

1. From the menu bar in the main window, select **File > Open > Aggregation Policy**. The *Select an Aggregation Policy* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the aggregation policy.
3. In the *Aggregation Policies* folder of the catalog of the owner, select the aggregation policy to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding aggregation policy window opens.
5. **Rename the aggregation policy** in the *Name* field.
6. [Set up \[page 556\]](#) the new aggregation policy.
7. Verify the aggregation policy structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. [Save \[page 558\]](#) the aggregation policy.

Related Information

[Setting Up an Aggregation Policy \[page 556\]](#)

[Saving an Aggregation Policy \[page 558\]](#)

2.4.19.1.2 Opening an Existing Aggregation Policy

You can open:

- An existing aggregation policy saved in the database
- An existing aggregation policy saved in an XML file

To open an existing aggregation policy saved in the database

1. From the menu bar in the main window, select **File > Open > Aggregation Policy**. The *Open Aggregation Policy* dialog box opens.

2. In the [Owner](#) drop-down menu, select the owner of the aggregation policy.
3. In the [Aggregation Policies](#) folder of the catalog of the owner, select the aggregation policy.
4. Click the [Open](#) button. The [Aggregation Policy](#) window opens in display mode.

To open an existing aggregation policy saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the [Open Parameters](#) dialog box, the [Open as Sub-Element of Current Object](#) option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File**. The [Open](#) window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click [Open](#). The [Open Parameters](#) dialog box opens.
4. Select the [Open as New Object](#) option.
5. Select the object that you want to insert.
6. Click [Open](#). A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.19.1.3 Modifying an Aggregation Policy

The modifications that you can make to an aggregation policy differ depending on whether it has been saved or not. You cannot modify the name of the aggregation policy and its related charged item class once you have saved it.

Modify an Aggregation Policy

1. [Open \[page 554\]](#) the aggregation policy.

2. Set the editing mode by clicking the *Edit Mode* icon  on the main toolbar. The aggregation policy may be reloaded if it has been modified since you have opened it.
3. [Set up \[page 556\]](#) the aggregation policy.
4. Verify the structure of the aggregation policy by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
5. [Save \[page 558\]](#) the aggregation policy.

2.4.19.1.4 Setting Up an Aggregation Policy

You must [create \[page 553\]](#), [open \[page 554\]](#), or [modify \[page 555\]](#) an aggregation policy before setting it up. An *Aggregation Policy* window must be open.

Set Up an Aggregation Policy

1. In the upper part of the *Aggregation Policy* window, identify the aggregation policy:
 - *Name*: Type the unique identifier of the aggregation policy if you create the aggregation policy. You cannot modify this field.
 - *Description*: Describe the function of the aggregation policy if necessary.
 - *Charged Item Class*: Select a [charged item class \[page 543\]](#) which must correspond to the class of charged items to aggregate. The properties of the selected class are used to fill the table located in the *Aggregation Rules* tab.
2. In the lower part of the *Aggregation Policy* window, you must fill in or modify the following tabs:
 - [Aggregation Rules \[page 556\]](#)
 - [Aggregation Period \[page 557\]](#)

Related Information

[Aggregation Period \(Tab\) \[page 557\]](#)

[Aggregation Rules \(Tab\) \[page 556\]](#)

2.4.19.1.4.1 Aggregation Rules (Tab)

The *Aggregation Rules* tab allows you to define the aggregation rules for each property of the charged item class that has been selected.

Each rule is based on a function which is applied to a property of the charged item class. The following functions are available:

- **Constant:** The default function is used to aggregate the charged items which have the same value and the same property type.
- **First:** The aggregated value corresponds to the non-zero value of the first charged item.
- **Last:** The aggregated value corresponds to the non-zero value of the last charged item.
- **Lowest:** The aggregated value corresponds to the lowest value of the pending and the current charged items. The null value is considered a positive infinity value, except for the date properties for which the null value is not taken into account.
- **Greatest:** The aggregated value corresponds to the highest value of the pending and the current charged items. The null value is considered a negative infinity value, except for the date properties for which the null value is not taken into account.
- **Sum:** The aggregated value corresponds to the sum of the values of the pending and the current charged items. The null value is considered the value 0.

The following table shows the types of property to which the functions apply (X for applicable and n/a for not applicable):

	String	Number	Date	Boolean
Constant	X	X	X	X
First	X	X	X	X
Last	X	X	X	X
Lowest	n/a	X	X	n/a
Greatest	n/a	X	X	n/a
Sum	n/a	X	n/a	n/a

i Note

- You can specify a reporting threshold for each function related to a Number property. For each Number property, the **Threshold** enables the reporting of the pending charged item each time the threshold value is exceeded.
- The Constant function also enables the reporting of the pending charged item if the condition is not respected (the value of the current charged item is not equal to the value of the pending charged item for the same property type).

2.4.19.1.4.2 Aggregation Period (Tab)

The **Aggregation Period** tab allows you to define a period for aggregating charged items that are related to confirmations of quotas. When this period expires, the pending charged item is considered reportable, and no other aggregation can be performed on it by the system. A new aggregation period is then started to aggregate the future charged items.

To define the aggregation period, you set up the following options:

- **Activate:** Select the checkbox to activate or deactivate the aggregation period.
- **Maximum Duration (in Hours):** Type the number of hours of the aggregation period.

2.4.19.15 Saving an Aggregation Policy

Once you have created a aggregation policy and then verified its configuration, you are ready to save it. You can save the aggregation policy to either the database or as an XML file on your hard disk.

To save a new aggregation policy to the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the aggregation policy.
3. Click *Save*. The *Aggregation Policy Creation* dialog box opens to inform you that the aggregation policy has been successfully saved.
4. Click *OK*.

To save an existing aggregation policy to the database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. If the *Aggregation Policy Modification* dialog box opens to inform you that the aggregation policy has been successfully modified, click *OK*. The new version of the aggregation policy is saved as the only current version.
3. If a *Warning* dialog box opens to inform you that the aggregation policy has been modified since you opened it, you can:
 - Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the aggregation policy.
 - Click *Cancel* to come back to the aggregation policy. See below how to save the aggregation policy as an XML file.

To save a aggregation policy as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click *OK*. The *Save* dialog box opens.
3. Select a directory to save the aggregation policy.
4. In the *File name* field, type the name of the file.
5. Click *Save*. The aggregation policy is saved as an XML file in your selected directory.

2.4.19.1.6 Deleting an Aggregation Policy

Before you delete an aggregation policy, you must first delete all objects which reference it or remove the references in the objects.

Delete an Aggregation Policy

1. From the menu bar in the main window, select **File > Delete > Aggregation Policy**. The *Delete Aggregation Policy* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the aggregation policy.
3. In the *Aggregation Policies* folder of the catalog of the owner, select the aggregation policy.
4. Click *Delete*. A deletion dialog box asks if you want to delete the aggregation policy.
5. Confirm the deletion of the aggregation policy by clicking *Yes*:
 1. If a dialog box confirms your choice, the aggregation policy has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the aggregation policy is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

Note

If an error message appears after clicking *Yes* at step 5, you must delete the object or objects that reference the aggregation policy. The identifiers of these objects appear in the message.

2.4.19.1.7 Exporting an Aggregation Policy

You can export aggregation policies to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to import the aggregation policy back into SAP Convergent Charging.

To export a aggregation policy

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the aggregation policy.
3. In the catalog of the owner, select the aggregation policy.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the aggregation policy.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.19.1.8 Importing an Aggregation Policy

You can import aggregation policies in XML format from a directory of your hard disk.

Several versions of an aggregation policy can exist in a database, corresponding to their stages of modification. You can import all the versions of an aggregation policy into SAP CC Core Tool or select only the versions you want.

To import a aggregation policy

1. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
2. Open the directory in which the aggregation policy is saved, and then select the aggregation policy file.
3. Click *Open*. The *Import Objects* dialog box opens.
4. Leave the default *All versions* option selected, or do the following:
 - To select only one version as of a certain date, select the *One version per object* option.
 - To replace all versions by the imported version, select the *Replace all versions* option.
 - To replace or not some existing versions by the imported version, select the *Use modification date as of* option and choose the date on which you save the imported version.
5. In the *Import* column, clear the checkboxes of objects you do not wish to import.
6. Click *Import*.

i Note

SAP CC Core Tool can only import an object which has previously been exported and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available for import.

2.4.20 Charges

⚠ Caution

As of SP 5 for release 5.0, the behavior of this master data is modified in case of an integrated *SAP Solution* based on SAP S/4HANA Cloud. Every reference or operation related to [prepaid accounts \[page 670\]](#) (in subscriber accounts) is no more available. For further information, refer to SAP Note [2772452](#).

→ Remember

- In an integrated *SAP Solution* scenario with the SAP CRM and SAP ERP/FI-CA components of SAP Business Suite, if you need to manage payments to a business partner, SAP SE recommends that you only configure appropriate master charges in SAP Convergent Charging (SAP CC) with the *Revenue*

Sharing and Partner Settlement feature enabled in SAP ERP/FI-CA. Refer to the [O2C Integration Guide \[page 383\]](#) documentation for more information about partner settlement, customer billable item classes, and partner billable item classes.

- Dependent charges cannot be used in stateless mode (refer to the section below if needed) even if menus and commands are available in the Core Tool user interface.

Stateless and Stateful Modes

Stateful and stateless are adjectives that describe whether a computer or computer program is designed to note and remember one or more preceding events in a given sequence of interactions with a user, another computer or program, a device, or other outside element. Stateful means that the computer or the program keeps track of interactions, usually by setting values in a storage field designated for that purpose. Stateless means that there is no record of previous interactions. Each interaction request is entirely processed from information that comes with it.

Stateless Mode

The stateless rating is a service provided by SAP Convergent Charging to your client application (online mediation system). The stateless rating feature means that the SAP CC system does not charge any account for a service usage but only calculates the corresponding price amount (rating process). During the stateless rating operations, the state of SAP Convergent Charging does not change. In this mode, SAP Convergent Charging does not modify or keep any data in its database after rating (balances, credit limits, counters in contracts).

For example, states of counters are stored and maintained in an external system outside SAP Convergent Charging. SAP CC Core Server runs as a basic 'calculator'. This rating process corresponds to the 3GPP "Class A rating definition".

i Note

In stateless mode, you cannot use objects such as charge plans, provider contracts, and dependent charges.

Stateful Mode

SAP Convergent Charging maintains the states of counters, for example, and updates counters when the rating is confirmed. In this mode, SAP Convergent Charging modifies or keeps data in its back-end database after charging. Stateful charging corresponds to the 3GPP "Class B rating definition".

In stateful mode, you can use any of SAP Convergent Charging's objects.

In SAP Convergent Charging 5.0, a charging business scenario consists of two stages:

- A rating process (aka dynamic pricing)
- And a charging process (determination of invoice recipient)

For example, when an end customer consumes a usage-based service to monetize, the rating process dynamically calculates a priced amount while the charging process defines which prepaid or external account will be charged or refilled with the amount.

A reusable charge allows you to configure this charging business scenario through a decision tree made up of two parts:

- The [price plan](#) that models the rating process (dynamic pricing)
- The [charging plan](#) that models the charging process (account assignment)

Charges consist of two types: [master \[page 563\]](#) and [dependent \[page 564\]](#) charges.

Price Plan

i Note

Using several currencies If you want to build commercial offers by using several currencies, you must create a charge for each currency in the same offer. To do this, you duplicate the same price plan whose currency you simply change. You then add these charges to the offer.

A reusable charge always includes a single price plan. The [price plan \[page 570\]](#) is a decision tree representing the algorithm to calculate an amount linked to a usage event, a recurring event, or a one-shot event.

For example, an amount can be linked to the usage of an Internet service through a [chargeable item class \[page 531\]](#) if the price plan contains a [usage rate component \[page 573\]](#).

One or more charges make up an [offer \[page 611\]](#). If the price plan in a charge uses [counters \[page 567\]](#), [parameters \[page 574\]](#), or [translation tables \[page 422\]](#), you can redefine their values when integrating the charge in the offer. You can modify these values again in the related [subscription \[page 700\]](#) for a given customer.

You can think of charges as small pricing blocks that are related to chargeable item classes (*) and exist independently of offers. And you can even use charges in several offers that are related to the same chargeable item class.

(*) In this case, the price plan of the charges must contain a usage rate component.

Charging Plan

A reusable charge always includes a single charging plan. A [charging plan](#) is a decision tree that defines which accounts will be charged or refilled with the amount of the service calculated by the related price plan.

To charge or refill an account, the charging plan is linked to a [subscriber account \[page 668\]](#) through the mapping of charging references included in each subscription. When an end customer subscribes to different charges, the charging references of the related charging plan are connected to one or more accounts defined in the related [subscriber account \[page 668\]](#).

Before Starting

→ Remember

- It is strongly recommended to read the [caution \[page 570\]](#) about what you can do or not in price plans
- [Read the note \[page 582\]](#) about making retroactive changes to a charge, an offer or a charge plan
- [Read the note \[page 567\]](#) about the persistent counters

Before [creating \[page 580\]](#) and [setting up \[page 583\]](#) a reusable charge, you must be familiar with the following:

- [Charge Window Areas \[page 566\]](#)
- Type of charges: [master \[page 563\]](#) and [dependent \[page 564\]](#) charges.
- [Counters \[page 567\]](#)
- [Price Plans \[page 570\]](#)
- [Charging Plans](#)
- [Version change of a charge \[page 602\]](#)

Related Information

[Customized Use of Mapping Tables in the Charges and Refill Logic \[page 475\]](#)

[Customized Use of Range Tables in the Charges and Refill Logic \[page 513\]](#)

[Using SAP CRM Prices in Recurring Charges](#)

[Synchronizing Recurring Fees with Billing Cycles in SAP Convergent Invoicing](#)

2.4.20.1 Master Charges

A master charge is a [charge \[page 560\]](#):

- Not synchronized with other charges customized in an offer
- Independent of other charges concerning its trigger mode and its calculation mode

An [offer \[page 611\]](#) contains at least a master charge, and the master charge contains the price plan. A master charge can be used to credit or debit a client or partner depending on its role in the charge plan.

This charge represents a main amount that is agreed upon between the end customer and the service provider. It does not represent an associated amount such as sponsorship, the commission paid on the sale of a service, or a derived amount such as a discount on a basic price (which varies depending on usage).

Trigger mode

Contrary to the [dependent charge \[page 564\]](#), a master charge is triggered independently of other charges. For example, if an end customer decides to subscribe to a document consultation service, the corresponding

subscription charge is triggered without being dependent on another event. If the master charge is triggered periodically, the periodicity is not linked to another charge.

Calculation mode

A master charge contains the main [price plan \[page 570\]](#) of an amount. The master charge can function using solely its rating context property values and does not require data calculated in another price plan. You can share transient counters set up in the price plan of the master charge with the price plan of dependent charges.

Characteristics

You need to set up charges if you use them in offers. Setting up a master charge means redefining its existing characteristics.

i Note

You define a reusable charge as a master charge on the [Definition \[page 584\]](#) tab.

2.4.20.2 Dependent Charges

i Note

- In an integrated [SAP Solution](#) scenario with the SAP CRM and the SAP ERP/FI-CA components of SAP Business Suite, if you need to manage payments to a business partner, SAP SE recommends that you do not configure any dependent charges. [Refer to the note \[page 560\]](#).
- Dependent charges cannot be used in stateless mode (refer to the section below if needed) even if menus and commands are available in the graphical user interface.

Unlike a [master charge \[page 563\]](#), a dependent charge:

- Is synchronized with another charge customized in the offer.
- Uses either the trigger mode or the calculation mode of the other charge or uses both modes simultaneously.
- May depend upon another dependent charge. In this case, the links between charges are translated into a series of descending dependencies.
- Is assigned a [role](#) when it is customized inside an offer.

❖ Example

Private individuals can subscribe to *Learn.com*, a company providing a range of online documents. Learn.com buys the documents from specialized authors to whom it pays royalties in the form of commissions on received income.

Commissions are represented by a **Sales Commission** dependent charge linked to a **Document Subscription** master charge.

Trigger Mode

A dependent charge can only be triggered when the charge it depends on is triggered.

❖ Example

For example, when a customer pays subscription fees, a commission is to be paid to a third party. In this way, the **Document Subscription** charge triggers the dependent **Sales Commission** charge.

Calculation Mode

The calculation of a dependent charge can be linked to the amount calculated by another charge. The price plan of the dependent charge depends on the result of another price plan that is integrated in the other charge. This dependency means an amount will first be calculated in the main price plan before it can be used by the dependent plan.

The property that you use to link a master charge amount to a dependent charge is the base amount property . The link is determined by a common chargeable item class, a recurring rate, or a one-shot rate component. The base amount property can be used in cases such as commissions where a 10% commission is calculated from a master charge amount.

❖ Example

End customers can download reference documents from *Learn.com*. Downloading costs vary according to the module and document volume. Learn.com must pay the document authors a commission equal to 5% of sales. You need to know the download amount to determine the amount of commission to be paid.

The **Document Download** charge calculates the amount to be paid to Learn.com by its customers. The **Document Commission** charge calculates an amount to be paid to the authors, and this amount depends on the amount paid by the end customers.

Characteristics

You need to set up charges if you use them in simple or complex offers. Setting up a dependent charge means redefining its existing characteristics if necessary.

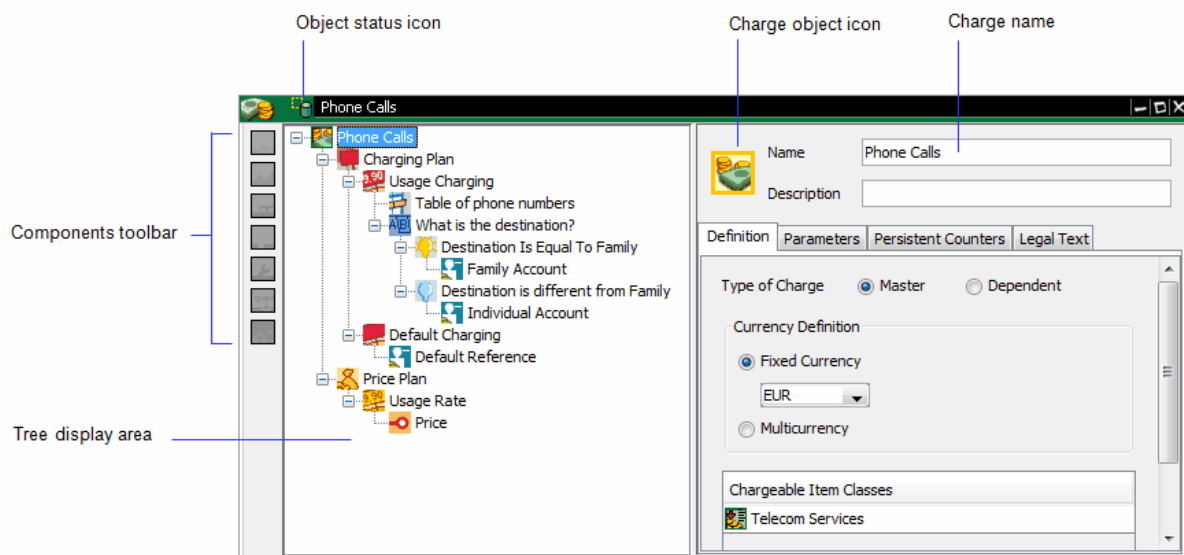
i Note

Dependent charges are set up on the **Definition** tab of charges included in offers.

2.4.20.3 Charge Window Areas

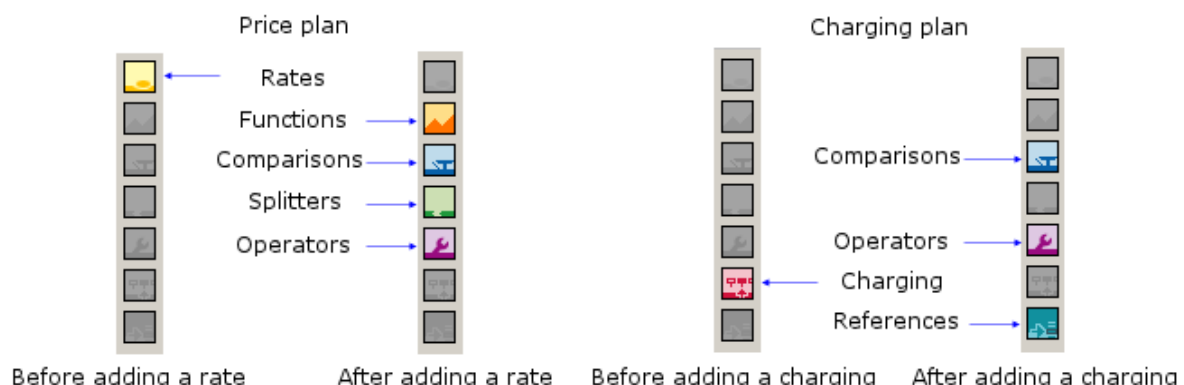
The *Charge* window opens when you open a charge or create a charge and link it to a chargeable item class.

The following figure shows a *Charge* window in which an SAP CC user has built a charging plan and a price plan. The charge "Phone Calls" is defined as a master charge and is linked to the chargeable item class "Telecom Services".



The *Components toolbar* is available when you click the *Price Plan* icon  or the *Charging Plan* icon  in the tree display area. The toolbar contains shortcut buttons to add calculation tools (called components) that are categorized into seven families according to their main functions.

If you have not yet added a component to your tree, only the *Rates* family icon or the *Charging* family icon is available. After adding a Rate or a Charging component, the other component families are available depending on the type:



The *object status icon* [\[page 395\]](#) shows you if the open object is being created, is being modified, or has been saved.

The *tree display area* shows a graphical representation of the tree, which is made up of rating and charging components that appear as icons. By clicking on different elements in the tree, the information related to the

selected element is displayed in the [tab area](#) and different component families are available on the [Components toolbar](#).

2.4.20.4 Counters

In SAP Convergent Charging 5.0, a [counter](#) is a numeric variable you can define and declare in a reusable charge. Each counter has a name and an initial value that you assign when you create the charge. A counter can be used in all rates, and you can change its value at any time in the charge. There is no limit to the number of counters you can create. During the implementation project phase, you check the performances.

You can declare two types of counters:

- [Persistent \[page 567\]](#)
- [Transient \[page 568\]](#)

Related Information

[Sharing Transient Counters with Dependent Charges in Charge Plans](#)

2.4.20.4.1 Persistent Counters

Note

Persistent counters are declared at the root of the reusable charge (see the [Definition \[page 584\]](#) tab). You can redefine persistent counters in a price plan but you cannot redefine persistent counters in a charging plan. This means that the persistent counters are only used with their initial value in a charging plan.

When you declare a persistent counter  in a charge, SAP CC will create a counter in each subscription that activates this charge. The counter is updated and saved to the back-end database during the charging process and refilling process. The life-cycle of a persistent counter is linked to that of a subscription or a provider contract.

Persistent counters declared in a charge are visible and can be redefined in offers including the charge.

In offers, you can configure persistent counters which can then be shared across some or all charges. These are called shareable counters.

Persistent counters introduce a new numeric rating property dedicated to a specific subscription. You can retrieve the rating property via the calculation system.

Example

As the telephone operator TelcoServ, you offer a package called Advantage. End customers pay a subscription fee of \$35 and receive special rates for weeknight and weekend calls. Anyone subscribing to

this offer receives 30 free minutes of call time. In order to include these minutes of usage as free of charge in your price plan, you create a counter that decrements for each minute used and signals SAP CC Core Server when 30 minutes have been used up. In this way, it can then start charging the service usage.

2.4.20.4.2 Transient Counters

i Note

Transient counters are only available in the price plan of a reusable charge (see the [Definition \[page 590\]](#) tab).

Contrary to a persistent counter, a transient counter  is not saved to the back-end database system but stored in internal memory during the charging process. The transient counters declared in a reusable charge are not visible and cannot be redefined in charge plans including the charge; However, [transient counters can be shared](#) by master and dependent charges.

The life cycle of transient counters is linked to a charging session because the transient counters are created when the corresponding session-based charging process starts, and they are deleted when the session-based charging process stops.

Transient counters are mainly used in tariff plans intended for [session-based charging \[page 364\]](#).

i Note

Transient counters can be shared with a master charge and its dependent charges once the reusable charges are customized in an offer. Refer to the procedure to enable this share.

❖ Example

In the chargeable item class "Telephone Services", you charge the end customer \$0.20 per call minute. To compute the price of a telephone call, you create a price plan using the transient counter "call_duration" and the [user properties \[page 531\]](#) "duration_quota" and "method". The user property "method" specifies if the duration quota is confirmed (updated) or reserved (not updated). The following table shows the session-based rating of a 3-minute call:

Session step	Amount to cancel	Amount to confirm	Amount to reserve
Start			3 x \$0.20 = \$0.60
(method = reservation)			call_duration = 0
(duration_quota = 3 minutes)			

Session step	Amount to cancel	Amount to confirm	Amount to reserve
Update	\$0.60 (3 x \$0.20)	2 x \$0.20 = \$0.40	
(method = confirmation)	call_duration = 0	call_duration = 2 minutes	-----
(duration_quota = 2 minutes)	-----	-----	3 x \$0.20 = \$0.60
-----			call_duration = 2 minutes
(method = reservation)			
(duration_quota = 3 minutes)			
Stop	\$0.60 (3 x \$0.20)	1 x \$0.20 = \$0.20	
(method = confirmation)	call_duration = 2 minutes	call_duration = 3 minutes	
duration_quota = 1 minute			

2.4.20.4.3 Using a Charge to Configure the Initialization of a Shared Counter

You configure a reusable charge that defines the initialization of a shared persistent counter when it is created in a [provider contract](#).

This charge must include:

- The declaration of the persistent counter you want to share
- A parameter dedicated to the counter initialization
- A [One-Shot Rate](#) component⁵³ that configures the initialization of a counter with the parameter value

⚠ Caution

Do not initialize the same counter twice.

To create a reusable charge dedicated to the settings initializing the shared counter

1. Create and set up a reusable charge.
2. Add a one-shot rate component, a persistent counter, and a parameter to the charge. Note that the parameter enables you to initialize the counter value at provider contract level.
3. Set the *Event Name* to *Activation* in the *Definition* tab of the *One-Shot Rate* component.

⁵³ See the [primary help of logic components \[page 831\]](#) for more information about *One-Shot Rates* and *Counter Operators*

4. Add a [Counter Operator \[page 573\]](#) component to the *One-Shot Rate* branch tree.
5. Set the counter to the value of the parameter in this *Counter Operator* component⁵⁴

2.4.20.5 Price Plans

A price plan is a set of instructions that computes the amount of a [charge \[page 560\]](#). A price plan is graphically represented by a rating tree.

At runtime, calculations in a price plan are only performed when the charge is triggered by:

- The arrival of service usage information or a ticket after a service⁵⁵ has been consumed.
- A provider contract event: activation, suspension, or resumption
- A periodic event in the case of a recurring amount such as an annual subscription fee
- The trigger of a master charge for a dependent change

→ Remember

[Read the topic \[page 683\]](#) about taxes because you can include or not the taxes in price plans.

Before Starting

⚠ Caution

We strongly recommend that you do not modify the structure of price plans in existing charges that are already subscribed in subscriptions.

You can however modify existing charges already subscribed by adding to or removing from price plans any component with the exception of RECURRING RATES or ONE-SHOT RATES components.

If you want to add RECURRING RATES or ONE-SHOT RATES components to an existing charge already subscribed, you must do the following:

- Create a new charge in which you insert the one or more new components
- Update the related offers by adding the new charge
- Update the subscriptions relating to the offers that you have modified

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If you are building a price plan for prepaid environment and [prerating and postrating \[page 362\]](#), the operations are used to avoid negative account balances. You thus need to keep the following considerations in mind when creating price plans. You should design your price plan so that the prerating amount is greater than or equal to the postrating amount. If a rating event is canceled, this should not result in a postrating

⁵⁴ See the [primary help of logic components \[page 831\]](#) for more information about *One-Shot Rates* and *Counter Operators*

⁵⁵ Represented in SAP CC by a [chargeable item class \[page 531\]](#)

balance becoming greater than the pre-rating balance. If you do not follow this rule, the balance may be less than 0. (The note is equally true for the [session-based rating \[page 364\]](#) feature. The confirmed amount must not be greater than the reserved amount.)

Before [setting up \[page 590\]](#) a price plan, you must be familiar with the following:

- [Rating Tree \[page 571\]](#)
- [Rate Components \[page 573\]](#)
- [Counters \[page 567\]](#)
- [Parameters \[page 574\]](#)
- [Rating Context \[page 357\]](#)
- [Session-Based Charging and Reservation \[page 364\]](#)

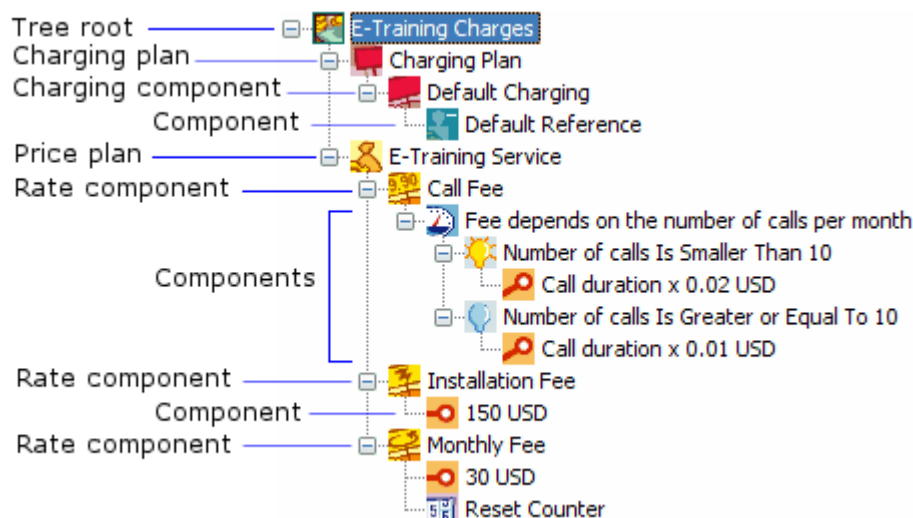
Related Information

[Working with Price Plans \[page 590\]](#)

2.4.20.5.1 Rating Tree

A [price plan \[page 570\]](#) is graphically represented by a tree structure called a rating tree. A price plan component represents each instruction inside a price plan. A rating tree is a decision tree that contains the price plan. This structure consists of a root from which [rate components \[page 573\]](#) create branches. At the ends of each branch, a Function component describes an amount.

As shown in the illustration below, the tree contains the root  representing the charge and the price plan  with branches for the different rate components:



In addition to rate components, you can create the following items that can be redefined at offer or subscription level:

- [Counters \[page 567\]](#)
- [Parameters \[page 574\]](#)
- [Pricing Macros \[page 411\]](#)
- [Translation Tables \[page 422\]](#)

The following items can be redefined at charge plan or provider contract level:

- [Counters \[page 567\]](#)
- [Parameters \[page 574\]](#)

Several price plans can reuse pricing macros and translation tables.

Test of a price plan

Once your price plan is complete, SAP Convergent Charging provides you with the [Rating Trial Run \[page 603\]](#) tool to test your price plan.

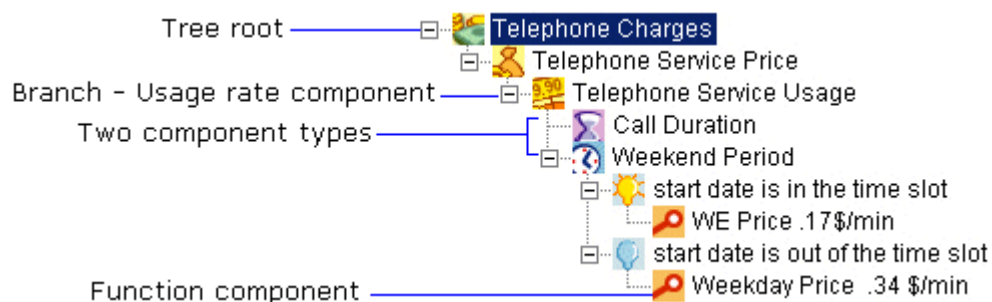
2.4.20.5.2 Example of a Price Plan

You are the telephone operator TelcoServ who sells telephone communications. You invoice your customers' telephone calls on a call-length basis. If the call is made during the weekend, the price is \$0.17 cents/minute. If the call is made during the week, the price is \$0.34 cents/minute.

Your Price Plan will contain a Usage rate branch. This branch will include several calculation or test actions which answer the following questions:

- How long was the call?
- Was the call made during the weekend period?
- What is the price to be applied?

You carry out these actions and decisions by using components that belong to several families. Your rating tree looks like this:



2.4.20.5.3 Rate Components

Rate components are calculation tools you use to create a [price plan \[page 570\]](#) or a [pricing macro \[page 411\]](#). Together the components make up a rating tree. You use the rating tree in a price plan to calculate the amount of a [charge \[page 560\]](#).

Each main branch of the price plan begins with a Rate component that is linked to a rate activation method. There are three types of rate linked to three methods of activation:

Type of rate	Activation
 Usage	Each usage
 Recurring	Periodic
 One-Shot	Once only (One-Off)

The values generated higher up a rating branch become available to all parts of the branch further toward the ends of the branch. When a property is generated on one rating branch, it cannot be used on another rating branch.

Once you have selected the price plan icon  in the rating tree display area of your charge, you can start building a rating tree.

Price plan components

The components of a rating tree are grouped into five families depending on their main function:

- Rate components  always begin the main branches of a rating tree.
- Comparator , Splitter  and Operator  components help to calculate a rate.
- Function components  end each branch of a rating tree with a final calculated amount.

i Note

For more comprehensive detail on using each component, refer to the primary help relating to components: [Working with Logic Components \[page 831\]](#)

2.4.20.5.4 Parameters

In SAP Convergent Charging 5.0, a *parameter*  is a variable defined in a [reusable charge \[page 560\]](#) to customize the pricing logic for the subscription- and usage-based service to monetize. You set up a name, a type, and a default value to the parameter when you declare it in the reusable charge. This declaration leads to the automated creation of parameters in the contracted subscription by using the default value or a new and redefined value. The advantage of this parameter is that you can redefine its value in the pricing catalog or in the customer master data.

Use

At runtime, a parameter introduces a new numeric, a date, or a string-type property to the [rating context \[page 357\]](#). You can configure a [price plan \[page 570\]](#) or a [charging plan](#) that uses the parameter value.

i Note

Particular string types are available in a reusable charge: *Mapping Table ID*, *Mapping Table Key*, and *Range Table ID*. You need these types to use [mapping tables \[page 469\]](#) or [range tables \[page 503\]](#) in your pricing logic or to use [SAP CRM prices in recurring charges](#).

Redefinition

A parameter **can be redefined later** on to highly customize the pricing configuration of your chargeable service or product:

- In the pricing catalog, you can redefine the value of a parameter when you add the charge that contains it to an [offer \[page 611\]](#) (see the [parameters of a charge plan](#)).
- In customer master data, a parameter is automatically added to a [>subscription \[page 700\]](#) that is subscribed to by an end customer. The parameter value is redefined when this charge is activated (contracted) as part of a [>subscription](#). For example, see the [parameters of subscriptions \[page 743\]](#).

Example

See [Example of Parameters \[page 575\]](#).

Configuration

Parameters are set up on the [Parameters \[page 585\]](#) tab of reusable charges.

2.4.20.5.4.1 Example of Parameters

TelcoServ company proposes a certain number of call time (hours) for a given subscription. The configured price plan calculates the corresponding subscription fee, which can also be a parameter. The call plan has two parameters **Subscription** and **Call Time**. These parameters can vary as shown below:

Subscription Parameter	Call Time Parameter
\$20	2 hours
\$40	5 hours
\$60	10 hours

Using these parameters, you can design and configure specialized packages (call plans) where no other parameters are visible.

For example, you can model, design, and configure a **2-hour Subscription** package in which the amount of call time is set to two hours and the amount of the subscription is \$20.

2.4.20.6 Charging Plans

→ Remember

If you use charge plans, provider contracts, and refill plans, you cannot refill an account through a charging plan. You must use a [refill plan](#).

A charging plan is a set of instructions that determines a reference to:

- Charge the calculated amount of a price plan to an account.
- Refill the account with the calculated amount of the refill logic.

A charging plan is represented by a charging tree whose leaves are [References components](#): Default Reference, Internal Reference, External Reference, and Refill.

Charging References

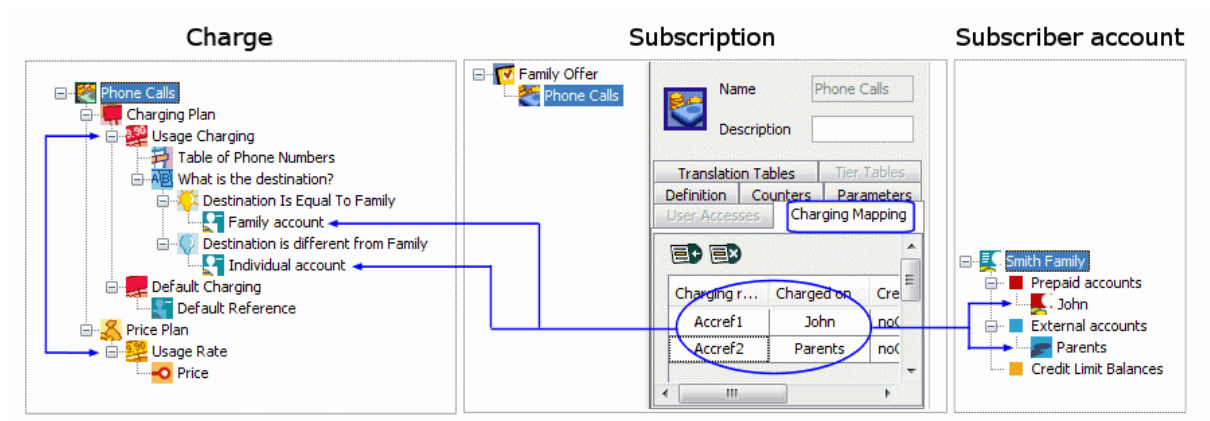
When working with charges and [offers \[page 611\]](#) for subscriptions, you create **charging references which are not typed**.

In a charging plan, the References components contain the charging references to accounts. You create the charging references in the internal reference dictionary, except the charging references of the External Reference that you create in the External Reference component itself. When the charging references are assigned to the accounts defined in a subscription (see the illustration below), SAP CC can charge or refill the accounts with the calculated amounts of the price plan.

You can use:

- **External charging references:** They relate to the External Reference component. These charging references are used to charge accounts outside SAP Convergent Charging (external systems); therefore, you cannot use external references in the charging mapping of subscriptions.
- **Other charging references:** They relate to the Default Reference, Internal Reference, and Refill components. These charging references are used as charging links between charges and subscriber accounts as shown in the illustration below. In a subscription, a table describes the combinations between charging references and accounts.

The following illustration shows the relationship between charge, subscription, and subscriber account:



Note that in a:

- **Charge:** A charging plan is triggered by the same events as those of the price plan. Before building a charge, it is therefore important to know the rules⁵⁶ describing the links between the charging plan and the price plan. By default, the charging plan contains a default component, a default reference, and a [dictionary of internal references](#).
- **Subscription:** The tab **Charging Mapping** of a charge allows you to assign the accounts of the subscriber to the references of the charging plan. For more information, refer to [charging mapping \[page 738\]](#) and how to [set up this mapping \[page 748\]](#) in the subscriptions.
- **Subscriber account:** Depending on the subscription mapping, the accounts and balances of the [subscriber account \[page 668\]](#) are charged or refilled with amounts calculated in the price plan. If the charging mapping in the subscription is empty, the subscriber account contains a default account which is charged or refilled with all amounts calculated in the price plan.

Before Starting

Before [setting up \[page 594\]](#) a charging plan, you must be familiar with the following:

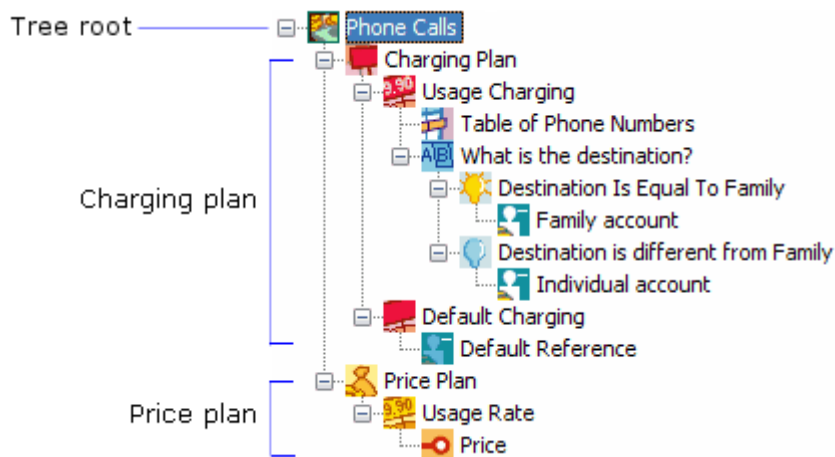
- [Charging Tree](#)
- [Charging Components](#)
- Charging Plan rules (refer to the primary help relating to components [here \[page 831\]](#).)
- [Account Assignments](#) in provider contracts
- [Charging Mapping \[page 738\]](#) in subscriptions

⁵⁶ For more information about the rules, refer to the primary help relating to [component \[page 831\]](#).

2.4.20.6.1 Charging Tree

A charging plan is graphically represented in the user interface by a tree structure called a charging tree. Each instruction inside a charging plan is represented by either a charging component or a pricing component⁵⁷. A charging tree is a decision tree that contains the charging plan. This structure consists of a root from which charging components create branches. At the ends of each branch, a Reference component describes which account must be debited or credited.

As shown in the illustration below, the tree contains the root  representing the charge, the [charging plan](#) , and the charging tree with the branches for the different [charging components](#) or [rate components](#) [page 573]:



In a charging plan, you can use [translation tables](#) [page 422] or [parameters](#) [page 574]⁵⁸ which are variables and properties that can be redefined at offer or subscription level. The parameters can also be redefined at charge plan or provider contract level. Translation tables can be reused in several charges.

2.4.20.6.2 Example of a Charging Plan

TelcoServ offers a Family package allowing to charge calls to a family or individual account depending on call destinations. The family Smith subscribed to the Family package allowing Mr and Mrs Smith's calls to be charged to an external account (postpaid account) while their son's calls are charged to a prepaid account. When John calls his parents, calls are charged to the external account

According to the illustration below, the price plan calculates the price of each call. After calculation, the amount of the price plan is charged to the Family account (external account) or the Individual account (prepaid account).

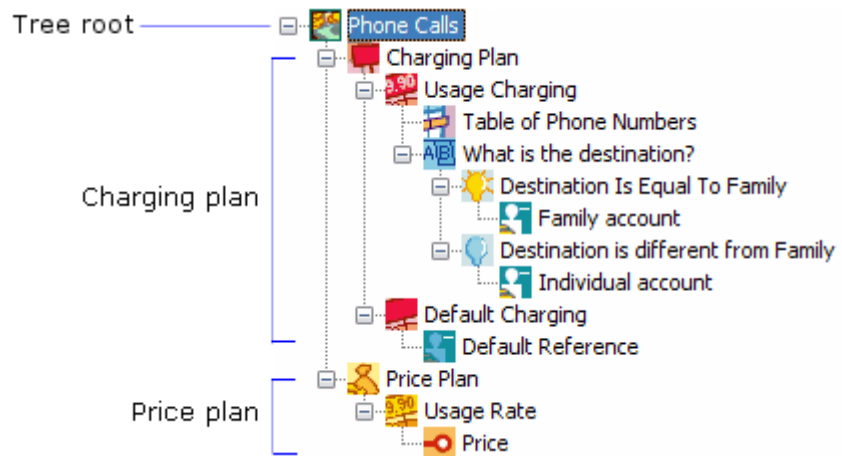
The charging plan contains a [Usage charging](#) branch. This branch includes test actions which answer the following questions:

⁵⁷ A charging plan can also contains some rate components such as comparators and operators.

⁵⁸ Parameters are created in the charge.

- What is the phone number?
- What is the call destination?
- Which account should be charged?

These actions and decisions are carried out by using components that belong to a several families. The charging tree looks like this:



2.4.20.6.3 Charging Components

Charging components are tools you use to create a [charging plan](#). Together the components make up a [charging tree](#). You use the charging tree in a charging plan to debit or refill an account.

Each main branch of the charging plan begins with a Charging component that is linked to a charging activation method. There are three types of charging linked to three methods of activation:

Type of charging	Activation
 Usage	Each usage
 Recurring	Periodic
 One-Shot	Once only

The values generated higher up a charging branch become available to all parts of the branch further toward the ends of the branch. When a property is generated on one charging branch, it cannot be used on another charging branch.

Once you have selected the charging plan icon  in the charging tree display area of your charge, you can start building a charging tree.

Charging plan components

The components of a charging tree are grouped into three families depending on their main function:

- Charging components  always begin the main branches of a charging tree.
- Comparator  and Operator  components⁵⁹ help to make comparisons, create, or modify properties.
- Reference components  end each branch of a charging tree.

Note

For more comprehensive detail on using each component, refer to the primary help relating to components [here \[page 831\]](#).

2.4.20.7 Working with Reusable Charges

Related Information

[Creating a Reusable Charge \[page 580\]](#)

[Opening an Existing Charge \[page 581\]](#)

[Modifying a Charge \[page 582\]](#)

[Setting Up a Reusable Charge \[page 583\]](#)

[Adding a Component \[page 600\]](#)

[Saving a Charge \[page 586\]](#)

[Reading a Price Plan \[page 603\]](#)

[Doing a Trial Run of a Price Plan \[page 603\]](#)

[Deleting a Charge \[page 588\]](#)

[Deleting the Versions of a Charge \[page 603\]](#)

[Exporting a Charge \[page 589\]](#)

[Importing a Charge \[page 589\]](#)

[Using SAP CRM Prices in Recurring Charges](#)

[Synchronizing Recurring Fees with Billing Cycles in SAP Convergent Invoicing](#)

⁵⁹ These components are also used in a [price plan \[page 570\]](#) to calculate a price.

2.4.20.7.1 Creating a Reusable Charge

Use one of these procedures to create a [reusable charge](#) [page 560].

To create a charge

1. From the menu bar in the main window, select **File > New > Charge**. The *Choose Owner* window opens.
2. In the *Owner of Object* drop-down menu, select the owner of the new charge.
3. Click *OK*. The *New Charge* window opens.
4. [Set up](#) [page 583] the reusable charge.
5. Verify the charge structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save](#) [page 586] the reusable charge.

→ Tip

You can create a charge by opening an existing charge and copying it.

To create a charge from an existing charge

1. From the menu bar in the main window, select **File > Open > Charge**. The *Open Charge* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the new reusable charge.
3. In the *Charges* folder of the catalog of the owner, select the charge to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *Charge* window opens.
5. [Modify](#) [page 582] the reusable charge if necessary.
6. Verify the charge structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save](#) [page 586] the reusable charge.

i Note

- A [master charge](#) [page 563] is independent of all other charges.
- A [dependent charge](#) [page 564] depends on another charge in order to be calculated or triggered.
- Each [Usage Rate component](#) [page 854] configured in a price plan can only refer to an exclusive [chargeable item class](#) [page 531], which means two usage rates cannot share the same chargeable item class (this is true for a Usage Charging component in a charging plan).
- For more information about working with rating or charging components, see the topic [Working with Logic Components](#) [page 831].

Related Information

[Setting Up a Reusable Charge \[page 583\]](#)

[Saving a Charge \[page 586\]](#)

2.4.20.7.2 Opening an Existing Charge

You can open:

- An existing charge saved in the database
- A previous version of a charge saved in the database
- An existing charge saved in an XML file

To open an existing charge saved in the database

1. From the menu bar in the main window, select **File > Open > Charge**. The *Open Charge* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charge.
3. In the *Charges* folder of the catalog of the owner, select the charge. The *charge* window opens in display mode.

Charges are managed chronologically. After you save a charge, you can access [previous versions \[page 602\]](#) of it that exist in the database.

To open a previous version of a charge saved in the database

1. From the menu bar in the main window, select **File > Open > Charge**. The *Open Charge* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charge.
3. In the *Charges* folder of the catalog of the owner, select the charge, and then click *Open*. The *Charge* window opens in display mode.
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the charge from the list.
6. Click *View*.

To open an existing charge saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File** > **Open** > **From File** . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

Related Information

[Display/Edit Mode \[page 390\]](#)

2.4.20.7.3 Modifying a Charge

You can modify a [price plan \[page 570\]](#) or a [charging plan](#) and add to or remove counter declarations or parameters from a previously saved charge. When you save the charge in the database, you can modify its versions (see the process below).

Change the Version of an Object

When you open an object, you can access its versions by clicking the *Change Version*  icon on the toolbar.

Modifying and saving an object modifies the *Change Version* list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

To modify a charge

1. From the menu bar in the main window, select **File > Open > Charge**. The *Open Charge* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charge.
3. In the *Charges* folder of the [pricing catalog \[page 400\]](#), select the charge.
4. Click *Open*. The *Charge* window opens in display mode.
5. Set up the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The charge may be reloaded if it has been modified since you have opened it.
6. [Set up \[page 583\]](#) the charge.
7. Verify the charge structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
8. [Save \[page 586\]](#) the charge.

i Note

You cannot modify a charge type once you have defined it.

Related Information

[Display/Edit Mode \[page 390\]](#)

[Setting Up a Reusable Charge \[page 583\]](#)

[Saving a Charge \[page 586\]](#)

2.4.20.7.4 Setting Up a Reusable Charge

[Create \[page 580\]](#), [open \[page 581\]](#), or [modify \[page 582\]](#) a charge before setting it up. A *Charge* window must be open.

The elements of the [Charge window \[page 566\]](#) enable you to create:

- A [price plan \[page 570\]](#) that calculates the amount of a charge
- A [charging plan](#) that charges the calculated amount of the price plan to an account

Set Up a Reusable Charge

1. In the tree display area of the *Charge* window, click the charge object icon .
2. In the right pane of the charge window, identify the reusable charge. In the *Name* field, type the unique identifier of the charge. In the *Description* field, describe the function of the charge if necessary.

3. Set up the following tabs of the charge:
 - [Definition \[page 584\]](#)
 - [Parameters \[page 585\]](#)
 - [Legal Text \[page 586\]](#)
4. Click the price plan  in the right pane of the charge window, and then [set up \[page 590\]](#) the price plan of the charge.
5. Click the charging plan  in the right pane of the charge window, and then [set up \[page 594\]](#) the charging plan of the charge.

2.4.20.7.4.1 Charge: Definition

Definition (Tab)

The *Definition* tab allows you to define the type and currency of the reusable charge and to select the chargeable item classes relevant for the configuration of *Usage Rate* components.

Type of Charge: Select the charge type, [Master \[page 563\]](#) or [Dependent \[page 564\]](#). A master charge is independent of all other charges while a dependent charge depends on another charge in order to be calculated or triggered.

i Note

About currencies:

- At [charge plan](#) level, you can redefine the currency if you assign the *Multicurrency* option to the charge.
- The currency cannot be modified once the charge has been created.

Currency Definition: This area allows you to select the currency that you want to associate to the charge.

- *Fixed currency*: Provides the list of currencies. Select a currency.
- *Multicurrency*: Select this option if you do not want to associate a specific currency to the charge. This option allows you to create one only charge that can be reused in different offers or refill plans. This option avoid creating the same charge many times and associating each charge to a different currency.

Chargeable Item Classes: This area displays the [chargeable item classes \[page 531\]](#) related to the charge. Clicking a chargeable item class opens its window. Do not forget that a chargeable item class is associated to a charge when you add a usage rate to the price plan of the charge. If the chargeable item class belongs to a [chargeable item package \[page 530\]](#) coming from a version earlier than SAP CC 4.0, the chargeable item class is identified by a two-part name, one of which is in parentheses. For example, the chargeable item class "SMS (E2E_TELCOMOB_CIP)" is part of the chargeable item package "E2E_TELCOMOB_CIP".

i Note

Persistent counters can be reused in price plans and charging plans but cannot be modified in the price and charging plans.

Persistent counters: Click  to add a row to the table. Click  if you want to delete a persistent counter from the table. Fill in the following columns of each row that you add to the table:

- *Name*: Type the persistent counter name
- *Description*: Describe the function of the persistent counter if necessary
- *Initial Value*: Type a numerical value to initialize the persistent counter

2.4.20.7.4.2 Charge: Parameters

Create [\[page 580\]](#) or modify [\[page 582\]](#) a charge before [setting it up \[page 583\]](#). In the left pane of the *Charge*

window, click the charge root  to view, and then open the *Parameters* tab.

The *Parameters* tab allows you to add parameters to the [charge \[page 560\]](#).

Parameters (Tab)

Fill in or modify the *Parameters* tab.

: Click to add a [parameter \[page 574\]](#) to the configuration table.

: Click to delete a parameter from the table.

Name: Type the parameter name.

Description: Describe the function of the parameter if necessary.

Type: Provides the list of parameter types. Select the parameter type: *Number*, *String* or *Date*, *Mapping Table ID*, *Mapping Table Key*, or *Range Table ID*⁶⁰.

Value: Type a numerical value, a string value, or a date to initialize the parameter depending on its type. For the types *Mapping Table ID* and *Range Table ID*, a window is displayed. Select the appropriate class and the [mapping table \[page 469\]](#) or [range table \[page 503\]](#).

Visibility: Select one of the following option:

- *Internal*: The parameters are only available inside the reusable [charge \[page 560\]](#).
- *External*: The parameters can be modified outside the charge, in an offer or a subscription, for example.

⁶⁰ Refer to [Parameters \[page 574\]](#) in price plans.

Recurring Charges Configuration

i Note

This configuration is useful only with charge plans (not with offers) and when implementing the data configuration in an *SAP Solution* scenario with SAP CRM or SAP Convergent Invoicing.

In an integrated *SAP Solution* scenario, if your charge contains [recurring rates \[page 856\]](#), you can create special parameters to:

1. [Use the prices](#) defined for SAP CRM products.
2. [Synchronize your recurring rates](#) with the billing cycles of SAP Convergent Invoicing.

2.4.20.7.4.3 Charge: Legal Text

[Create \[page 580\]](#) or [modify \[page 582\]](#) a charge before [setting it up \[page 583\]](#). In the left pane of the *Charge*

window, click the charge root  to view, and then open the *Legal Text* tab.

The *Legal text* tab allows you to type text, legal or not, regarding the charge. You can save the text to a file or open a file to import text in the *Legal Text* tab.

Legal Text (Tab)

Fill in or modify the *Legal Text* tab.



: Click to clear all the text in the *Legal Text* tab.



: Click to import text in the *Legal Text* tab. The *Open* dialog box opens. Open the directory in which the text is saved, select the text file, and then click *Open*.



: Click to save the text to a file. The *Save* dialog box opens. Select a directory to save the text to. In the *File name* field, type the name of the file, and then click *Save*.

2.4.20.7.5 Saving a Charge

Once you have created or modified a reusable charge, and then verified its structure, you are ready to save it. You can save the reusable charge either into the back-end database or as an XML file on your hard disk.

Save and Release a New Reusable Charge into the Database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the pricing catalog that includes the service pricing configuration for the subscription- and usage-based services to monetize.
3. Click *Save*. The *Charge Creation* dialog box opens to inform you that the charge has been successfully saved and released.
4. Click *OK*.

Save and Release a New Version of an Existing Reusable Charge into the Database

Note

If a *Warning* dialog box opens to inform you that the charge has been modified since you opened it, you can:

1. Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the charge.
2. Click *Cancel* to come back to the charge. See later in this chapter how to save the charge as an XML file.

1. From the menu bar in the main window, select **File > Save > In the Database**. A dialog box opens to ask if you want to save the charge.
2. Click *Yes*. The *Save Version* window opens.
3. In this window, select one of the following options:
 - *Create a new version*: The *Start Date* is automatically filled in with the current date/time while the *End Date* is automatically filled in with *No End Date*. You can however replace these dates/times by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates related to existing versions. In this list, *No Start Date* represents an undetermined date/time in the past while *No End Date* represents an undetermined date/time in the future. A message informs you when you overwrite versions.
 - *Replace Versions*: The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click *Save*. The *Charge Modification* dialog box opens to inform you that the charge has been successfully saved and released.
5. Click *OK*.

Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, do not save a new version of a charge to a date before the last prerating operation because this will lead to a rating error.

Save a Reusable Charge as an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.
2. Select a directory to save the charge.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The charge is saved as an XML file in your selected directory.

2.4.20.76 Managing the Versions

See:

- [Changing the Version of a Charge \[page 602\]](#)
- [Deleting the Versions of a Charge \[page 603\]](#)

2.4.20.77 Deleting a Charge

Before you delete a charge, you must first delete all master data objects which reference it.

Caution

There is no “undo” function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

To delete a charge

1. From the menu bar in the main window, select **File > Delete > Charge**. The *Delete Charge* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charge.
3. In the *Charges* folder of the catalog of the owner, select the charge.
4. Click *Delete*. A deletion dialog box asks if you want to delete the charge
5. Confirm the deletion of the charge by clicking *Yes*:
 1. If a dialog box confirms your choice, the charge has been successfully deleted.
 2. If a *Warning* dialog box opens to inform you that the charge is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

Note

If an error message appears after clicking *Yes* at step 5, you must delete the object or objects that reference the charge. The identifiers of these objects appear in the message.

2.4.20.7.8 Exporting a Charge

You can export charges to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to [import \[page 529\]](#) the charge back into SAP CC Core Tool.

i Note

If you export a charge using chargeable item classes belonging to a chargeable item package, SAP Convergent Charging exports the [chargeable item package \[page 530\]](#) with all its chargeable item classes.

To export a charge

1. From the menu bar in the main window, select **File > Export**. The *Choose Object* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the charge.
3. In the catalog of the owner, select the charge.
4. Click *OK*. The *Save* dialog box opens.
5. Select a directory to export the charge.
6. In the *File name* field, type the name of the file.
7. Click *Save*.

2.4.20.7.9 Importing a Charge

You can import charges in XML format from a directory in your database.

Several versions of a charge can exist in files, corresponding to their stages of modification. You can import all versions of a charge into SAP Convergent Charging, or select only the versions you want.

i Note

To import a charge

1. Log on and connect to the target SAP CC system.
2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the charge is saved, and then select the charge file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected if you want to import all the versions of the imported objects, or do the following:

- To select only one version as of a certain date, select the [One version per object](#) option, and then select the date in the [Version as Of](#) field.
 - To replace all versions by the imported version, select the [Replace all versions](#) option.
 - To replace or not some existing versions by the imported version, select the [Use modification date as of](#) option and choose the date on which you save the imported version. Depending on this date, some existing versions will be replaced or not by the imported version.
6. In the [Import](#) column, clear the checkboxes of objects you do not want to import. You can remove the full list of [chargeable item packages \[page 530\]](#) if the chargeable item classes belonging to these chargeable item packages are not used in existing charges of the database. SAP CC Core Tool allows this operation only if you select the options [All versions](#) or [Replace All Versions](#) because the chargeable item packages are not arranged in chronological order.
 7. Click [Import](#).

i Note

SAP CC Core Tool can only import an object which has previously been [exported \[page 528\]](#) and saved ([File > Export](#)), rather than saved directly to a file ([File > Save > In a File](#)).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.20.8 Working with Price Plans

Related Information

[Setting Up the Price Plan of a Charge \[page 590\]](#)

[Changing the Sequence of Components \[page 592\]](#)

[Inserting an Existing Price Plan into a Charge \[page 593\]](#)

2.4.20.8.1 Setting Up the Price Plan of a Charge

[Create \[page 580\]](#) or [modify \[page 582\]](#) a charge, and then [set up \[page 583\]](#) the charge before setting up the price plan. A [Charge](#) window must be open.

i Note

Before modifying a price plan, it is strongly recommended to [read the caution \[page 570\]](#) about what you can do or not.

i Note

Applicable to offers and subscriptions but not applicable to charge plans, provider contracts, and refill plans. If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features, and if there are unresolved prerating events for the subscription that uses your price plan, modifying the price plan may lead to a postrating result that differs from its corresponding prerating result. In addition, do not save a new version of a price plan to a date before the last prerating operation because this will lead to a rating error. (The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying a price plan may result in errors.)

In a *Charge* window, a [price plan \[page 570\]](#) is graphically represented by a rating tree, which can consist of price plan components using counters, parameters, pricing macros, translation tables, or tier tables depending on the requirements of the plan.

Set Up the Price Plan (Policy) of a Charge

1. In the rating tree display area of the *Charge* window, make sure that the price plan icon  is selected; otherwise, select it.
2. In the right pane of the charge window, identify the price plan. In the *Name* field, type the unique identifier of the price plan. In the *Description* field, describe the function of the price plan if necessary.
3. In the *Transient Counters* area, you can add [transient counters \[page 567\]](#) to the price plan. Click  to add a row to the table. Click  if you want to delete a transient counter from the table. Fill in the columns of each row that you add to the table: in the *Name* column, Type the transient counter name; In the *Description* column, describe the function of the transient counter if necessary; In the *Initial Value* column, type a numerical value to initialize the transient counter. If the counter name already exists in another price plan in a charge and if you create a charge plan by setting up a master and a dependent charge, then the transient counters are shared. At runtime, the SAP CC system the value of the counter from the master charge to the dependent charge. See [Sharing Transient Counters with Dependent Charges in Charge Plans](#) for more information.
4. [Add \[page 598\]](#) rate components to the price plan, and then set up the rate components⁶¹.
5. [Add \[page 600\]](#) functions, comparators, splitters or operators components to the price plan, and then set up the components⁶².

i Note

- You can [remove \[page 601\]](#), cut, copy and paste components or sections of a rating tree by right-clicking the component and selecting *Remove*, *Cut*, *Copy* or *Paste*.
- When you click the price plan icon , the *Rates* icon  on the *Components* toolbar becomes available.

⁶¹ For more information about setting up rate components, refer to the primary help relating to components [here \[page 831\]](#).

⁶² For more information about setting up rate components, refer to the primary help relating to components [here \[page 831\]](#).

2.4.20.8.2 Changing the Sequence of Components

In some price plans, the order of logic components is important. For example, if two rates of the same component family are triggered by the same event, the first rate in the price plan will be calculated first.

You can change the sequence of Rate  components and Operator  components to create different calculation conditions in a price plan.

Moving Rate components

When you move a Rate component, you also move the rating branch attached to it.

Rate components are arranged in a price plan in the following order:

-  Usage rates
-  One-Shot rates
-  Recurring rates

You can only rearrange a rate within its section of the price plan. For example, you can only move a Recurring rate within the Recurring section - you cannot move a Recurring rate to the top of the price plan which is reserved for Usage rates.

Moving Operator components

Operator components can only be moved within their rating branch, and only at the same level of the branch.

To change the sequence of components in a price plan

1. In the rating tree display area of a charge, right-click the component you want to move.
2. Select one of these commands:
 - [Move Up Component \[page 601\]](#)
 - [Move Down Component \[page 602\]](#)

i Note

- You can [remove \[page 601\]](#), cut, copy and paste components or sections of a rating tree by right-clicking the component and selecting [Remove](#), [Cut](#), [Copy](#) or [Paste](#).

2.4.20.8.3 Inserting an Existing Price Plan into a Charge

i Note

Inserting a price plan into a charge also inserts the related charging plan.

If you have previously saved a charge as an XML file to your hard disk, you can insert its price plan into a new or an existing charge; however, if you want to replace a price plan in an existing charge, make sure that this action is necessary because the price plan will completely be replaced by the new one. Keep in mind that a charge window must be open if you want to insert a price plan into the charge.

→ Remember

You can insert a price plan into an existing charge only if the price plan was correctly verified before you [saved the charge \[page 586\]](#) as an XML file; otherwise, the price plan does not appear in the [Open Parameters](#) window. To verify the price plan of a charge saved as an XML file, open the charge from the [Open Parameters](#) window by selecting the [Open as New Object](#) option, and then click the [Verify](#) icon  on the main window toolbar. Once the [Verify Charge](#) window is open, correct all elements underlined in red, and then save the charge again as an XML file.

To insert an existing price plan (and the related charging plan) into a charge

1. In the rating tree display area of the charge window, click the Price Plan icon .
2. From the menu bar in the main window, select **File > Open > From File** . The [Open](#) window opens.
3. Open the directory in which the charge is saved, and then select the charge file.
4. Click [Open](#). The [Open Parameters](#) dialog box opens.
5. Select the [Open as Sub-Element of Current Object](#) option. The price plans  in the list become available if they have correctly been verified before being saved as an XML file. Refer to the note above.
6. Select the price plan you that want to insert.
7. Click [Open](#). The existing price plan is inserted into the charge.

2.4.20.9 Working with Charging Plans

Related Information

[Setting Up the Charging Plan of a Charge \[page 594\]](#)

[Changing the Sequence of Components \[page 596\]](#)

[Inserting an Existing Charging Plan in a Charge \[page 597\]](#)

2.4.20.9.1 Setting Up the Charging Plan of a Charge

[Create \[page 580\]](#) or [modify \[page 582\]](#) a charge, and then [set up \[page 583\]](#) the charge before setting up the price plan. A charge window must be open.

In a *Charge* window, a [charging plan](#) is graphically represented by a charging tree, which can consist of charging plan components using counters, parameters, translation tables, tier tables, or mapping tables depending on the requirements of the plan.

→ Remember

Setting up the internal reference dictionary depends on the objects you are working on. If you are working on charge plans, provider contracts, and refill plans, you must use charging references which are typed. If you are working on offers and subscriptions, you must use charging references which are not typed.

Set Up the Charging Plan (Policy) of a Charge

1. In the charging tree display area of the charge window, make sure that the charging plan icon  is selected; otherwise, select it.
2. In the right pane of the charge window, identify the charging plan. In the *Name* field, type the unique identifier of the charging plan. In the *Description* field, describe the function of the charging plan if necessary.
3. [Create and set up](#) the internal reference dictionary.
4. In the left pane, and if necessary⁶³, [add \[page 599\]](#) charging components to the charging plan, and then set up the charging components⁶⁴.
5. If you have added charging components, [add \[page 600\]](#) comparators, operators or references components to the charging plan, and then set up the components⁶⁵.

i Note

- You can [remove \[page 601\]](#), cut, copy and paste components or sections of a rating tree by right-clicking the component and selecting *Remove*, *Cut*, *Copy* or *Paste*.

⁶³ Charging components are not mandatory because the charging plan already contains a  Default component. You can

remove the  Default Reference, and then add any comparators or operators before adding any other reference to the Default component.

⁶⁴ For more information about setting up charging components, refer to the primary help relating to components [here \[page 831\]](#)

⁶⁵ For more information about setting up charging components, refer to the primary help relating to components [here \[page 831\]](#)

- When you click the charging plan icon , the *Charging* icon  on the *Components* toolbar becomes available.

2.4.20.9.1.1 Internal Reference Dictionary

To access to an internal reference dictionary, you must click the [charging plan](#) of a charge to display the related tab area.

A charging plan consists of one or more [charging components](#) (usage charging, recurring charging, and one-shot charging). Each charging component that you add to a charging plan must refer to a [prepaid or a postpaid account \[page 668\]](#) which is charged after the charging plan has been triggered. Therefore, the internal reference dictionary allows you to create references which are used in the charging components to refer to an account. These references are then used at [charge](#) level (in the charge plan) where they are mapped to [account assignments](#) of the charge plan.

Depending on the objects you are working on, the internal reference dictionary consists of charging references which are:

- *Typed*: If you are working on charge plans, provider contracts, or refill plans, you must create a dictionary of typed charging references.
- *Not typed*: If you are working on offers and subscriptions, you can create a dictionary consisting of charging references which are not typed. Note that the dictionary is not mandatory because it depends on the content of the charging plan.

→ Remember

Do not forget that once you have created and saved the charge, you can no longer modify the dictionary of internal references. Therefore, you must create all the references you need to use in the charging plan before saving the charge.

You can assign any [Reference \[page 578\]](#) component (*Internal Reference*, *Default Reference*, *External Reference* or *Refill Reference*) to each charging component inserted in the charging tree. However, you can select an internal reference of the dictionary only for an *Internal Reference* component or a *Refill Reference* component. You can also select the *Default Charging Reference* for a *Refill* component.

Furthermore, when creating the internal references of the dictionary, you must assign a back-up to each of the internal references. When modifying a charge, you can add new references to the charging plan of a charge. Because the new references may not exist in the charging mapping of old subscriptions, the dictionary keeps a backup reference to replace any new reference that is not in the [charging mapping of a subscription \[page 748\]](#). For more information, also refer to [Charging Mapping \[page 738\]](#).

Internal reference dictionary tab

Charging References: You add the charging references to the dictionary depending on the objects you are working on

- **Typed:** Select this option if you work with charge plans, refill plans, and provider contracts
- **Not Typed:** Select this option if you work with offers and subscriptions

This tab allows you to create a dictionary of internal references.

Use the table and its icons to create charging references.



: Add a new row to the table.



: Delete a row from the table

Charging reference name: Type the name of the charging reference. You can reuse this charging reference in any branches of the charging tree.

Backup reference: This option is available only if you use charging references which are not typed. Type the name of the backup reference. If necessary, you can assign the Default Charging Reference to all charging references.

Type: This option is available only if you use charging references which are typed. Select one of the following:

- **Prepaid:** Assigns the charging reference to a prepaid account
- **Postpaid:** Assigns the charging reference to a postpaid account

2.4.20.9.2 Changing the Sequence of Components

In some charging plans, the order of logic components is important. For example, if two Operator components are triggered by the same event, the first Operator component will be triggered first.

You can change the sequence of Operator  components to create different charging conditions in a charging plan.

Moving Charging components

When you move a Charging component, you also move the charging branch attached to it.

Charging components are arranged in a charging plan in the following order:

-  Usage charging
-  One-Shot charging
-  Recurring charging
-  Default component

You can only rearrange a charging component within its section of the charging plan. For example, you can only move a Usage charging within the Usage section, but you cannot move a Recurring rate to the top of the charging plan which is reserved for Usage charging.

Moving Operator components

Operator components can only be moved within their rating branch, and only at the same level of the branch.

To change the sequence of components in a charging plan

1. In the rating tree display area of a charge, right-click the component you want to move.
2. Select one of these commands:
 - [Move Up Component \[page 601\]](#)
 - [Move Down Component \[page 602\]](#)

i Note

- You can [remove \[page 601\]](#), cut, copy and paste components or sections of a rating tree by right-clicking the component and selecting *Remove*, *Cut*, *Copy* or *Paste*.

2.4.20.9.3 Inserting an Existing Charging Plan in a Charge

Refer to the topic [Inserting an Existing Price Plan into a Charge \[page 593\]](#).

2.4.20.10 Using the Action Menu

Related Information

[Adding a Rate Component \[page 598\]](#)

[Adding a Charging Component \[page 599\]](#)

[Adding a Component \[page 600\]](#)

[Removing a Component \[page 601\]](#)

[Moving Up a Component \[page 601\]](#)

[Moving Down a Component \[page 602\]](#)

[Changing the Version of a Charge \[page 602\]](#)

[Deleting the Versions of a Charge \[page 603\]](#)

[Reading a Price Plan \[page 603\]](#)

2.4.20.10.1 Adding a Rate Component

You can add one or more rate components to the rating tree.

The rate branch is a mandatory base for your price plan. You cannot create a price plan without a rate branch

that contains at least one of the following rate components:  Usage Rate,  Recurring Rate or  One-Shot Rate.

→ Remember

Do not forget that you cannot add a usage rate component to a price plan whose charge is not associated to a [chargeable item class](#) [page 531].

To add and set up a rate component

1. In the rating tree, click the price plan icon .
2. On the [Components](#) toolbar, move the pointer over  Rates, and then click one of the following rate components:  Usage Rate,  Recurring Rate or  One-Shot Rate.
3. In the [Name](#) field of the right pane, type the name of the rate component.
4. In the [Description](#) field of the right pane, describe the function of the rate component if necessary.
5. Set up the rate component⁶⁶.

i Note

When a price plan contains several rate branches such as Usage Rates, Recurring Rates, and One-Shot Rates, the rate branches are automatically arranged in this order in the rating tree:

-  Usage Rates
-  One-Shot Rates
-  Recurring Rates

For example, if you add a new usage rate to the rating tree, it is automatically added after the last usage rate branch.

⁶⁶ For more information about setting up rate components, refer to the primary help relating to components [here](#) [page 831]

2.4.20.10.2 Adding a Charging Component

You can add one or more charging components to the charging tree.

The charging branch is not a mandatory base because the charging plan already contains a  Default component; however, if you create a charging branch, it must at least contain one of the following rate

components:  Usage Charging,  Recurring Charging or  One-Shot Charging.

To add and set up a charging component

1. In the charging tree, click the charging plan icon .
2. On the *Components* toolbar, move the pointer over  Charging, and then click one of the following rate components:  Usage Charging,  Recurring Charging or  One-Shot Charging.
3. In the *Name* field of the right pane, type the name of the charging component.
4. In the *Description* field of the right pane, describe the function of the charging component if necessary.
5. Set up the charging component⁶⁷.

i Note

When a charging plan contains several charging branches such as Usage charging, Recurring charging, and One-Shot charging, the charging branches are automatically arranged in this order in the charging tree:

-  Usage charging
-  One-Shot charging
-  Recurring charging
-  Default component

For example, if you add a new usage charging to the charging tree, it is automatically added after the last usage charging branch.

⁶⁷ For more information about setting up charging components, refer to the primary help relating to components [here \[page 831\]](#).

2.4.20.10.3 Adding a Component

You can add one or more components to the rating tree or the charging tree.

For adding a component to the rating tree

You build each branch of the rating tree by using several combinations of the following components:

Functions,  Comparators,  Splitters or  Operators. You must end each branch of the rating tree with a function component. Note that function components are the leaves of the tree.

i Note

- Because you cannot insert a [pricing macro \[page 411\]](#) in a price plan, you need to insert components such as a macro function or a macro operator in a price plan to reuse an existing pricing macro.
- Because you cannot insert a [translation table \[page 422\]](#) in a price plan, you need to insert a table operator component in a price plan to reuse an existing translation table.
- Because you cannot insert a [tier table \[page 437\]](#) in a price plan, you need to insert a table operator component in a price plan to reuse an existing tier table.

To add and set up a component

1. In the rating tree, click the component under which you want to add a component.
2. On the [Components](#) toolbar, click the component that you need to add to the rating tree. You can select a component that belongs to one of these families:  Functions,  Comparators,  Splitters or  Operators.
3. In the [Name](#) field of the right pane, type the name of the component.
4. In the [Description](#) field, describe the function of the component if necessary.
5. Set up the component⁶⁸.

i Note

If necessary, you can change the order of components. Place the cursor on the component to move, right-click to open the shortcut menu, and then select [Move Up Component](#) or [Move Down Component](#).

⁶⁸ For more information about setting up components, refer to the primary help relating to components [here \[page 831\]](#).

To add a component to the charging tree

The rules and procedures are the same as those for the rating tree except that the  Functions, the 

Splitters components and the pricing macros are not available for the charging tree. Furthermore, 

References replace the  Functions as the leaves of the tree.

i Note

If you want to add components to the  Default component, you must first remove the  Default Reference, and then add any Comparators or Operators before adding any other reference.

2.4.20.10.4 Removing a Component

Use this procedure to remove a component from a tree.

To remove a component from a tree

1. In the tree, click the component that you want to remove.
2. From the menu bar in the main window, select  **Action**  **Remove Component** . The component is removed.

i Note

- To remove an entire tree branch, right-click a component and select **Remove Component**.
- Some components in the middle of a tree branch allow you to remove them and all other components attached to them towards the end of the branch. These branch sections can be removed only when the **Remove Component** command is available.
- You can remove, cut, copy, or paste components or sections of a tree by right-clicking a component and selecting **Remove**, **Cut**, **Copy**, or **Paste**.

2.4.20.10.5 Moving Up a Component

Use this procedure to move up a component.

To move up a component

1. In the tree, click the component that you want to move up.
2. From the menu bar in the main window, select ► *Action* ► *Move Up Component* ►.

i Note

You can remove, cut, copy, or paste components or sections of a tree by right-clicking a component and selecting *Remove*, *Cut*, *Copy*, or *Paste*.

2.4.20.10.6 Moving Down a Component

Use this procedure to move down a component.

To move down a component

1. In the tree, click the component that you want to move down.
2. From the menu bar in the main window, select ► *Action* ► *Move Down Component* ►.

i Note

You can remove, cut, copy, or paste components or sections of a tree by right-clicking a component and selecting *Remove*, *Cut*, *Copy*, or *Paste*.

2.4.20.10.7 Changing the Version of a Charge

Refer to the process below:

Change the Version of an Object

When you open an object, you can access its versions by clicking the *Change Version*  icon on the toolbar.

Modifying and saving an object modifies the *Change Version* list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.20.10.8 Deleting the Versions of a Charge

The procedure is the same as [Deleting the Versions of a Catalog Object \[page 408\]](#).

2.4.20.10.9 Reading a Price Plan

Once you have created a price plan, you can generate a descriptive representation of it. This process is called reading a price plan.

To read a price plan

1. [Open \[page 581\]](#) a charge.
2. On the toolbar in the main window, click the *Read Price Plan* icon . The *Read Price Plan* dialog box opens.
3. Check the price plan description for accuracy, and then click *Close*.

2.4.20.10.10 Doing a Trial Run of a Price Plan

Once you have built and verified a price plan, you can test the logic of its rating process to ensure that the correct results have been achieved. To do this, you use the *Rating Trial Run* tool which is a testing tool provided with SAP Convergent Charging.

To test a price plan

1. Make sure that the price plan that you want to test is open; otherwise, [open \[page 581\]](#) the price plan.
2. [Open \[page 607\]](#) the *Rating Trial Run* tool.
3. [Set up \[page 608\]](#) the *Rating Trial Run* tool.
4. [Run \[page 608\]](#) the *Rating Trial Run* tool.

2.4.20.11 Rating Trial Runs

Once you have built and verified a price plan or pricing macro, you can test the logic of their rating process to ensure that the correct results have been achieved. To do this, you can use the *Rating Trial Run* tool which is a testing tool provided with SAP Convergent Charging.

The [Rating Trial Run](#) tool allows you to manipulate and change the values of specific rates that are used in the rating process and locate the related components that do not work correctly.

When adjusting and finalizing an offer, the [Rating Trial Run](#) tool allows you to view the [rating context \[page 357\]](#) in detail.

! Restriction

Rating Trial Runs do not consider allowance creation.

Trial run procedure

The [Rating Trial Run](#) tool tests only one rating branch at a time; therefore, the trial run procedure consists in testing each branch of the rating tree of your price plan or pricing macro. For each rating branch, the trial run procedure is split into three main steps:

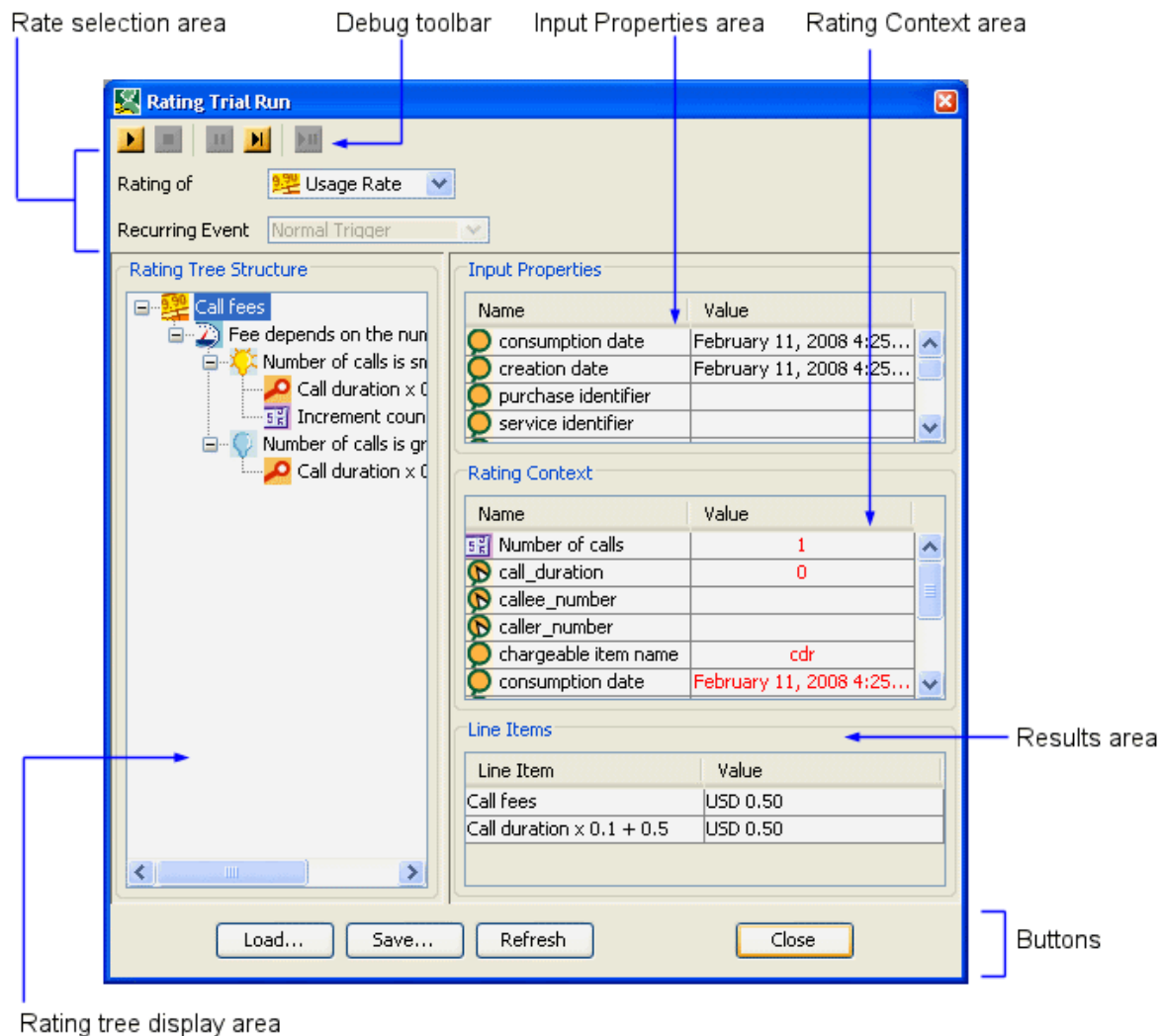
1. You need to set or change the values of the properties that are used in your price plan or pricing macro.
2. You start the [Rating Trial Run](#) tool. The tool uses the algorithm of the price plan or pricing macro, which is based on the values of the properties and provides a set of actual calculation results.
3. Once you have performed a rating trial run, the results area displays the final calculated price. You can compare the calculation results with the expected test results.

Testing a price plan or pricing macro

1. Open the [price plan \[page 570\]](#) or [pricing macro \[page 411\]](#) that you want to test.
2. [Open \[page 607\]](#) the [Rating Trial Run](#) tool.
3. [Set up \[page 608\]](#) the [Rating Trial Run](#) tool.
4. [Run \[page 608\]](#) the [Rating Trial Run](#) tool.

2.4.20.11.1 Rating Trial Run Window

Once you have opened the [Rating Trial Run](#) tool to test your price plan or pricing macro, you are presented with the [Rating Trial Run](#) window.



Rate Selection area

The *Rate Selection* area allows you to select one rate component of the price plan or pricing macro that you want to test. When the window opens initially, the first rate of the price plan or pricing macro is displayed by default.

Debug toolbar

Five buttons represent the modes to test your price plan or pricing macro. Each button corresponds to a specific test action. The buttons are the following:

Button	Mode	Description
	Start	Starts the test procedure.
	Stop	Stops the test procedure immediately.
	Set Breakpoint	Allows you to specify where the execution must be paused so that you can control the rating process.
	Step by Step	Allows you to control the execution of the program by moving from the current rating component to the next available component.
	Run to	Allows you to run the test procedure to the current cursor location. This is similar to a breakpoint; however, once the program runs a second time, this breakpoint is ignored.

Input Properties area

The [Input Properties](#) area displays the properties and values that are predefined in the price plan or pricing macro. These properties and values relate to the selected rate, the counters and parameters. This area also allows you to set or change the values of the properties.

Rating Context area

The [Rating Context \[page 357\]](#) area displays all of the properties that are available during the rating process. It also allows you to modify the values of these properties during the test procedure.

Rating tree display area

The [Rating Tree Display](#) area displays the rating tree that corresponds to the selected rate in the [Rate Selection](#) area.

Results area

The [Results](#) area displays the test results of the rating process. The first line displays the total calculated price while the remaining lines represent the individual items, component by component, that make up this total price.

Buttons

Load: Allows you to restore the input properties previously saved in a file. Click this button to open the directory in which the file is saved. Select the file, and then open it. The values saved in the file are assigned to the input properties. An error message is displayed if the input properties previously saved are not the same as the current input properties.

Save: Allows you to save the input properties in a file. Click this button to open the directory in which you want to save the file. Type the name of the file, and then save the file.

Refresh: Click to cancel any changes and restore the *Rating Trial Run* window to its original state.

Close: Click to close the *Rating Trial Run* window.

2.4.20.11.2 Working with Rating Trial Runs

Related Information

[Opening the Rating Trial Run Tool \[page 607\]](#)

[Setting Up the Rating Trial Run Tool \[page 608\]](#)

[Running the Rating Trial Run Tool \[page 608\]](#)

2.4.20.11.2.1 Opening the Rating Trial Run Tool

You must verify your price plan or pricing macro before debugging it. Once you have fully verified the price plan or pricing macro, you can open the *Rating Trial Run* tool.

To open the Rating Trial Run tool

1. Open the window of the price plan or pricing macro that you want to test.
2. On the main window of SAP Convergent Charging, click . The *Rating Trial Run* window is displayed. The rating tree of the first rate in the price plan or pricing macro is displayed in the left pane of the window (*Rating Tree Display* area) and its corresponding properties in the right pane (*Input Properties* area).

2.4.20.11.2.2 Setting Up the Rating Trial Run Tool

Once you have opened the [Rating Trial Run](#) tool, you first need to choose the component to test if your price plan or pricing macro is made up of several components, and then you must set the property values of the price plan or pricing macro depending on your needs.

To set up the Rating Trial Run tool

1. In the Rating of list of the Rating Trial Run window, select the rate component that you want to test: Usage Rate, Recurring Rate or One-Shot Rate. The Rating Trial Run tool tests only one rating branch at a time.
2. ⁶⁹If you have selected  [Recurring Rate](#) as the component to test, you must also select the event that triggers the consumption of this rate in the [Recurring Event](#) field: [Normal Trigger](#), [Subscription activation](#) or [Subscription cancellation](#).
3. In the [Input Properties](#) area, change or set the values of the properties that are used by your price plan or pricing macro in the rating process. If necessary, use the vertical scroll bar to move the properties up or down. The values that you type or change are displayed in red.

When the [Rating Trial Run](#) tool is set up, you can [run \[page 608\]](#) it.

2.4.20.11.2.3 Running the Rating Trial Run Tool

Before running the [Rating Trial Run](#) tool, make sure that you have verified the price plan or pricing macro that you want to test; otherwise, the [Rating Trial Run](#) tool displays an error message.

Once you have [set up \[page 608\]](#) the [Rating Trial Run](#) tool, you can run it by selecting the mode in which you want to do the test. You can choose one the main modes to perform a trial run:

- Click  to quickly perform the trial run (with or without breakpoints)
- Click  to perform the trial run step by step and display the calculation results at each step
- Click  to perform the trial run that uses at least one breakpoint

⁶⁹ This step does not apply to  [Usage Rate](#) and  [One-Shot Rate](#).

Button	Mode	Description
	Start	This mode performs the trial run of the rate component that you select in the <i>Rating of</i> field. When the trial run is complete, you can verify the values of the <i>Rating Context</i> [page 357] properties and the expected results in the <i>Line Items</i> area. Note: If the rating tree contains some breakpoints, you must click , , or  to continue the trial run.
	Stop	This mode stops the trial run permanently. You must click , , or  to start a new trial run. Note: This button is available when you select the <i>Step by Step</i> mode or the <i>Run to</i> mode.
	Set Breakpoint	This mode allows you to set or remove breakpoints that are used to stop the trial run temporarily. You can continue the trial run by clicking , , or . To set a breakpoint, click a component in the <i>Rating Tree Structure</i> area, and then click . The component label appears in red. To remove a breakpoint, click a component in the <i>Rating Tree Structure</i> area, and then click . The component label appears in black. Note: You can use this mode in combination with the <i>Start</i> mode, the <i>Step by Step</i> mode or the <i>Run to</i> mode.

Button	Mode	Description
	Step by Step	This mode performs the trial run of the rate component that you select in the <i>Rating of</i> field, but performs one component at a time. You must click  to perform the next component. This mode allows you to verify the values of the <i>Rating Context</i> properties and the calculation results in the <i>Line Items</i> area at each step. Note: This button is available when you select the component just below the rate component of the tree.
	Run to	This mode performs the trial run of the rate component that you select in the <i>Rating of</i> field only if you have set at least one breakpoint. Once you have set a breakpoint, click . The trial run stops at the breakpoint. To continue the trial run, click . The breakpoint is automatically removed, but the <i>Run to</i> mode is not available any more.

Results

Once you have performed a rating trial run, the results are displayed in the *Line Items* area:

- The first line represents the final price of the rating branch
- The remaining lines represent the individual items, component by component, that make it up

❖ Example

For example, you test the usage rate "Call fee" of your price plan. This usage rate is made up of two branches: Call duration x 0.02 USD and Call duration x 0.01 USD, which are triggered depending on the number of calls. If the number of calls is smaller than 10, the price is calculated according to Call duration x 0.02 USD; otherwise, the price is calculated in the second branch according to Call duration x 0.01 USD.

Before running the *Rating Trial Run* tool, you set the property Call duration to 100 and the property Number of calls to 10 in the *Input Properties* area.

You start the *Rating Trial Run* tool. Once the trial run is complete, the *Line Items* area displays the following:

Line Item	Value
Call fee	USD 1.00
Call Duration x 0.01 USD	USD 1.00

The first line of the *Line Items* area displays the final price of the usage rate "Call fee". The second line displays the result of the branch "Call duration x 0.01 USD". In this example, the results are the same, but results and number of line items depend on the complexity of your price plan.

2.4.21 Offers

→ Remember

Offers cannot be used in stateless mode (see section below if necessary) even if menus and commands are available in the graphical user interface.

⚠ Caution

Offers are part of the former Data Model (DM). As of release 2.0, a newer data model provides you with *charge plans* and a lot of new concepts.

Stateless and Stateful Modes

Stateful and stateless are adjectives that describe whether a computer or computer program is designed to note and remember one or more preceding events in a given sequence of interactions with a user, another computer or program, a device, or other outside element. Stateful means that the computer or the program keeps track of interactions, usually by setting values in a storage field designated for that purpose. Stateless means that there is no record of previous interactions. Each interaction request is entirely processed from information that comes with it.

Stateless Mode

The stateless rating is a service provided by SAP Convergent Charging to your client application (online mediation system). The stateless rating feature means that the SAP CC system does not charge any account for a service usage but only calculates the corresponding price amount (rating process). During the stateless rating operations, the state of SAP Convergent Charging does not change. In this mode, SAP Convergent Charging does not modify or keep any data in its database after rating (balances, credit limits, counters in contracts).

For example, states of counters are stored and maintained in an external system outside SAP Convergent Charging. SAP CC Core Server runs as a basic 'calculator'. This rating process corresponds to the 3GPP "Class A rating definition".

i Note

In stateless mode, you cannot use objects such as charge plans, provider contracts, and dependent charges.

Stateful Mode

SAP Convergent Charging maintains the states of counters, for example, and updates counters when the rating is confirmed. In this mode, SAP Convergent Charging modifies or keeps data in its back-end database after charging. Stateful charging corresponds to the 3GPP “Class B rating definition”.

In stateful mode, you can use any of SAP Convergent Charging's objects.

Use

An offer is an object that your customer can subscribe to. A simple offer consists of one or more charges. A complex offer consists of one or more suboffers, with the addition of zero, one or several [charges \[page 560\]](#). A suboffer is an offer that is added to, and part of, another offer.

Before Starting

→ Remember

- [Read the note \[page 582\]](#) about making retroactive changes to a charge or an offer
- [Read the topic \[page 683\]](#) about taxes

Before [creating \[page 623\]](#) and [setting up \[page 626\]](#) an offer, you must be familiar with the following:

- Main [creation stages \[page 613\]](#) of an offer
- [Structure \[page 615\]](#) of an offer
- [Changes \[page 616\]](#) that you can make to an offer
- Specific [characteristics \[page 617\]](#) of a charge included in an offer
- [Relationship types \[page 620\]](#) for a charge
- [Operation types \[page 620\]](#) for a charge
- [Roles \[page 621\]](#) represented by a charge
- [Activation Status \[page 620\]](#) of a charge
- Version change of an offer (as described below if needed):

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.21.1 Offer Creation Stages

The following list summarizes the three main stages in creating a simple and complex offer, each of which requires that you define certain offer characteristics:

1. [General characteristics](#): Identifier and validity period
2. [Structure](#): Charges and suboffers composition, subscription rules for suboffers
3. [Setup](#): Charges and suboffers

General Characteristics

When you create an offer, you can specify its period of validity by using two dates/times: the effective date/time and the expiration date/time. This period corresponds to the period during which it is possible to subscribe to an offer.

i Note

General characteristics are set up on the [Definition \[page 630\]](#) tab of offers.

Structure

You can easily describe the composition of an offer. For basic offers, you simply choose the charges relating to chargeable item classes included in the offer that you want to create. You choose these charges from the catalog of the service provider.

For complex offers, you select the offers and charges that make up your offer in the same way. When selecting offers, you can choose whether or not to integrate charges already incorporated in the offer. You can then add suboffer subscription rules.

Subscription Rules for Suboffers

For each suboffer forming part of a complex offer, you need to indicate the following subscription rules:

- Whether the subscription is mandatory or optional
- Minimum and maximum number of subscriptions if necessary
- Subscription steps if you want to impose multiple subscriptions by fixing a set number of subscriptions per batch

i Note

Subscription rules are set up on the [Definition \[page 640\]](#) tab of suboffers.

Charge Dependencies

If an offer contains dependent charges, you must specify the dependent relationships between them. For each dependent charge, you need to specify which charge in the offer plays the role of the master charge in terms of triggering or calculation.

i Note

Charge dependencies are set up on the [Dependencies \[page 637\]](#) tab of offers.

Configuration

Depending on the complexity of the offer, you [set up charges \[page 647\]](#) and/or [suboffers \[page 638\]](#).

2.4.21.2 Example of an Offer

There are two types of offer: simple and complex.

A basic offer contains only charges associated with one or more chargeable item classes. You select and set up these charges when creating a simple offer.

A complex offer is made up of suboffers and charges as required. A suboffer is a simple or complex offer inside another offer. You select and set up suboffers and charges when creating a complex offer.

❖ Example

Simple Offer

The telephone operator Telcoserv proposes a Fixed Telephone offer which is priced in one of three ways:

- Telephone equipment, monthly charged
- Telephone calls, charged per minute
- Line installation, charged once

Each of these costs is represented by a charge applied to the chargeable item class `Telephone`. The basic **Fixed Telephone** offer is created using three charges as shown in the table below:

Simple Offer	Charge	Rate Used in Price Plan	Chargeable Item Class
Fixed Telephone	Equipment rental	Recurring	Telephone
	Calls	Usage	
	Installation	One-shot	

❖ Example

Complex Offer

The telephone operator Telcoserv also has an **Internet Access** simple offer that is charged at connection time. In combining this offer with the **Fixed Telephone** offer, Telcoserv is able to market the **TelInter** package created as follows:

Complex Offer	Simple Offer	Charge	Chargeable Item Class
TelInter	Fixed Telephone	Equipment rental	Telephone
		Calls	
		Installation	
	Internet Access	Connection	Internet

2.4.21.3 Offer Structure

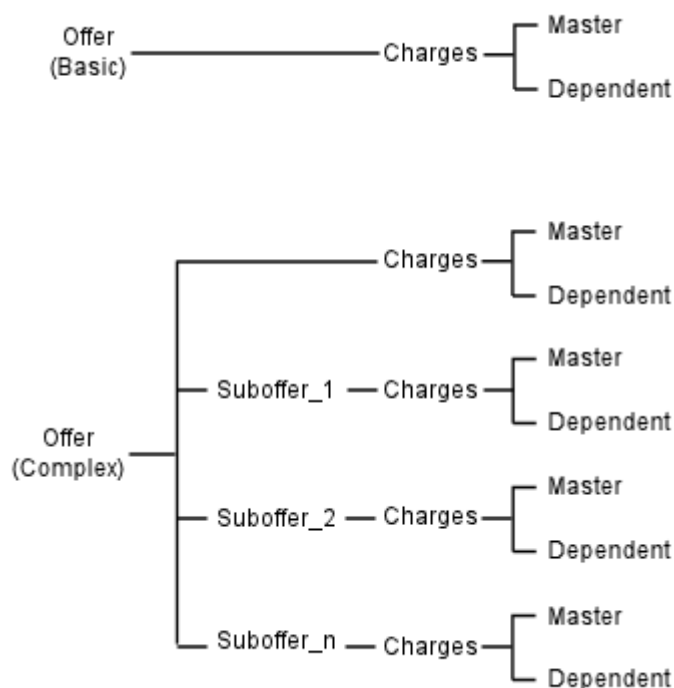
An offer describes the way to sell one or more end-customer services. Offers are graphically represented in SAP Convergent Charging by using a tree structure.

As shown in the illustration below, an offer can contain:

- Charges: [master \[page 563\]](#) or [dependent \[page 564\]](#) charges
- Suboffers

An offer is:

- Basic when it contains at least a master charge and zero, one or more dependent charges.
- Complex when it contains one or more suboffers and zero, one or more charges.



i Note

Each suboffer is an offer that can itself include one or more suboffers.

2.4.21.4 Offer Changes

Over time, the offers present in your catalog will change and you will consequently need to modify them. The three key domains in which you can make changes are pricing, offer structure and setup.

Price changes

The pricing terms described in the charges can be revised over time. For example, you can change the basic subscription price included in a subscription charge. Agreements already signed for offers containing this charge will be subject to these changes, with the exception of certain specific subscriptions such as price freeze and assignment of specific parameters.

Structure changes

You can modify an offer structure in the following ways:

- Composition - add charges and suboffers
- Organization - change charge dependency links
- Modify subscription rules

→ Remember

- You cannot remove charges or suboffers from an offer once they have been saved in the offer
- Subscriptions saved prior to structural modifications will remain unchanged because these changes are not retroactive

Setup changes

You can change the setup used to create an offer for charges and sub-offers. However, not all changes will be reflected in existing subscriptions.

→ Remember

- Modifications of the main characteristics of charges used in an offer are reflected in current subscriptions, except for those with a specific setup. For example, if you have redefined the subscription price in a charge with a parameter, the prices of all current and future subscriptions will be updated when you change these, except if a subscription has a fixed price
- In the case of secondary characteristics or the setup of suboffers, changes will not be applied to current subscriptions

2.4.21.5 Charges in Offers

Related Information

[Characteristics of a Charge \[page 617\]](#)

[Example of Characteristics \[page 618\]](#)

[Relationship Types \[page 620\]](#)

[Operation Types \[page 620\]](#)

[Activation Status \[page 620\]](#)

[Roles \[page 621\]](#)

2.4.21.5.1 Characteristics of a Charge

Charges can have main and secondary characteristics. You define main characteristics when you create a charge. When you use charges inside an offer, you give them secondary characteristics.

Once you have selected the charges that you want to add to an offer, you can redefine some of their main characteristics and assign secondary characteristics to them. The setup choices made for a particular offer only apply to this offer.

Main characteristics

When you create it, the charge can have the following characteristics:

- Charge type ([master \[page 563\]](#) or [dependent \[page 564\]](#))
- [Parameters \[page 574\]](#) if used
- [Counters \[page 567\]](#) if used
- [Pricing Macros \[page 411\]](#) if used
- [Translation Tables \[page 422\]](#) if used

You cannot change the charge type when the charge is included in an offer, but you can modify parameter values and add content to translation tables that are used in it.

When you incorporate a charge into an offer, you can redefine its parameters if you have set the [Visibility](#) field to [External](#).

You can add further content to a translation table from within an offer or a subscription. The new content does not alter the content of the original translation table.

i Note

Main characteristics are redefined on the [Parameters \[page 651\]](#) tab, the [Counters \[page 650\]](#) tab and the [Translation Tables \[page 652\]](#) tab of the charge.

Secondary characteristics

A charge has several secondary characteristics which you define when you use a charge in an offer:

- [Activation Status \[page 620\]](#)
- [Relationship Types \[page 620\]](#)
- [Operation Types \[page 620\]](#)
- [Roles \[page 621\]](#) for dependent charges

Secondary charge characteristics are only valid in the offer to which they have been assigned. If you reuse this charge in another offer, you can redefine secondary characteristics for the new offer.

You can redefine the status previously set in a suboffer that makes up a complex offer.

❖ Example

Learn.com has assigned mandatory status to the Membership Fee charge for the Document Download offer. In building the complex Complete Organization Module offer using the Organizations Module and the Document Download offers to promote customer flexibility, the company can redefine the status of the Membership Fee charge as “optional”. Learn.com can thus exempt customers from membership fees. If the status is not modified, the system will apply mandatory status.

2.4.21.5.2 Example of Characteristics

Learn.com has divided its customers into several sectors such as private individuals, large companies, training organizations, and associations. It wishes to propose several training offers adapted to these different sectors.

The Module Subscription fee varies according to these sectors. For the training organization sector, the company proposes a complex offer combining the Organization Module and Document Download on request, on payment of a membership fee. In creating the price plan for the Module Subscription charge, the subscription fee parameter is added. Learn.com can then add other charges and offers as below.

Charges

Charge	Price Plan	Main Characteristics
Module Subscription	Monthly module subscription: - Recurring rate - Monthly periodicity	Master charge parameter: - Name: Subscription fee - Default value: \$10
Document Download	Document download: Usage rate	Master charge parameter: - Name: Download fee - Default value: \$1/MB
Access Fee	Download access: One-shot rate	Master charge

Offers

Offer	Offer Type	Composition	Elements	Main Characteristics
Private Individual Module	Simple	1 charge	Module Subscription charge	Subscription fee: not redefined. Value applied: \$10.
Company Module	Simple	1 charge	Module Subscription charge	Redefined subscription fee: \$15
Organization Module	Simple	1 charge	Module Subscription charge	Redefined subscription fee: \$15
Document Download	Simple	2 charges	Access Fee charge	
			Document Download charge	Download fee: not redefined. Value applied: \$1/MB.
Complete Organization Module	Complex	2 charges	Organization Module offer	Module Subscription master charge. Subscription fee: not redefined. Value applied: \$15.
			Document Download offer	Access Fee master charge. Document Download master charge. Value applied: \$1/MB.

For the Complete Organization Modules, the subscription fee applied is the value assigned in the Organization Module offer (\$15), for the following reasons:

- The Organization Module offer is a component of the Complete Organization Module offer
- The subscription fee is redefined in the Organization Module offer

The subscription fee is redefined in the Organization Module offer

2.4.21.5.3 Relationship Types

The relationship type allows you to choose whether the relationship with the service provider will be with a client or with a partner.

i Note

Relationship types are set up on the [Definition \[page 648\]](#) tab of charges included in offers.

2.4.21.5.4 Operation Types

The operation type allows you to specify whether to credit or debit the client or the partner involved.

i Note

Operation types are set up on the [Definition \[page 648\]](#) tab of charges included in offers.

♣ Example

Learn.com offers its customers a range of online training materials. It buys tutorials from specialized authors, converts them into electronic format, and adapts them to e-learning. Customers can buy these training materials in modules and download them. Costs may vary from module to module and can be determined by a module code. The Purchase Module charge is a master charge for the following reasons:

- When a customer decides to buy a module, the cost self-triggers because it does not depend on another event.
- The price plan of the Purchase Module charge can calculate the price to be paid without requiring the intermediary calculation of another price plan. Customers choose their module when executing a download command, which means the module code is part of the rating context. Once the Module Code user property has been created in the chargeable item class, this data may be used in the price plan of the Purchase Module charge to determine the price.

2.4.21.5.5 Activation Status

When you select dependent or master charges to build an offer, you can choose whether they are mandatory or optional.

i Note

Activation status are set up on the [Definition \[page 648\]](#) tab of charges included in offers.

Mandatory status

While defining a master or dependent charge, if you choose mandatory status, the charge will be always included in the offer subscription. You can specify the setup and effective date of this charge when creating the subscription.

Optional status

While defining a master or dependent charge, if you choose optional status, the charge will not be activated by default in the subscription. You can manually include the charge in the subscription later if necessary.

❖ Example

Optional Status

The training organization Techlingua signs a contract with Learn.com for the Complete Organization Module, on which it will receive a 5% discount on the subscription fee. Learn.com normally grants this type of one-shot discount to major customers. To enable the selective discount, Learn.com creates a dependent Discount charge in the Complete Organization Module with optional status, then manually activates the Discount charge in the Techlingua subscription. The Discount charge remains available for other subscriptions but will not be activated unless it is triggered.

2.4.21.5.6 Roles

You choose the roles of dependent charges when building an offer.

i Note

Roles are set up on the [Definition \[page 648\]](#) tab of dependent charges included in offers.

A dependent charge is assigned its role when it is used in an offer and not when it is created. This means the same dependent charge may play different roles in different offers:

- Commission
- Third-party billed commission
- Sponsorship
- Discount
- Other

The role of a charge is only valid for offers for which it is created, which means you can use a single charge to calculate commission in one offer and sponsorship in another.

However, if you need to use a suboffer (in which the dependent charges have already been assigned roles) to build a complex offer, you cannot modify these roles within the suboffer.

Commission

i Note

Like a master charge, a dependent charge can be linked to a subscriber account through the [charging mapping](#) of a subscription. In this case, the related prepaid account is debited or credited depending on the role of the dependent charge.

Commission, such as a sales commission, is an amount paid to a third party. A commission is charged to an account payable and is paid to a single agent.

Third-party billed commission

A third-party billed commission is an amount paid to a third party. This type of commission can be paid to a single third party (refer to the note above).

Sponsorship

Sponsorship is an amount paid by a third party to promote the sale of a service (through a chargeable item class). Because the costs of service consumption are shared between consumers and sponsors, the service provider is partly paid by its customers (consumers) and partly paid by its sponsors. Sponsorship may be paid by a single sponsor designated as "client" or "service provider" in the subscriber account (refer to the note above).

Discount

A discount is an amount to lower the amount paid by a customer.

Other

A dependent charge can also be assigned a customized role, known as "Other." In this case, you need to configure certain parameters when setting up the charge. You must decide whether:

- The client or partner will be credited or debited.
- A new transaction will be created: For example, a commission generates a new transaction because there is an actor but a discount does not create a new transaction.
- The relationship type is client or partner, which means transactions will be charged to accounts receivable or accounts payable.
- The master transaction will be adjusted: For example, a sponsorship adjusts a master transaction because the dependent charges do not affect the revenue for the service provider. The revenue corresponds to the

amount originally calculated by the master charge, and the final amount to be paid by the customer will be adjusted accordingly.

Dependent charges summary

The following table summarizes the parameters and fields for the different predefined roles that are assigned to a given dependent charge. Note that the only parameters and fields that the user is free to configure are those for the **Other** role:

	Operation	Create New Transac- tion	Relationship Type	Adjust Master Trans- action
Commission	Credit	Yes	Partner	No
Third-party billed commission	Debit	Yes	Client	No
Sponsorship	Debit	Yes	Client	Yes
Discount	Credit	No	N/A	N/A
Other	Free	Free	Free	Free

2.4.21.6 Working with Offers

Related Information

[Creating an Offer \[page 623\]](#)
[Opening an Existing Offer \[page 624\]](#)
[Modifying an Offer \[page 625\]](#)
[Setting Up an Offer \[page 626\]](#)
[Deleting an Offer \[page 628\]](#)
[Saving an Offer \[page 627\]](#)
[Exporting an Offer \[page 629\]](#)
[Importing an Offer \[page 629\]](#)
[Setting Up the Tabs of an Offer \[page 630\]](#)

2.4.21.6.1 Creating an Offer

Use one of the following procedures to create an offer.

To create an offer

1. From the menu bar in the main window, select **File > New > Offer**. The *Choose an Offer* dialog box opens.
2. In the *Owner of Object* drop-down menu, select the owner of the offer.
3. Click *OK*. The *New Charge* window opens.
4. *Set up* the offer.
5. Verify the charge structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. *Save* the offer.

→ Tip

You can create a charge by opening an existing charge and copying it.

To create a charge from an existing offer

1. From the menu bar in the main window, select **File > Open > Offer**. The *Choose an Offer* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the new offer.
3. In the *Offers* folder of the catalog of the owner, select the charge to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *offer* window opens.
5. *Modify* the offer if necessary.
6. Verify the charge structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. *Save* the offer.

2.4.21.6.2 Opening an Existing Offer

You can open:

- An existing offer saved in the database
- A previous version of a offer saved in the database

To open an existing offer saved in the database

1. From the menu bar in the main window, select **File > Open > Offer**. The *Open Offer* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the offer.

3. In the *Offers* folder of the catalog of the owner, select the offer, and then click *Open*. The *Offer* window opens in *display mode* [page 390].

Offers are managed chronologically. After you save a offer, you can access *previous versions* [page 602] of it that exist in the database. However, if you modify and save a previous version of an offer, all later versions of it are deleted.

To open a previous version of a offer saved in the database

1. From the menu bar in the main window, select **File > Open > Offer**. The *Open Offer* dialog box opens.
2. In the *Owner* drop-down menu, select the owner of the offer.
3. In the *Offers* folder of the catalog of the owner, select the offer, and then click *Open*. The *Offer* window opens in *display mode* [page 390].
4. On the toolbar in the main window, click the *Change Version* icon . The *Change Version* dialog box opens.
5. Select a version of the offer from the list.
6. Click *View*.

Note

You can only delete a previous version of an offer by modifying it, specifying an effective date earlier than the effective date of the original version, and then saving the offer.

2.4.21.6.3 Modifying an Offer

The modifications that you can make to an offer differ depending on whether it has been saved or not.

⚠ Caution

If your configuration of SAP Convergent Charging uses the *prerating and postrating* [page 362] features⁷⁰, certain modifications to an offer to which there is at least one subscription that contains unresolved prerating events may mean that the postrating result will differ from the prerating result, causing a rating error.

If this is the case, **do not** make the following modifications:

- Modifying a parameter or translation table in an offer, suboffer or offer and saving the offer to a date before the last prerating
- Modifying the charge dependencies in an offer
- Modifying a offer expiration date to a date before the last prerating date
- Modifying the client/partner or service provider in a charge

⁷⁰ The note of caution is equally true for the *session-based rating* [page 364] feature. For example, if there are pending sessions, modifying an offer may result in errors.

→ Remember

Read the note [\[page 582\]](#) about making retroactive changes to a charge or an offer.

i Note

When changes are made in offers, the related subscriptions are updated only for the changes applying to counters or parameters which are assigned the state `Not Redefined` in the subscriptions.

To modify a offer

1. [Open \[page 624\]](#) the offer
2. Set the edit mode by clicking the *Edit Mode* icon  on the main toolbar. The offer may be reloaded if it has been modified since you have opened it.
3. [Set up \[page 626\]](#) the offer.
4. Verify the offer structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
5. [Save \[page 627\]](#) the offer.

To preserve the integrity of the database, you cannot remove elements from the structure of a saved offer, and many of the fields in the *Definition* tab of a charge are unavailable.

2.4.21.6.4 Setting Up an Offer

An offer is:

- Basic when it contains at least a master charge and zero, one or more dependent charges
- Complex when it contains one or more suboffers and zero, one or more charges

In the offer window, an offer is graphically represented by an offer tree, which consists of the following:

-  : Offer root
-  : Suboffer - one or more, which also contain charges and may contain more suboffers
-  : Charge - one or more

You must [create \[page 623\]](#), [open \[page 624\]](#), or [Modifying an Offer \[page 625\]](#) an offer before setting it up. An offer window must be open.

To set up an offer



1. In the left pane of the offer window, click the offer root
2. In the right pane of the offer window, identify the offer. In the *Name* field, type the unique identifier of the offer if you create the offer. You cannot modify this field. In the *Description* field, describe the function of the offer if necessary.
3. Set up the following tabs of the offer: [Definition \[page 630\]](#), [Counters \[page 631\]](#), [Parameters \[page 632\]](#), [Translation Tables \[page 632\]](#), [Tier Tables \[page 634\]](#), [Additional Information \[page 637\]](#), and [Dependencies \[page 637\]](#).
4. If necessary, [add \[page 664\]](#) one or more suboffers, and then [set up \[page 638\]](#) the suboffers.
5. If necessary, [add \[page 664\]](#) one or more charges, and then [set up \[page 647\]](#) the charges.
6. If necessary, [remove \[page 665\]](#) one or more suboffers or charges.

2.4.21.6.5 Saving an Offer

Once you have created or modified an offer, and then verified its structure, you are ready to save it. You can save the reusable offer either into the back-end database or as an XML file on your hard disk.

To save and release a new offer into the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Save in the catalog* dialog box opens.
2. Select the name of the pricing catalog.
3. Click *Save*. The *Offer Creation* dialog box opens to inform you that the offer has been successfully saved and released.
4. Click *OK*.

To save and release a new version of an existing offer into the database

i Note

If a *Warning* dialog box opens to inform you that the offer has been modified since you opened it, you can:

1. Click *Overwrite* and then *Yes* to overwrite the changes performed by another user. Clicking *No* enables you to come back to the offer.
2. Click *Cancel* to come back to the offer. See later in this chapter how to save the offer as an XML file.

1. From the menu bar in the main window, select **File > Save > In the Database**. A dialog box opens to ask if you want to save the offer.

2. Click [Yes](#). The [Save Version](#) window opens.
3. In this window, select one of the following options:
 - [Create a new version](#): The [Start Date](#) is automatically filled in with the current date while the [End Date](#) is automatically filled in with [No End Date](#). You can however replace these dates by selecting them with the calendar or the arrow at the right of the field. Clicking the arrow displays the dates related to existing versions. In this list, [No Start Date](#) represents an undetermined date in the past while [No End Date](#) represents an undetermined date in the future. A message informs you when you overwrite versions.
 - [Replace Versions](#): The existing versions are displayed from the latest to the oldest. If the list contains one version, this version is displayed as "Unique Version". You can replace one or more consecutive versions. A message informs you when you overwrite versions. Note that the list can display identical versions whose periods are different.
4. Click [Save](#). The [Offer Modification](#) dialog box opens to inform you that the offer has been successfully saved and released.
5. Click [OK](#).

To save a offer as an XML file

1. From the menu bar in the main window, select [File](#) > [Save](#) > [In a File](#) . The [Save](#) dialog box opens.
2. Select a directory to save the offer.
3. In the [File name](#) field, type the name of the file.
4. Click [Save](#). The offer is saved as an XML file in your selected directory.

2.4.21.6.6 Deleting an Offer

Before you delete an offer, you must first delete all objects which reference it.

For example, you can not delete an offer that is part of a subscription in the database. You must first delete the subscription that contains this offer, and then you can delete the offer.

i Note

There is no "undo" function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

To delete an offer

1. From the menu bar in the main window, select [File](#) > [Delete](#) > [Offer](#) . The [Delete an Offer](#) dialog box opens.
2. In the [Owner](#) drop-down menu, select the owner of the offer.
3. In the [Offers](#) folder of the catalog of the owner, select the offer.

4. Click [Delete](#). A deletion dialog box asks if you want to delete the offer
5. Confirm the deletion of the offer by clicking [Yes](#):
 1. If a dialog box confirms your choice, the offer has been successfully deleted.
 2. If a [Warning](#) dialog box opens to inform you that the offer is currently being edited, you are not allowed to delete it. See the topic [Concurrent Edition Management \[page 391\]](#) for more information.

i Note

If an error message appears after clicking [Yes](#) at step 5, you must delete the object or objects that reference the offer. The identifiers of these objects appear in the message.

2.4.21.6.7 Exporting an Offer

You can export offers to a directory of your hard disk, where they are saved as XML files.

Unlike the process of simply saving an object to a file, the export process saves all versions and associated objects to a file, allowing you to import the offer back into SAP Convergent Charging.

To export an offer

1. From the menu bar in the main window, select **File > Export**. The [Choose Object](#) dialog box opens.
2. In the [Owner](#) drop-down menu, select the owner of the offer.
3. In the catalog of the owner, select the offer.
4. Click [OK](#). The [Save](#) dialog box opens.
5. Select a directory to export the offer.
6. In the [File name](#) field, type the name of the file.
7. Click [Save](#).

2.4.21.6.8 Importing an Offer

You can import offers in XML format from a directory in your database.

Several versions of an offer can exist in files corresponding to their stages of modification. You can import all versions of an offer into SAP CC Core Tool, or select only the version that you want.

To import an offer

1. Log on and connect to the target SAP CC system.

2. From the menu bar in the main window, select **File > Import**. The *Open* dialog box opens.
3. Open the directory in which the offer is saved, and then select the offer file.
4. Click *Open*. The *Import Objects* dialog box opens.
5. Leave the default *All versions* option selected if you want to import all the versions of the imported objects, or do the following:
 - To select only one version as of a certain date, select the *One version per object* option, and then select the date in the *Version as Of* field.
 - To replace all versions by the imported version, select the *Replace all versions* option.
 - To replace or not some existing versions by the imported version, select the *Use modification date as of* option and choose the date on which you save the imported version. Depending on this date, some existing versions will be replaced or not by the imported version.
6. In the *Import* column, clear the checkboxes of objects you do not want to import, if necessary.
7. Click *Import*.

Note

SAP CC Core Tool can only import an object which has previously been [exported \[page 629\]](#) and saved (**File > Export**), rather than saved directly to a file (**File > Save > In a File**).

This is because the export process saves all versions of an object and the objects attached to it, rather than just one version that lacks associated objects. The import process requires all versions and associated objects to be available.

2.4.21.6.9 Setting Up the Tabs of an Offer

Related Information

[Offer: Definition \[page 630\]](#)

[Offer: Counters \[page 631\]](#)

[Offer: Parameters \[page 632\]](#)

[Offer: Translation Tables \[page 632\]](#)

[Offer: Tier Tables \[page 634\]](#)

[Offer: Additional Information \[page 637\]](#)

[Offer: Dependencies \[page 637\]](#)

2.4.21.6.9.1 Offer: Definition

[Create \[page 623\]](#) or [Modifying an Offer \[page 625\]](#) an offer before setting it up. In the left pane of the offer

window, click the offer root  to view, and then open the *Definition* tab.

The *Definition* tab allows you to define the validity dates for the offer.

Definition tab

Fill in or modify the *Definition* tab.

Effective Date: Date from which subscriptions can be created for the offer. Click the calendar button , and then select a date.

Expiration Date: Date from which subscriptions can no longer be created for the offer. Click the calendar button , and then select a date.

i Note

You can manually type a date of validity into these fields, but you must type it in the following format: May 30, 2004 12:00:00 AM

Detailed Description: Describe the offer if necessary. This field allows you to type a long text.

2.4.21.6.9.2 Offer: Counters

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting it up \[page 626\]](#). In the left pane of the offer

window, click the offer root  to view, and then open the *Counters* tab.

The *Counters* tab allows you to create counters that can be shared with charges and suboffers.

Counters tab

Use the table and its icons to create shared counters.



: Click to add a counter row to the table.



: Click to delete a counter row from the table.

Name: Type the name of the shared counter.

Description: Describe the function of the shared counter if necessary.

Initial Value: Type a numerical value to initialize the shared counter.

2.4.21.6.9.3 Offer: Parameters

Create [page 623] or modify [page 625] an offer before setting it up [page 626]. In the left pane of the offer

window, click the offer root  to view, and then open the *Parameters* tab.

The *Parameters* tab allows you to create parameters that can be shared with charges and suboffers.

Parameters tab

Use the table and its icons to create shared parameters.

: Click to add a parameter row to the table.

: Click to delete a parameter row from the table.

Name: Type the name of the shared parameter.

Description: Describe the function of the shared parameter if necessary.

Type: Provides the list of parameter types. Select one of the following type: Number, String or Date.

Value: Type the value of the shared parameter. Its format must correspond to the selected type.

Visibility: Provides the list of *Visibility* options. The *Visibility* option allows you to choose the object in which you can modify the parameter value. Select one of the following visibility options:

- *Subscription*: Makes the shared parameter available for later modification in a subscription
- *Offer*: Makes the shared parameter available for modification only inside the offer

2.4.21.6.9.4 Offer: Translation Tables

Create [page 623] or modify [page 625] an offer before setting it up [page 626]. In the left pane of the offer

window, click the offer root  to view, and then open the *Translation Tables* tab.

The *Translation Tables* tab allows you to create new *Translation Tables* [page 422] from existing translation tables used in the charges of the offer. You can use these new translation tables (*shared translation tables* [page 723]) in the suboffers and charges included in the offer or in the subscriptions related to the offer.

i Note

You can create many shared translation tables from the same translation table of the offer.

The *Translation Tables* tab consists of two tables:

- The first table allows you to create shared translation tables and authorize or not the extension of the shared translation tables in subscriptions

- The second table allows you to extend the shared translation tables of the offer

Setting up the first table

Use the table and its icons to share translation tables.



: Click to add a translation table row to the table.



: Click to delete a translation table row from the table.

Table Code: Provides the list of translation tables used in the charges of the offer. Select the translation table that you want to share.

Shared Name: Type the name of the shared translation table.

Extension: Provides the list of *Extension* options. The *Extension* option allows you to extend or not the content of the shared translation table in a subscription. Select one of the following extension options:

- *Authorized:* Authorizes the extension of the translation table in a subscription
- *Not Authorized:* Does not authorize the extension of the translation table in a subscription

Setting up the second table

Once you have shared a translation table, you can create additional content that you add to the original content.

The additional content modifies the shared translation table but does not modify the original translation table linked to a charge. Only the charges inside the offer in which tables are explicitly linked to the shared translation table will benefit from the additional content.

You can add one or more rows to the translation table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information

from external .CSV type files by clicking .

Use the icons to fill in the translation table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.

Use the following icon...	To...
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.21.6.9.5 Offer: Tier Tables

Create [page 623] or modify [page 625] an offer before setting it up [page 626]. In the left pane of the offer

window, click the offer root  to view, and then open the *Tier Tables* tab.

The *Tier Tables* tab allows you to create new tier tables from existing tier tables [page 437] used in the charges of the offer. You can use these new tier tables (shared tier tables [page 725]) in the suboffers and charges included in the offer or in the subscriptions related to the offer.

i Note

You can create many shared tier tables from the same tier table of the offer.

The *Tier Tables* tab consists of two tables:

- The first table allows you to create shared tier tables and authorize or not the extension of the shared tier tables in subscriptions
- The second table allows you to extend the shared tier tables of the offer

Setting up the first table

Use the table and its icons to share tier tables.



: Click to add a tier table row to the table.



: Click to delete a tier table row from the table.

Table Code: Provides the list of tier tables used in the charges of the offer. Select the tier table that you want to share.

Shared Name: Type the name of the shared tier table.

Extension: Provides the list of *Extension* options. The *Extension* option allows you to extend or not the content of the shared tier table in a subscription. Select one of the following extension options:

- *Authorized*: Authorizes the extension of the tier table in a subscription
- *Not Authorized*: Does not authorize the extension of the tier table in a subscription

Setting up the second table

Once you have shared a tier table, you can create additional content that you add to the original content.

The additional content modifies the shared tier table but does not modify the original tier table linked to a charge. Only the charges inside the offer in which tables are explicitly linked to the shared tier table will benefit from the additional content.

You can add one or more rows to the tier table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking .

Use the icons to fill in the tier table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.21.6.9.6 Offer: Additional Information

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting it up \[page 626\]](#). In the left pane of the offer

window, click the offer root  to view, and then open the [Additional Information](#) tab.

The [Additional Information](#) tab allows you to create information that is only descriptive and not reused by SAP Convergent Charging at any stage of the process. For example, you can create a table with the author's name of the offer, the author's code, the creation date, and another information. If necessary, you can retrieve this information by using an external system.

Additional Information tab

Use the table and its icons to create additional information.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: Number, String or Date.

Value: Type the additional information according to the selected type.

2.4.21.6.9.7 Offer: Dependencies

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting it up \[page 626\]](#). In the left pane of the offer

window, click the offer root  to view, and then open the [Dependencies](#) tab.

The [Dependencies](#) tab allows you to:

- Link master charges to dependent charges
- Prioritize the dependency links

→ Remember

You can use dependent charges as master charges except in the following cases:

- A dependent charge with a sponsor or a discount role cannot be used as a master charge
- A dependent charge with a commission role can only be master of a dependent charge with a commission role

i Note

The [Dependencies](#) tab is unavailable if your offer contains only master charges.

Dependencies tab

Use the table and its icons to assign master charges to dependent charges. Be careful with the order in which the dependencies are listed in the table.



: Click to add a dependency row to the table.



: Click to delete a dependency row from the table.



: Click to move a row up. This changes the priority order of dependencies.



: Click to move a row down. This changes the priority order of dependencies.

[The charge](#): Provides the list of dependent charges used in the offer. From the drop-down list, select a dependent charge.

[Depends on](#): Provides the list of master or dependent charges used in the offer. See the note about restrictions, earlier in this topic. From the drop-down list, select the charge that you want to link to the dependent charge.

2.4.21.7 Working with Suboffers in an Offer

Related Information

[Setting Up a Suboffer in an Offer \[page 638\]](#)

[Setting Up the Tabs of a Suboffer \[page 639\]](#)

2.4.21.7.1 Setting Up a Suboffer in an Offer

You can add suboffers to offers by selecting each offer in the same way as you add charges.

When you incorporate a suboffer containing a dependent charge into an offer, the previously established dependency links are transferred to the complex offer. You can redefine these dependency links by specifying which charge plays the role of master charge in relation to each dependent charge.

You must [set up \[page 626\]](#) an offer before setting up a suboffer. An *Offer* window must be open.

To set up a suboffer in an offer

1. In the left pane of the *Offer* window, click the suboffer  to set up.
2. In the right pane of the offer window, set up the following tabs of the suboffer: [Definition \[page 640\]](#), [Counters \[page 641\]](#), [Parameters \[page 641\]](#), [Translation Tables \[page 642\]](#), and [Tier Tables \[page 644\]](#).
3. If the suboffer contains one or more charges, set up the charges. For each charge, click  in the left pane of the offer window, and then [set up \[page 647\]](#) the charge.
4. If necessary, [ignore \[page 665\]](#) one or more charges that are not useful to the suboffer. You can deactivate a charge if the offer has not been saved yet.

Note

- If you save the offer before defining the suboffer inside it, you cannot adjust default values in the suboffer later. If a suboffer is incorrectly defined once an offer is saved, you must delete the offer, and then redefine the offer and the suboffer.
- If the *Counters*, *Parameters* or *Translation Table* tabs of a suboffer are unavailable (dimmed), this  means that a counter, a parameter, or a translation table was not created at offer root  level of the original suboffer.

2.4.21.7.2 Setting Up the Tabs of a Suboffer

Related Information

[Suboffer: Definition \[page 640\]](#)

[Suboffer: Counters \[page 641\]](#)

[Suboffer: Parameters \[page 641\]](#)

[Suboffer: Translation Tables \[page 642\]](#)

[Suboffer: Tier Tables \[page 644\]](#)

2.4.21.7.2.1 Suboffer: Definition

Create [page 623] or modify [page 625] an offer before setting up [page 638] a suboffer. In the left pane of the

offer window, click a suboffer  to view, and then open the *Definition* tab.

You define a suboffer by specifying how it will be used in a subscription. For example, you can define a suboffer as a multiple suboffer which is a suboffer that can be subscribed many times in a [Subscription Structure](#) [page 703].

Definition tab

Fill in or modify the *Definition* tab.

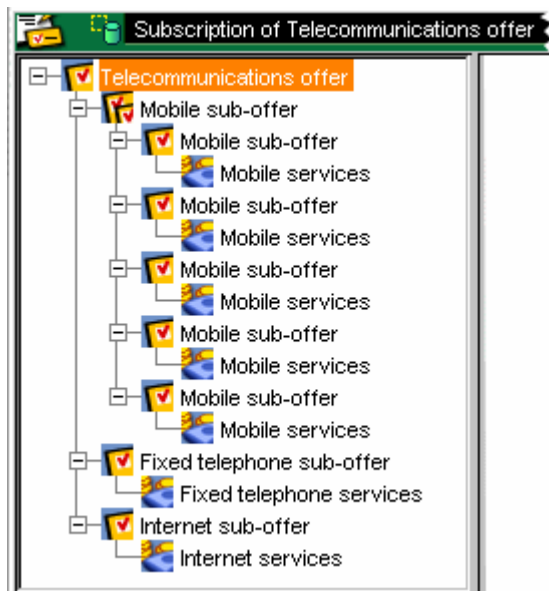
Offer: Displays the name of the suboffer. You can modify the offer corresponding to the suboffer by clicking



, making necessary changes and saving them.

Subscription: Select the status of the suboffer in subscriptions by clicking either *Mandatory* or *Optional*.

Minimum Order: Defines a suboffer as a multiple suboffer if you type a number higher than 1. This field is used together with the *Maximum Order* field. Type the minimum number of times that a suboffer can be subscribed. For example, if you type "5", the subscription window displays the suboffer as shown in the illustration below, in which the Mobile suboffer can be subscribed a minimum of 5 times.



Maximum Order: Type the maximum number of times a suboffer can be subscribed. This number must be equal to or greater than the value of the *Minimum Order* field.

Order Step: Type the size of the batch if the suboffer is subscribed in a batch. For example, if the suboffer is subscribed five times for each subscription, type "5".

2.4.21.7.2.2 Suboffer: Counters

Create [page 623] or modify [page 625] an offer before setting up [page 638] a suboffer. In the left pane of the

offer window, click a suboffer  to view, and then open the *Counters* tab.

The *Counters* tab allows you to link the counter of a suboffer to a shared counter of the offer. A table displays the list of all counters created at suboffer level.

i Note

If the *Counters* tab is unavailable (dimmed), this means that a counter was not created at root level of the original suboffer. To open the original suboffer, click the *Definition* tab of the offer, and then click



next to the *Offer* field.

Counters tab

Fill in or modify the *Counters* tab.

State: Provides the list of counter states. Select one of the following state:

- *Not Redefined*: Select this state if you do not want to link the counter to a shared counter of the offer
- *Linked*: Select this state if you want to link the counter to a shared counter of the offer

Name: Displays the name of the suboffer counter.

Description: Displays the function of the suboffer counter.

Initial Value: Provides the list of shared counters. Select the shared counter that you want to link to your suboffer counter. The value of the suboffer counter is now the same as that of the shared counter. The values of all the counters within the charges of the suboffer that are linked to the suboffer counter are now the same as that of the shared counter created for the offer.

i Note

The counters list displayed in the *Counters* tab only shows the counters created for the suboffer but do not show the counters created specifically for the charges inside the suboffer.

2.4.21.7.2.3 Suboffer: Parameters

Create [page 623] or modify [page 625] an offer before setting up [page 638] a suboffer. In the left pane of the

offer window, click a suboffer  to view, and then open the *Parameters* tab.

The [Parameters](#) tab allows you:

- To redefine or not the parameter of a suboffer
- To link the parameter of the suboffer to a shared parameter of the offer

i Note

If the [Parameters](#) tab is unavailable (dimmed), this means that a counter was not created at root level of the original suboffer. To open the original suboffer, click the [Definition](#) tab of the offer, and then click



next to the [Offer](#) field.

Parameters tab

Fill in or modify the [Parameters](#) tab.

[State](#): Provides the list of parameter states. Select one of the following state:

- [Not Redefined](#): Select this state if you do not want to link the parameter to a shared parameter of the offer
- [Redefined](#): Select this state if you want to redefine the parameter of a suboffer
- [Linked](#): Select this state if you want to link the parameter to a shared parameter of the offer

[Name](#): Displays the name of the suboffer parameter.

[Description](#): Displays the function of the suboffer parameter.

[Type](#): Displays the parameter type.

[Value](#): This field varies depending on the option that you select in the [State](#) field:

- [State Set to Redefined](#): Type the new value of the parameter.
- [State set to Linked](#): Provides the list of shared parameters. Select the shared parameter that you want to link to your suboffer parameter. The value of the suboffer parameter is now the same as that of the shared parameter. The values of all the parameter within the charges of the suboffer that are linked to the suboffer parameter are now the same as that of the shared parameter created for the offer.

i Note

The parameters list displayed in the [Parameters](#) tab only shows the parameters created for the suboffer but do not show the parameters created specifically for the charges inside the suboffer.

2.4.21.7.2.4 Suboffer: Translation Tables

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting up \[page 638\]](#) a suboffer. In the left pane of the

offer window, click a suboffer  to view, and then open the [Translation Tables](#) tab.

The *Translation Tables* tab allows you:

- To link a shared translation table of the suboffer to a shared translation table of the offer
- To extend the content of a translation table of the suboffer

Note

If the *Translation Tables* tab is unavailable (dimmed), this means that a counter was not created at root level



of the original suboffer. To open the original suboffer, click the *Definition* tab of the offer, and then



click next to the *Offer* field.

Translation Tables tab

Fill in or modify the *Translation Tables* tab.

Instance Name: Provides the list of all the shared translation tables that were created at suboffer level. Select the shared translation table that you want to link to the shared translation table of the offer. If necessary, you

can modify the content of the original table of the suboffer by clicking

Instance: Provides the list of the shared translation tables of the offer. Select the shared translation table that you want to link to the translation table selected in the Instance Name field. After you select a shared translation table, the extension of the translation table defined at offer level can be used by the suboffer.

Specific Instance: Allows you to add content to a translation table of the suboffer. The additions and modifications that you make only apply inside this offer and do not modify the data in the original translation table.

To modify the table, you add one or more rows, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking

Use the icons to fill in the table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.

Use the following icon...	To...
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.21.7.2.5 Suboffer: Tier Tables

Create [page 623] or modify [page 625] an offer before setting up [page 638] a suboffer. In the left pane of the

offer window, click a suboffer  to view, and then open the *Tier Tables* tab.

The *Tier Tables* tab allows you:

- To link a shared tier table of the suboffer to a shared tier table of the offer
- To extend the content of a tier table of the suboffer

i Note

If the *Tier Tables* tab is unavailable (dimmed), this means that a counter was not created at root level of the original suboffer. To open the original suboffer, click the *Definition* tab of the offer, and then click  next to the *Offer* field.

Tier Tables tab

Fill in or modify the *Tier Tables* tab.

Instance Name: Provides the list of all the shared tier tables that were created at suboffer level. Select the shared tier table that you want to link to the shared tier table of the offer. If necessary, you can modify the content of the original table of the suboffer by clicking .

Instance: Provides the list of the shared tier tables of the offer. Select the shared tier table that you want to link to the tier table selected in the Instance Name field. After you select a shared tier table, the extension of the tier table defined at offer level can be used by the suboffer.

Specific Instance: Allows you to add content to a tier table of the suboffer. The additions and modifications that you make only apply inside this offer and do not modify the data in the original tier table.

To modify the table, you add one or more rows, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from external .CSV type files by clicking .

Use the icons to fill in the table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)

Use the following icon...	To...
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.21.8 Working with Charges in an Offer

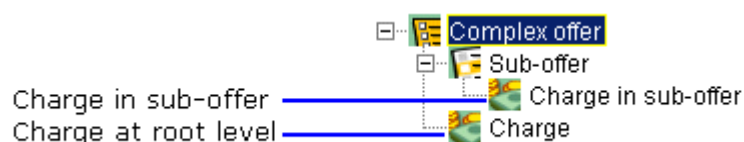
Related Information

[Setting Up a Charge in an Offer \[page 647\]](#)

[Setting Up the Tabs of a Charge in an Offer \[page 647\]](#)

2.4.21.8.1 Setting Up a Charge in an Offer

Setting up a charge in an offer means configuring aspects of it to meet the requirements of the offer. You can set up a charge in the offer root or in a suboffer in the same way.



You must set up an offer before setting up a charge. An offer window must be open.

To set up a charge in an offer

1. In the left pane of the offer window, make sure that the charge  is selected; otherwise, select it.
2. In the right pane of the offer window, set up the following tabs of the charge: [Definition \[page 648\]](#), [Counters \[page 650\]](#), [Parameters \[page 651\]](#), [Translation Tables \[page 652\]](#), [Tier Tables \[page 654\]](#), [Tax \[page 656\]](#), [Charged Item \[page 656\]](#), [Postpaid Transactions \[page 657\]](#), and [Prepaid Transactions \[page 658\]](#).

When setting up a charge, only the *Definition* tab is mandatory. The other tabs are optional.

Note

- If you save the offer before defining the charge inside it, you cannot adjust the charge values later. If a charge is incorrectly defined once an offer is saved, you must delete the offer, and then recreate it.
- If the *Counters*, *Parameters* or *Translation Table* tabs of a charge are unavailable (dimmed), this means a counter, a parameter, or a translation table was not used at charge level.

2.4.21.8.2 Setting Up the Tabs of a Charge in an Offer

Related Information

[Offer Charge: Definition \[page 648\]](#)

[Offer Charge: Counters \[page 650\]](#)

[Offer Charge: Parameters \[page 651\]](#)

[Offer Charge: Translation Tables \[page 652\]](#)

[Offer Charge: Tier Tables \[page 654\]](#)

[Offer Charge: Tax \[page 656\]](#)
[Offer Charge: Charged Item \[page 656\]](#)
[Offer Charge: Postpaid Transactions \[page 657\]](#)
[Offer Charge: Prepaid Transactions \[page 658\]](#)
[Setting Up the Tabs of the Tax Tab \[page 659\]](#)

2.4.21.8.2.1 Offer Charge: Definition

[Create \[page 623\]](#) or [modify \[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Definition* tab.

The *Definition* tab allows you to define how the [master \[page 563\]](#) or [dependent \[page 564\]](#) charge is used in the subscription, the [role \[page 621\]](#) it plays in the subscription and which actors it is linked to. The charge type is defined previously when you [create \[page 580\]](#) a charge.

⚠ Caution

If you save an offer before defining a charge, the charge will be saved using default settings. You cannot change the default settings in a charge that it is saved as part of an offer. If you need to change the definition settings of a charge after it has been saved in an offer, you must delete the offer, create it again, add the charge, and define it.

The *Definition* tab displays different fields depending on the type of the charge that you want to set up.

If you set up a master charge

Charge: Displays the name of the charge. If you want to modify the charge before defining it in the offer, you can

do so by clicking , [modifying \[page 583\]](#) the charge, saving your changes, and closing its window.

Activation [page 620]: Select one of the following options:

- *Mandatory*: The charge is subscribed automatically when an end customer subscribes to the offer
- *Optional*: The charge is an optional part of the offer

i Note

- The list of currencies is available only if the [Multicurrency \[page 584\]](#) option is associated to the related charge. If the related charge is associated to a specific currency, the offer is associated to the same currency, and the list of currencies is unavailable.
- The currency cannot be changed once the offer has been created.

Currency Definition: This area allows you to select the currency that you want to associate to the charge.

- *Fixed currency*: Provides the list of currencies. Select a currency.

- **Multicurrency:** Select this option if you do not want to associate a specific currency to the charge. This option allows you to create one only charge that can be reused in different charge plans, refill plans, or offers. This option avoid creating the same charge many times and associating each charge to a different currency.

Relationship Type [page 620]: Select one of the following options:

- **Client:** The subscriber of the offer consumes the service related to the charge, resulting in the generation of a client transaction
- **Partner:** The subscriber of the offer provides the service related to the charge, resulting in the generation of a partner transaction

Operation [page 620]: Depends on the option that you select in the **Relationship Type** field. Select one of the following options:

- **Debit Client:** The client pays a service provider for the consumption of the service related to the charge
- **Credit Client:** The client is paid by a service provider after the service is consumed
- **Debit Partner:** The partner pays for the consumption of the service related to the charge
- **Credit Partner:** The partner is paid for the consumption of the service related to the charge

If you set up a dependent charge

Charge: Displays the name of the charge. If you want to modify the charge before defining it in the offer, you can

do so by clicking , **modifying** [page 583] the charge, saving your changes, and closing its window.

Activation [page 620]: Select one of the following options:

- **Mandatory:** The charge is subscribed automatically when an end customer subscribes to the offer
- **Optional:** The charge is an optional part of the offer

Note

The currency cannot be modified once the charge has been created.

Currency Definition: This area allows you to select the currency that you want to associate to the charge.

- **Fixed currency:** Provides the list of currencies. Select a currency.
- **Multicurrency:** Select this option if you do not want to associate a specific currency to the charge. This option allows you to create one only charge that can be reused in different charge plans, refill plans, or offers. This option avoid creating the same charge many times and associating each charge to a different currency.

Roles [page 621]: Select one of the following roles that the charge plays in the offer:

- **Commission:** Is an amount paid to an agent (third party) such as a sales representative
- **Sponsorship:** Is an amount paid by a sponsor (third party) to a service provider
- **Discount:** Is a deduction in price or amount of a bill paid by the client
- **Third Party Billed Commission:** Is an amount paid to a third party after being billed by the third party
- **Other:** Select this option if you want to customize the role of the dependent charge

Operation [page 620]: Is only available if you select the Other option in the **Role** field above. Select one of the following options:

- *Debit Client/Partner*: The client or partner is debited
- *Credit Client/Partner*: The client or partner is credited

*Create New Transaction*⁷¹: If selected, a transaction is created which includes the amount calculated by the dependent charge. Some fields are available or not depending on which option you select in the *Role* field. Selecting an option other than *Other* in the *Role* field only makes the *Client/Partner* and *Service Provider* fields available while selecting the *Other* option allows you to select or not the *Create New Transaction* check box. If this check box is selected, all the fields in this area are available; otherwise, they are unavailable.

→ Remember

You must keep in mind that once a master charge has been triggered, the related dependent charges are triggered depending on the priority order defined in the [dependencies table \[page 637\]](#). This is the case with the *Use previous discounted amount* option. When you select this option, a discount is calculated on the initial amount of the master charge from which the previous discounts have already been subtracted; therefore, the resulting amount of the discount depends on the order of the dependent charges in the dependencies table.

- *Relationship Type [page 620]*: If you select the *Other* option in the *Role* field and the *Create New Transaction* check box, the *Relationship Type* option allows you to tag generated transactions as either *Client* or *Partner*.
- *Adjust Master Transaction*: If you select the *Other* option in the *Role* field and the *Create New Transaction* check box, the *Adjust Master Transaction* check box allows you to enable the amount calculated by the dependent charge to modify the master transaction amount. This will split the amount calculated by the master charge into two transactions: (i) Amount calculated by the dependent charge, and (ii) Amount calculated by the master charge minus the amount calculated by the dependent charge. Leaving the box unchecked will result in the creation of a transaction completely independent of a master charge.
- *Use previous discounted amount (if any)*: Is available if the *Discount* role and the *Create New Transaction* option are selected. If selected, this option allows you to apply the discount of the dependent charge to the amount of the master charge from which the previous discounts have already been subtracted. For example, the master charge amount "MA" is of \$200. The master charge "MA" is linked to three dependent charges having a role of discount "D1" (10%), "D2" (20%), and "D3" (50%). The dependent charges and triggered in the order "D1", "D2", and "D3". When the master charge "MA" is triggered, a transaction of \$200 is created. A second transaction is created for the dependent charge "D1": $\$200 \times 10\% = \$20$. A third transaction is created for the dependent charge "D2": $(\$200 - \$20) \times 20\% = \$36$. A fourth transaction is created for the dependent charge "D3": $(\$200 - (\$20 + \$36)) \times 50\% = \$72$.

2.4.21.8.2.2 Offer Charge: Counters

[Create \[page 623\]](#) or [modify \[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Counters* tab.

The *Counters* tab allows you to link the counter of a charge to a shared counter of the offer. In this tab, a table displays the list of all counters created at charge level. Each row in the table represents a counter.

⁷¹ If you choose not to create a new transaction, all the transactions created by the master charge and related dependent charges are merged into one single transaction; however, all the transaction details resulting from the dependent charges will not appear in the final transaction. Therefore, the transaction details of the dependent charges will be lost permanently.

i Note

If the [Counters](#) tab is unavailable (dimmed), this means that a counter was not created at price plan level



of the original charge. To open the original charge, click the [Definition](#) tab of the offer, and then click



next to the [Charge](#) field.

Counters tab

Fill in or modify the [Counters](#) tab.

[State](#): Provides the list of counter states. Select one of the following state:

- [Not Redefined](#): Select this state if you do not want to link the counter to a shared counter of the offer
- [Linked](#): Select this state if you want to link the counter to a shared counter of the offer

[Name](#): Displays the name of the charge counter.

[Description](#): Displays the function of the charge counter.

[Initial Value](#): Provides the list of shared counters. Select the shared counter that you want to link to your charge counter. The value of the charge counter is now the same as that of the shared counter defined in the offer.

2.4.21.8.2.3 Offer Charge: Parameters

[Create \[page 623\]](#) or [modify \[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the



offer window, click a charge to view, and then open the [Parameters](#) tab.

The [Parameters](#) tab allows you:

- To redefine or not the parameter of a charge
- To link the parameter of a charge to a shared parameter of the offer

i Note

If the [Parameters](#) tab is unavailable (dimmed), this means that a parameter was not created at charge level.



To open the original charge, click the [Definition](#) tab of the offer, and then click next to the [Charge](#) field.

Parameters tab

Fill in or modify the [Parameters](#) tab.

State: Provides the list of parameter states. Select one of the following state:

- **Not Redefined:** Select this state if you do not want to link the parameter to a shared parameter of the offer.
- **Redefined:** Select this state if you want to redefine the parameter of a charge. You can redefine a parameter only if in the charge its visibility is set to **External**.
- **Linked:** Select this state if you want to link the parameter to a shared parameter of the offer.

Name: Displays the name of the charge parameter.

Description: Displays the function of the charge parameter.

Type: Displays the parameter type. **Special types** [page 574] are converted to string type.

Value: This field varies depending on the option that you select in the **State** field:

- **State set to Redefined:** Type the new value of the parameter.
- **State set to Linked:** Provides the list of shared parameters. Select the shared parameter that you want to link to your charge parameter. The value of the charge parameter is now the same as that of the shared parameter.

2.4.21.8.2.4 Offer Charge: Translation Tables

Create [page 623] or modify [page 625] an offer before setting up [page 647] a charge. In the left pane of the offer window, click a charge  to view, and then open the **Translation Tables** tab.

The **Translation Tables** tab allows you:

- To share the extension of a translation table of the offer with a translation table of the charge
- To extend the content of the translation table of the charge

i Note

If the **Translation Tables** tab is unavailable (dimmed), this means that no translation table is used in the original charge. To open the original charge, click the **Definition** tab of the offer, and then click  next to the **Charge** field.

Translation Tables tab

Fill in or modify the **Translation Tables** tab.

Translation Table: Provides the list of all the translation tables that are used in the charge. Select the translation table that you want to link to a shared translation table of the offer. If necessary, you can modify the content of the original table used in the charge by clicking .

Instance: Provides the list of the shared translation tables of the offer. Select the shared translation table that you want to link to the translation table of the charge. After you select a shared translation table, the extension of the translation table defined at offer level can be used by the translation table of the charge.

Specific Instance: Allows you to extend the content of the translation table of the charge. The additions and modifications that you make apply only inside this offer and do not modify the data of the original translation table.

To modify the table, you add one or more rows, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from external .CSV type files by clicking .

Use the icons to fill in the table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.

Use the following icon...	To...
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.21.8.2.5 Offer Charge: Tier Tables

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Tier Tables* tab.

The *Tier Tables* tab allows you:

- To share the extension of a tier table of the offer with a tier table of the charge
- To extend the content of the tier table of the charge

i Note

If the *Tier Tables* tab is unavailable (dimmed), this means that no tier table is used in the original charge. To open the original charge, click the *Definition* tab of the offer, and then click  next to the *Charge* field.

Tier Tables tab

Refer to the [important note \[page 634\]](#) about tier tables at offer level before filling in or modifying the *Tier Tables* tab.

Fill in or modify the *Tier Tables* tab.

Tier Table: Provides the list of all the tier tables that are used in the charge. Select the tier table that you want to link to a shared tier table of the offer. If necessary, you can modify the content of the original table used in the

charge by clicking .

Instance: Provides the list of the shared tier tables of the offer. Select the shared tier table that you want to link to the tier table of the charge. After you select a shared tier table, the extension of the tier table defined at offer level can be used by the tier table of the charge.

Specific Instance: Allows you to extend the content of the tier table of the charge. The additions and modifications that you make apply only inside this offer and do not modify the data of the original tier table.

To modify the table, you add one or more rows, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking .

Use the icons to fill in the table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.

Use the following icon...



To...

Search for the next occurrence towards the bottom of the ta-

ble if the previous search with the icon  was success-
ful. The search is performed from right to left, row by row.

Each time that you click , the cell is highlighted if the
search is successful. When the end of the table is reached, a
message informs you that the value has not been found.

2.4.21.8.2.6 Offer Charge: Tax

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Tax* tab.

The *Tax* tab allows you to set up the tax for the charge. The rules for setting up the *Charge tax* tab in an offer are the same as those for setting up the [Charge tax tab in a charge plan](#).

2.4.21.8.2.7 Offer Charge: Charged Item

Create [\[page 623\]](#) or modify [\[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Charged Item* tab.

The *Charged Item* tab allows you to:

- Replace the [charged item class \[page 543\]](#) associated to the charge in the offer
- Change the values or properties of the charged item class
- Assign values to the fields of the charged item class

Charged Item tab

Fill in or modify the *Charged Item* tab.

Charged Item Based On: Provides the list of the charged item classes. Select a charged item class if you want to

replace the charged item class associated to the charge. Click  to open the charged item class, and then

modify it if necessary. Click  to refresh the charged item mapping.

Charged Item Mapping: Provides the list of the fields of the selected charged item class and the respective values or properties of these fields. To display less or more columns, click , and then select the columns you want to display or not.

- **Charged Item Field:** Displays the field names of the charged item class.
- **Property / Value:** Allows you to change the values or properties that are not dimmed.
- **Default Value:** Displays the field values defined at class level. For more information about the *Undefined* and *Empty* properties, consult [this topic \[page 548\]](#).

Note

If you set up a boolean field, the value is converted by SAP CC during the charging process. Strings "0" and "false" and number 0 are converted to `FALSE`. Strings "1" and "true" and number 1 are converted to `TRUE`; otherwise, the charging process fails because it cannot convert the value.

2.4.21.8.2.8 Offer Charge: Postpaid Transactions

⚠ Caution

This topic is intended for administrators and integrators.

You can maintain the old offers that you have created with SAP Convergent Charging 1.0, but you can no longer create new offers by using the old configuration related to prepaid or postpaid transactions. In addition, if you want to migrate the old offers to the new configuration related to charged items (SAP Convergent Charging 2.0), keep in mind that this process is irreversible. This means that if you use the [Migrate Charged Item Mapping on All Charges \[page 666\]](#) or [Migrating the Charged Item Mapping \[page 667\]](#) commands⁷² of the *Action* menu, the *Charge Prepaid* and *Charge Postpaid* tabs will be replaced by the *Charged Item* tab.

[Create \[page 623\]](#) or [modify \[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Postpaid Transactions* tab.

The *Postpaid Transactions* tab allows you to filter transaction details. When a service is consumed, a transaction is produced for charging purposes. You can filter transaction details to allow storing only the details you want in the database.

Postpaid Transactions tab

Fill in or modify the *Postpaid Transactions* tab.

The fields *Criteria #1*, *Criteria #2* and *Criteria #3* can be used by administrators to tag certain parameters of a transaction. This makes it easier to search for a particular transaction within a set of transactions.

Criteria #1: Provides the list of all the properties related to transactions. Select the first property.

⁷² These commands are available only for the offers created with SAP Convergent Charging 1.0.

Criteria #2: Provides the list of all the properties related to transactions. Select the second property.

Criteria #3: Provides the list of all the properties related to transactions. Select the third property.

Note

If the *Activate Filtering* option is not selected, all transaction details will appear in transactions.

Activate Filtering: Is selected by default. When the option is selected, standard default properties and charge-specific properties are available, but none of them is selected to avoid storing lot of data into the database. You can however select transaction details that you want to include in transactions. For example, you select the main properties, but you leave the secondary properties used to make intermediate calculations. To further optimize storage in database, you can also leave the check boxes *Price Plan Name*, *Charge Code*, and *Offer Code* cleared, but you select these labels if you want them to be included in transactions. You filter each transaction detail by selecting standard default properties  common to all charges, as well as properties that are specific to the charge:

-  User-defined properties, which were defined in the [chargeable item class \[page 531\]](#) that the charge relates to
-  Generated properties, such as those produced by a translation table
-  Counters
-  Parameters

2.4.21.8.2.9 Offer Charge: Prepaid Transactions

⚠ Caution

This topic is intended for administrators and integrators.

You can maintain the old offers that you have created with SAP Convergent Charging 1.0, but you can no longer create new offers by using the old configuration related to prepaid or postpaid transactions. In addition, if you want to migrate the old offers to the new configuration related to charged items (SAP Convergent Charging 2.0), keep in mind that this process is irreversible. This means that if you use the [Migrate Charged Item Mapping on All Charges \[page 666\]](#) or [Migrating the Charged Item Mapping \[page 667\]](#) commands⁷³ of the *Action* menu, the *Charge Prepaid* and *Charge Postpaid* tabs will be replaced by the *Charged Item* tab.

[Create \[page 623\]](#) or [modify \[page 625\]](#) an offer before [setting up \[page 647\]](#) a charge. In the left pane of the

offer window, click a charge  to view, and then open the *Postpaid Transactions* tab.

The *Prepaid Transactions* tab allows you to create up to 20 transaction details which can be used as additional information. Each transaction detail can be one of the following types:

- Date (up to 3 details)

⁷³ These commands are available only for the offers created with SAP Convergent Charging 1.0.

- Number (up to 7 details)
- String (up to 12 details)

Prepaid Transactions tab

Fill in or modify the *Prepaid Transactions* tab.



: Click to add a row to the table.



: Click to delete a row from the table.



: Click to move a row up.



: Click to move a row down.

Transaction Field: Provides a list of 20 fields for storing properties or values. Select a date (D_xx), a number (N_xx), or a string field (S_xx).

Definition Type: Select one of the following types:

- *Mapped to property*: Assigns a property to the *Transaction Field*
- *Fixed value*: Assigns a value to the *Transaction Field*

Property / Value: Select a property, a date from the calendar 📅, or type a value.

2.4.21.8.2.10 Setting Up the Tabs of the Tax Tab

Related Information

[Taxing Jurisdiction Info \[page 659\]](#)

[Customer Info \[page 660\]](#)

[Company Info \[page 661\]](#)

[Transaction Info \[page 662\]](#)

[Transaction Service Type \[page 663\]](#)

2.4.21.8.2.10.1 Taxing Jurisdiction Info

On this tab, you assign the correct jurisdiction to the transaction for obtaining and returning the correct tax to the billing system. Jurisdiction information can be supplied to the EZTax Engine in several ways. It can be

supplied using a Permanent (location) Code (P-Code), a NPANXX code, or a State Code. For example, a call can originate in Oregon, terminate in California and have a service address in Oregon.

Fill in or modify the *Taxing Jurisdiction Info* tab.

Origination: The origination location of the transaction to be taxed.

- *Type*: Provides the list of jurisdiction types. Select one of the following types :
 - *N (NPANXX)*
 - *P (P-Code)*
 - *S (State Code)*
- *Value*: Select or type the value assigned to the jurisdiction. Do one of the following:
 - Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
 - Select the value defined in a property
 - Type a constant value between "0000000000" and "9999999999" (10 digits)

Termination: The termination location of the transaction to be taxed.

- *Type*: Provides the list of jurisdiction types. Select a type.
- *Value*: Select or type the value assigned to the jurisdiction. Do one of the following:
 - Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
 - Select the value defined in a property
 - Type a constant value between "0000000000" and "9999999999" (10 digits)

Service Address: The service address of the transaction to be taxed.

- *Type*: Provides the list of jurisdiction types. Select a type.
- *Value*: Select or type the value assigned to the jurisdiction. Do one of the following:
 - Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
 - Select the value defined in a property
 - Type a constant value between "0000000000" and "9999999999" (10 digits)

2.4.21.8.2.10.2 Customer Info

On this tab, you define the customer information included in the transaction to be taxed.

Fill in or modify the *Customer Info* tab.

Customer Type: This option is used to specify the type of the customer involved in the transaction. To select a type, do one of the following:

- Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
- Select one of the following types:
 - *Business*: If transactions are made at a place of business
 - *Residential*: If transactions are made by a customer for home use
 - *Industrial*: If transactions are made at an industrial business
 - *Senior Citizen*: If transactions made by a customer meet the jurisdiction requirements
- Select the type defined in a property

Incorporated City Area: This option is used to specify whether the customer involved in the transaction is inside or outside of the incorporated area designated as their location. The tax may or may not be affected by this

designator depending upon whether or not the unincorporated areas are taxed in the same manner as the incorporated areas. To select the option "inside" or "outside", do one of the following:

- Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
- Select one of the following options:
- Select the option defined in a property

Exemption: The exemption level is the jurisdictional level of the taxing authority that defines the tax. It is used to exempt taxes at specific federal, state, county and/or local taxes. Select the exemption levels:

- **Fed Exempt:** Is used to specify a Federal level tax exemption
- **State Exempt:** Is used to specify a State level tax exemption
- **County Exempt:** Is used to specify a County level tax exemption
- **Local Exempt:** Is used to specify a Local level tax exemption

Service Class: This option is provided to delineate the primary activity of an organization as either long distance or local service. To select a service class, do one of the following:

- Select one of the following service classes:
 - **Long Distance:** Primary long distance providers are carriers vending their services with over 50% of the gross business activities in long distance revenue
 - **Local Primary:** Primary local service providers are carriers vending their services with over 50% of the gross business activities in local service revenue
- Select the service class defined in a property

Business Class: This option is used to specify if the business making the transaction is an Incumbent Local Exchange Company (ILEC) or a Competitive Local Exchange Company (CLEC). To select a business class, do one of the following:

- Select one of the following service classes:
 - **ILEC:** An ILEC company is engaged in selling services over company-owned lines and equipment
 - **CLEC:** A CLEC company is engaged in selling services competing with an incumbent provider
- Select the business class defined in a property

Lifeline: This option is used to indicate if a customer is a lifeline participant. Select the option defined in a property.

2.4.21.8.2.10.3 Company Info

On this tab, you define the transaction information which is contained in the transaction to be taxed.

Fill in or modify the [Company Info](#) tab.

Reseller: This option is used to specify if the telecommunication company and its services are regulated by the Public Utility Commission, the Federal Communication Commission and/or other government authorities. To select an option, do one of the following:

- Select one of the following options:
 - **Regulated:** The telecommunication company and its services are regulated
 - **Unregulated:** The telecommunication company and its services are not regulated
- Select the option defined in a property

Facilities Based: This option specifies the tangible facilities used by a company to deliver the service. If the carrier delivering the service has company-owned facilities used to provide the service, they are facilities based. If they do not own the facilities, they are non-facilities based.

- Select one of the following options:
 - **Facilities Based:** The carrier delivering the service has company-owned facilities used to provide the service
 - **Non-Facilities Based:** The carrier delivering the service has not company-owned facilities used to provide the service: The telecommunication company and its services are not regulated
- Select the option defined in a property

Franchise: This option specifies if the company provides services sold according to a franchise agreement between the carrier and jurisdiction.

- Select one of the following options:
 - **Franchise:** The company provides services sold according to a franchise agreement: The carrier delivering the service has company-owned facilities used to provide the service
 - **Non-Franchise:** The company does not provide services sold according to a franchise agreement
- Select the option defined in a property

2.4.21.8.2.10.4 Transaction Info

On this tab, you define the transaction information which is contained in the transaction to be taxed.

Fill in or modify the **Transaction Info** tab.

Number of Lines: When a local service is provided, a transaction must be generated with this option populated with the number of lines which the customer subscribes to. EZTax uses this information for generating per line taxes usually associated with local E911 charges and local telecommunications relay service taxes and other assorted taxes. Do one of the following:

- Type the number of lines
- Select the number of lines defined in a property

Number of Locations: When a local service is provided, this option must be populated with the number of locations which the customer has. EZTax uses this information for generating local taxes that are mandated for location by the taxing jurisdiction. Most of these taxes are flat fees; however, the charge field must be specified to allow for taxation based upon percentages of revenue instead of per location.

- Type the number of locations
- Select the number of locations defined in a property

Client Resale: Telecommunication companies are taxed on transactions made by their clients, which in some cases can be passed on or "resold" to their customers in part or in total. This option is used to specify whether the service transaction is final or if it must be resold.

- Select the value defined on the [Tax \[page 696\]](#) tab of the subscriber account
- Select one of the following types:
 - **Resale:** The service transaction must be resold
 - **Sale:** The service transaction is final
- Select the type defined in a property

Telecommunication Type: The telecommunication type specifies the type of the telecommunication transaction. To select a type, select one of the following options:

- Select one of the following types:
 - [Calls](#)
 - [Debit Card Calls](#)
 - [Point of Sale](#)
- Select the type defined in a property

Call Duration: The call duration specifies the length of phone call in minutes, with one tenth of a minute precision capability. EZTax uses the call duration for generating taxes that are specified as per minute flat fees in some taxing jurisdictions, and then stores the value in the EZTax log database. Select the call duration defined in a property.

2.4.21.8.2.10.5 Transaction Service Type

On this tab, you define the transaction and service types. EZTax stipulates a unique pair of numbers for each transaction and service type. The first number defines the transaction type and the second number defines the service type. Transaction types and service types are combined (or "paired") to uniquely describe a valid transaction / service pair for a transaction.

Fill in or modify the [Transaction Service Type](#) tab.

Types: Provides the list of transaction and service types. Select a type.

Description: Displays the description of the selected type.

2.4.21.9 Using the Action Menu

Related Information

[Adding a Charge to an Offer \[page 664\]](#)

[Adding a Suboffer to an Offer \[page 664\]](#)

[Removing a Suboffer or a Charge from an Offer \[page 665\]](#)

[Ignoring a Charge \[page 665\]](#)

[Changing the Version of an Offer \[page 666\]](#)

[Deleting the Version of an Offer \[page 666\]](#)

[Migrating the Charged Item Mapping on all Charges \[page 666\]](#)

[Migrating the Charged Item Mapping \[page 667\]](#)

2.4.21.9.1 Adding a Charge to an Offer

This procedure allows you to add a charge to the offer  or to the suboffer root .

To perform this procedure, you must [Opening an Existing Offer \[page 624\]](#) an offer.

To add a charge to an offer

1. From the menu bar in the main window, select ► *Action* ► *Add Charge* ►, or click the icon  on the toolbar in the main window. The *Choose a Charge* dialog box opens.
2. In the *Charges* folder, select the charge.
3. Click *OK*. The charge is added to the offer.
4. Select the charge  in the offer tree, and then [set up \[page 647\]](#) the tabs of the charge according to your requirements.

2.4.21.9.2 Adding a Suboffer to an Offer

This procedure allows you to add a suboffer to the root offer . To perform this procedure, you must open an offer.

To add a suboffer to an offer

1. In the open offer tree, select the root offer .
2. On the toolbar in the main window, click the *Add Suboffer* icon . The *Choose an Offer* dialog box opens.
3. In the *Offers* folder, select the offer.
4. Click *OK*.
5. Select the suboffer  in the offer tree, and then set up the tabs of the suboffer according to your requirements.

2.4.21.9.3 Removing a Suboffer or a Charge from an Offer

If you have added a charge or a suboffer to an offer and the offer is not yet saved, you can remove them from the offer.

To preserve the integrity of the database, SAP Convergent Charging does not allow you to remove a charge or a suboffer from an offer after you have saved them inside it. If you need to remove a charge or a suboffer after they have been saved in the offer, you must delete the entire offer and build it again.

To perform this procedure, you must [open \[page 624\]](#) an offer.

To remove a charge or suboffer from an offer

1. In an open offer, right-click the charge or offer that you want to remove.
2. Select [Remove](#). The charge or suboffer is removed from the offer.

i Note

You cannot remove a charge from a suboffer because the suboffer has been saved before being added to the offer.

2.4.21.9.4 Ignoring a Charge

If you have added a suboffer to an offer and the offer is not yet saved, you can ignore one or more charges in the suboffer. Ignoring a charge allows you to deactivate a charge in a suboffer. The charge is not removed from the suboffer but becomes unavailable (dimmed).

To preserve the integrity of the database, SAP Convergent Charging does not allow you to ignore a charge in a suboffer after you have saved the offer. If you need to ignore a charge after saving the offer, you must delete the entire offer and build it again.

To perform this procedure, you must [open \[page 624\]](#) an offer.

To ignore a charge in a suboffer

1. In an open offer, right-click the charge that you want to ignore.
2. Select [Ignored Charge](#). The charge is unavailable (dimmed).

2.4.21.9.5 Changing the Version of an Offer

The procedure is the same as for changing the version of an object (as described below if necessary):

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.21.9.6 Deleting the Version of an Offer

The procedure is the same as for [deleting the versions of a catalog object \[page 408\]](#).

2.4.21.9.7 Migrating the Charged Item Mapping on all Charges

i Note

This topic is intended for administrators and integrators.

[Read the caution \[page 657\]](#) before converting any old offer.

This procedure allows you to convert the old offers created in SAP Convergent Charging 1.0 into offers which are compliant with SAP Convergent Charging 2.0 and later versions.

Prerequisites

- You must determine and create the necessary [charged item classes \[page 531\]](#) that are relevant for your business model
- The SAP Convergent Charging system must be configured to generate charged item files (old transaction files)

To migrate the charged item mapping on all charges

1. [Open \[page 624\]](#) the offer that you want to convert.
2. Select the root of the offer.
3. From the menu bar in the main window, select ► **Action** ► *Migrate Charged Item Mapping on all Charges* ►. After the offer is converted, the *Ex. Acc. Transactions*, *Prepaid Transactions*, and *Postpaid Transactions* tab of the charges of the offer are no longer available but replaced by the [Charged Item \[page 656\]](#) tab.

2.4.21.9.8 Migrating the Charged Item Mapping

i Note

This topic is intended for administrators and integrators.

[Read the caution \[page 657\]](#) before converting any old offer.

This procedure allows you to convert the old offers created in SAP Convergent Charging 1.0 into offers which are compliant with SAP Convergent Charging 2.0 and later versions.

Prerequisites

- You must determine and create the necessary [charged item classes \[page 531\]](#) that are relevant for your business model
- The SAP Convergent Charging system must be configured to generate charged item files (old transaction files)

To migrate the charged item mapping on all charges

1. [Open \[page 624\]](#) an offer.
2. In the offer, select the charge that you want to convert.
3. From the menu bar in the main window, select ► **Action** ► *Migrate Charged Item Mapping* ►. After the offer is converted, the *Ex. Acc. Transactions*, *Prepaid Transactions*, and *Postpaid Transactions* tab of the charges of the offer are no longer available but replaced by the [Charged Item \[page 656\]](#) tab.

2.4.22 Subscriber Accounts

⚠ Caution

Do not modify or delete subscriber accounts with Core Tool when SAP Convergent Charging 5.0 is integrated and interfaced with a Customer Relationship Management (CRM) application or a provisioning system.

Creating, modifying, or deleting subscriber accounts **may result in inconsistencies** between the two systems because of data replication and synchronization mechanisms. To modify a subscriber account, you must use this CRM or provisioning system in your SAP system landscape.

- Consult the [Application Help](#) for more information about the *Customer Data Provisioning Process*.
- Consult the [Web Services Documentation \[page 383\]](#) if you need to integrate your CRM or provisioning system by implementing the *Web Services* technical interface provided by SAP Convergent Charging to manage this customer master data.

The manual procedures detailed in this section are relevant in:

- A production system landscape with few contracts directly managed with Core Tool (no CRM interfaced with SAP CC)
- A test, demo, or training system landscape



A **subscriber account** in SAP Convergent Charging (SAP CC) is a customer master data linked to a subscriber (party or individual) with end customers of a contracting service provider. A subscriber account contains all the prepaid accounts, credit limit balances, and external accounts that are debited when the end customer consumes chargeable services or credited when the end customer makes refills. A subscriber account belongs to a subscriber who is a party or an individual. A subscriber can be an end customer of the provider company.

A subscriber account is part of the customer master data managed by SAP Convergent Charging as an extension of the SAP master data in your SAP system landscape.

In rare implementation scenarios, the subscriber accounts must be manually created by SAP CC users.

Before creating [subscriptions \[page 700\]](#), you must create at least one subscriber account. Each existing provider contract is related to one and only one subscriber account.

⚠ Caution

On a platform where SAP CC is integrated with SAP CRM or with another provisioning system, subscriber accounts, prepaid accounts, and external accounts are automatically created and maintained. Creating, modifying or deleting subscriber accounts may result in inconsistencies between these two systems. SAP SE strongly recommends that you do not modify or delete existing subscriber accounts except under support supervision.

A subscriber account is defined by:

- The identifier of the subscriber account (mandatory)
- The identifier of the subscriber who signs the agreements. A subscriber who consumes a service or uses a product is also an end customer of the service/product provider company.

- The identifier of the service/product provider (mandatory) that owns the subscriber account; This identifier is the name of the pricing catalog owned by the service provider.
- A default charged account, which can be a prepaid or an external account (mandatory)
- [Prepaid accounts \[page 670\]](#) (optional)
- [External \(postpaid\) accounts \[page 675\]](#) (optional)
- [Credit limit balances \[page 678\]](#) (optional, not available with provider contracts)
- [A tax system \[page 683\]](#) (optional)
- Some additional information items (optional)

Some customer master data is attached to this subscriber account:

- [Subscriptions \[page 700\]](#) (optional) which belong to the subscriber account.
- [Subscriber mapping tables](#) (optional)
- [Subscriber range tables](#) (optional)

→ Recommendation

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#). Refer to the provided guidance.

How an Account Is Debited or Credited

A subscriber account is linked to the [charging plan \(policy\)](#) of a charge through a mapping of charging references included in subscriptions. When an end customer subscribes to a charge in a provider contract, the charging plan of the charge together with the charging mapping references specified in the subscription or the account assignment in the provider contract allow the system to identify which account of the subscriber account will be debited or credited with the amount calculated in the price plan.

❖ Example

In SAP Convergent Charging, the charging process consists usually of two stages: A dynamic pricing (aka rating) process and an account determination process.

When an end customer consumes a service, the pricing process calculates the corresponding fees while the second process defines which prepaid and external accounts will be debited with the fees and calculates the distribution of the fees between these accounts. Credit limit balances can possibly be debited.

Before Starting

Before [creating \[page 686\]](#) and [setting up \[page 690\]](#) a subscriber account, you should be familiar with:

- [Taxes \[page 683\]](#)
- [Prepaid Accounts \[page 670\]](#)
- [External Accounts \[page 675\]](#)

- [Credit Limit Balances \[page 678\]](#)

Transport

You cannot transport customer master data with the Core Tool user interface. It is a *Customizing* activity and need to be implemented in your productive SAP system landscape.

Depending on your landscape and business/technical requirements, master data distribution, replication, or synchronization processes must be implemented.

2.4.22.1 Prepaid Accounts

⚠ Caution

Do not modify or delete prepaid accounts with Core Tool when SAP Convergent Charging is integrated with a CRM application or a provisioning system.

Creating, modifying, or deleting prepaid accounts may result in inconsistencies between the two systems because of data replication and synchronization mechanisms. Refer to the caution about subscriber accounts.



A **prepaid account** is a monetary counter associated to a currency. Funds are placed in the account before the service begins, and then the charges linked to the services consumed by the subscribers or allowed end customers are debited as much as necessary.

Balance

The balance of an account is defined by a minimal value (threshold). Depending on service providers' requirements, the threshold is usually close to the value of 0. Usage is rejected when the balance reaches the threshold. However, if overspending (refer the note below) is authorized for specific usage, the threshold is ignored, and the usage can be debited from the account even though the balance of the account is less than the threshold.

Crediting a fee to a prepaid account consists in increasing the amount of its balance. Conversely, debiting a fee consists in decreasing the amount of its balance.

i Note

About overspending and refills (in case of convergent charging services based on [subscriptions \[page 700\]](#))

- Components References include an option that authorizes overspending in charging plans⁷⁴
- Prepaid accounts can be credited by using refills through [charging plans \[page 575\]](#)

Threshold

It is the minimal value of a balance ensuring that the account is sufficiently funded to pay an account fee, for example, or to reserve money in order to limit the processing error of the vendor. When the threshold is reached, usage or events are rejected.

Alerts

Prepaid account balances can be connected to [expiration and amount alerts \[page 674\]](#).

Taxes

Depending on the ways you allow the end customers to make a refill (credit pre-purchased or cash advance), taxes may have been paid or not.

The holder of this account can be subject to pay the tax according to the tax settings configured in SAP Convergent Charging.

States of a Prepaid Account

A prepaid account can be:

- **Active:** The prepaid account is charged depending on how you configure the default or internal reference components in the related charging plan. The prepaid account can be refilled. If overspending is authorized, debiting is possible. You can block, lock, or close an active prepaid account.
- **Blocked:** The prepaid account is charged depending on how you configure the default or internal reference components in the related charging plan. The prepaid account can be refilled. If overspending is authorized, debiting is possible. You can reactivate, lock, or close a blocked prepaid account.
- **Locked:** The prepaid account is charged depending on how you configure the default or internal reference components in the related charging plan. Refills and overruns are authorized. If overspending is authorized, debiting is possible. You can reactivate, block, or close a locked prepaid account.
- **Closed:** The prepaid account is charged depending on how you configure the default or internal reference components in the related charging plan. Refills and overruns are forbidden. Once closed, you cannot change a prepaid account any more.

You can [schedule \[page 673\]](#) the states of a prepaid account.

⁷⁴ For more information on [References](#) and [Refill](#) components, refer to the primary help relating to [logic components \[page 831\]](#).

Related Information

[Setting Up a Prepaid Account \[page 672\]](#)

[Prepaid Account: Definition \[page 673\]](#)

[Prepaid Account: Alerts \[page 674\]](#)

2.4.22.1.1 Working with Prepaid Accounts

[Setting Up a Prepaid Account \[page 672\]](#)

[Refilling a Prepaid Account \[page 675\]](#)

Related Information

[Setting Up a Prepaid Account \[page 672\]](#)

2.4.22.1.1.1 Setting Up a Prepaid Account

Caution

Do not modify a prepaid account created by a CRM application or another provisioning system interfaced with SAP CC. Refer to the [caution \[page 668\]](#) about subscriber accounts.

In a prepaid environment scenario, use this procedure to set up a [prepaid account \[page 670\]](#) in the subscriber account for the belonging subscriber.

Set Up a Prepaid Account

1. In the left pane of the [Subscriber Account](#) window, click the prepaid account  to set up.
2. In the right pane of the subscriber account window, identify the prepaid account.
 - In the [Name](#) field, type the identifier of the prepaid account. You cannot modify this field.
 - In the [Description](#) field, describe the function of the prepaid account if necessary.
3. Set up the following tabs of the prepaid account:
 - [Definition \[page 673\]](#)
 - [Alerts \[page 674\]](#)

- [Tax](#)

2.4.22.1.1.1.1 Prepaid Account: Definition

Create [\[page 686\]](#) or modify [\[page 690\]](#) a subscriber account and then [set it up \[page 690\]](#) before setting up

this tab. In the tree display area of the *Subscriber Account* window, click  to view this tab.

On the *Definition* tab, you define the amount of the prepaid account and its minimal amount. You define the currency and the account that will be debited when the prepaid account is empty. If necessary, you set up the schedule, which can be combined with alerts.

i Note

The *Balance* and the *Currency* fields can be modified only when the subscriber account is being created. Once you have saved the subscriber account, these fields appear dimmed (unavailable). The balance is modified when it is charged for service consumption or when you refill it.

Definition (Tab)

Fill in or modify the *Definition* tab.

External Account Code: Type the code of the external account. In an integrated *SAP Solution* scenario with SAP Convergent Invoicing, it represents the business partner (GPART).

External Account Name: Type the name of the external account. In an integrated *SAP Solution* scenario with SAP Convergent Invoicing, it represents the contract account (VKONT).

Client: Type the name of the holder of the prepaid account, if necessary. This can be the [subscriber of the subscriber account \[page 693\]](#) (for example, the end customer of the service provider) or another person. This person can be subject to pay the tax according to the tax settings.

Balance: Type the initial amount of the prepaid account.

Threshold: Type the minimal amount of the prepaid account. Service consumption can be rejected by SAP Convergent Charging if the threshold is reached.

Currency: Select the currency of the prepaid account.

Overrun: Provides the list of the other prepaid or external accounts of the subscriber account. Select an other account to which the prepaid account will be linked. The selected account will be debited when the balance of the prepaid account is not sufficient. For example, if the balance amounts to \$50 with a threshold of \$10 and if the amount to be debited from the balance is \$70, the balance will be debited with \$40 while the selected account is debited with the remaining amount of \$30.

i Note

The overrun function is deactivated when the prepaid account is closed. If no account is selected, service consumption is rejected by SAP Convergent Charging when the threshold is reached.

Schedule: Allows you to schedule the [states of the prepaid account \[page 670\]](#). You can [create alerts \[page 674\]](#) that will be triggered depending on the schedule. A schedule can be postponed when [making a refill \[page 675\]](#).

- **Blocked on:** Click the calendar button , and then select a date on which the prepaid account will be blocked.
- **Locked on:** Click the calendar button , and then select a date on which the prepaid account will be locked.
- **Closed on:** Click the calendar button , and then select a date on which the prepaid account will be closed.

2.4.22.1.1.1.2 Prepaid Account: Alerts

[Create \[page 686\]](#) or [modify \[page 690\]](#) a subscriber account and then [set it up \[page 690\]](#) before setting up

this tab. In the tree display area of the *Subscriber Account* window, click  to view this tab.

You can define two types of alerts for a prepaid account:

- Alerts depending on an amount
- Alerts depending on time

Alerts (Tab)

Fill in or modify the *Alerts* tab.



: Click to add a row to the table.



: Click to delete a row from the table.

Amount Alerts: They are displayed in a table. Each row of the table represents an amount alert defined by a code and an amount. A notification is sent to a dedicated system when the prepaid account is less than or equal to the threshold value of an alert. The currency used in alerts is that of the prepaid account.

- **Code:** Type a code for the alert. The code is used to mark the alert notification.
- **Threshold:** Type the amount triggering the alert.

Expiration Alerts: An alert is triggered a number of days before or after one of the dates defined in the [schedule \[page 673\]](#). For example, the alert "alert1_prepaid" is triggered two days before the prepaid account is locked in order to warn the user that the account is due to expire soon; and therefore, the user must refill the account.

- **Code:** Type a code for the alert. The code is used to identify the alert notification.
- **Triggering time:** Type a number of days.
- **Triggering mode:** Select if the alert is triggered before or after the reference state changes.
- **State:** Select one of the following states: *Active*, *Blocked*, *Locked*, or *Closed*.

2.4.22.1.1.2 Refilling a Prepaid Account

You cannot manually refill a prepaid account from the SAP CC 5.0 Core Tool user interface, but SAP Convergent Charging provides functions and operations that can be implemented in your SAP system landscape to provide refilling services on a prepaid account in a subscriber account.

Consult the SAP CC [Tuning Guide](#) about the necessary *Customizing* activities: Implementation of dedicated service operations from the [Web Services](#) technical interface, dedicated configuration of pricing master data of a service provider (see [refill plan](#)).

Note

When SAP CC is connected to SAP CRM or SAP ERP/FI-CA, refill functions are available. Refer to the documentation of this software components.

Prerequisites

Your convergent charging services are based on provider contracts.

Related Information

[Prepaid Accounts \[page 670\]](#)

2.4.22.2 External Accounts

Caution

Do not modify or delete external accounts with Core Tool when SAP Convergent Charging is integrated with a CRM application or a provisioning system.

Creating, modifying, or deleting external accounts may result in inconsistencies between the two systems because of data replication and synchronization mechanisms. Refer to the caution about subscriber accounts.



An **external account** is a reference to an account outside SAP Convergent Charging and managed by a third-party invoicing and billing system. An external account represents a postpaid account owned by the subscriber (agreement signatory party), the end customer (service consumer), or another party. Invoicing and billing is also processed outside SAP CC.

The currency of the external account must be the same as the currency of the external billing account.

Unlike a [prepaid account \[page 670\]](#), the balance of an external account is not limited; Therefore, if you need to limit a subscriber's expenses in real time, you must use a [credit limit balance \[page 678\]](#).

Account Types

SAP CC verifies the compatibility between account types and business transactions in real time. To be checked in real time, an external account can be assigned one of the following types:

- **Payable:** An account payable is an account by which a service provider owes a partner money (and sends settlement reports to the partner).
- **Receivable:** An account receivable is an account by which a client owes a service provider money (and receives invoices from the service provider).

By default, no type is assigned to the external account.

Taxes

The holder of this account can be subject to pay the tax according to the tax settings configured in SAP Convergent Charging.

You can define the taxation policy to be applied to the external account. If you do not fill in the [Tax](#) tab of the account, [the taxation policy \[page 696\]](#) defined in the subscriber account applies.

Related Information

[Setting Up an External Account \[page 677\]](#)

[External Account: Definition \[page 677\]](#)

2.4.22.2.1 Working with External Accounts

Related Information

[Setting Up an External Account \[page 677\]](#)

2.4.22.2.1.1 Setting Up an External Account

⚠ Caution

Do not modify an external account created by a CRM or another provisioning system interfaced with SAP CC. Refer to the [caution about subscriber accounts \[page 668\]](#).

Use this procedure to set up an [external \(postpaid\) account \[page 675\]](#).

Set Up an External Account

1. In the left pane of the [Subscriber Account](#) window, click the prepaid account  to set up.
2. In the right pane of the subscriber account window, identify the prepaid account.
 - In the [Name](#) field, type the identifier of the external account. You cannot modify this field.
 - In the [Description](#) field, describe the function of the external account if necessary.
3. Set up the following tabs:
 - [Definition \[page 677\]](#)
 - [Tax](#)

2.4.22.2.1.1.1 External Account: Definition

[Create \[page 686\]](#) or [modify \[page 690\]](#) a subscriber account and then [set it up \[page 690\]](#) before setting up

this tab. In the tree display area of the [Subscriber Account](#) window, click  to view this tab.

On the [Definition](#) tab, you define the amount of the external account and its minimal amount. You define the currency and the account that will be debited when the external account is empty. If necessary, you set up the schedule, which can be combined with alerts.

Definition (Tab)

Fill in or modify the [Definition](#) tab.

External Account Code: Type the code of the account in the external billing system. This code is used to mark the charged transactions.

External Billing System: Type the code of the external billing system.

Currency: Select the currency of the account.

Control charged transactions compatibility: If you select this option, SAP Convergent Charging checks in real time the compatibility between account types and transactions. In the external billing system, the compatibility

is based on the account type: Receivable or payable. In the [definition of the charge customized in the charge plan](#), the charged transactions (aka charged items) are respectively marked *Client* for a receivable account and *Partner* for a payable account. Therefore, the charged transactions are compatible with the external account if the account type is the same. If the charged transactions are not compatible, the charging request will not be completed, and the charged transaction will be rejected, triggering a charging exception at mediation level. But if you do not select this option, the type of the account is set to *Undefined*, and no compatibility is checked.

- [Account Type \[page 675\]](#): Select receivable or payable as the type of the account.

2.4.22.3 Credit Limit Balances

A credit limit balance is a monetary counter associated to a currency and intended to limit the usage of a chargeable service for a time period.

Alerts

Credit limit balances can be connected to amount alerts. An alert is a notification sent (*) to a dedicated system when the amount of a credit limit balance is less than or equal to the threshold value of an alert.

(*): End customers are informed in real time, for example, when they are making a phone call.

Reset

Credit limit balances are reset manually or automatically to the value of the expense limit to be controlled. Each time a chargeable service is consumed, the credit limit balance is debited. When the balance is reset, it is credited with its credit limit. However, if the credit limit balance reaches the value of 0 before being reset, SAP Convergent Charging does not allow service consumption except if overspending is authorized.

❖ Example

A client wants to limit the consumption of a service SMS to \$10 per month. The limit of the credit limit balance is set to \$10. When the balance is reset every month, it is credited with \$10.

Related Information

[Setting Up a Credit Limit Balance \[page 679\]](#)

[Setting Up the Automated Reset of a Credit Limit Balance \[page 680\]](#)

[Manually Resetting a Credit Limit Balance \[page 682\]](#)

2.4.22.3.1 Working with Credit Limit Balances

[Setting Up a Credit Limit Balance \[page 679\]](#)

[Setting Up the Automated Reset of a Credit Limit Balance \[page 680\]](#)

[Manually Resetting a Credit Limit Balance \[page 682\]](#)

2.4.22.3.1.1 Setting Up a Credit Limit Balance

Use this procedure to set up a [credit limit balance \[page 678\]](#) in a subscriber account.

Set Up a Credit Limit Balance

1. In the left pane of the *Subscriber Account* window, click  to set up.
2. In the right pane of the subscriber account window, identify the credit limit balance.
 - In the *Name* field, type the unique identifier of the credit limit balance. You cannot modify this field.
 - In the *Description* field, describe the function of the credit limit balance if necessary.
3. Set up the following tabs of the credit limit balance:
 - [Definition \[page 679\]](#)
 - [Alerts \[page 680\]](#)

2.4.22.3.1.1.1 Credit Limit Balance: Definition

[Create \[page 686\]](#) or [modify \[page 690\]](#) a subscriber account and then [set it up \[page 690\]](#) before setting up this tab. In the tree display area of the *Subscriber Account* window, click to view the *Definition* tab.

On the *Definition* tab, you define the initial amount of the credit limit balance and its currency. You choose to reset the credit limit balance manually or periodically.

i Note

The *Balance* and the *Currency* fields can be modified only when the subscriber account is being created. Once you have saved the subscriber account, these fields appear dimmed (unavailable). The balance is modified when it is charged for service consumption or when it is reset.

Definition (Tab)

Fill in or modify the *Definition* tab.

Balance: Type the initial amount of the credit limit balance.

Currency: Select the currency of the credit limit balance.

The credit is reset: Enter the reset value, and then select the method to reset the credit limit balance.

- *With credit init value of*: Type the reset value of the credit limit balance.
- *Manually*: Select this option if you want to reset the credit limit balance by using the [Reset Credit Limit Balance \[page 682\]](#) command on the *Action* menu.
- *Periodically*: Select this option if you want to reset the credit limit balance automatically. Click [here \[page 680\]](#) to have more details on how to set up the date and time.

2.4.22.3.1.1.2 Credit Limit Balance: Alerts

[Create \[page 686\]](#) or [modify \[page 690\]](#) a subscriber account and then [set it up \[page 690\]](#) before setting up this tab. In the tree display area of the *Subscriber Account* window, click to view the *Alerts* tab.

You can define one or more alerts for a credit limit balance. A notification is sent to a dedicated system when the credit limit balance is less than or equal to the threshold value of an alert. The currency used in alerts is that of the credit limit balance.

Alerts (Tab)

Fill in or modify the *Alerts* tab.



: Click to add a row to the configuration table.



: Click to delete a row from the table.

Amount Alerts: They are displayed in a table. Each row of the table represents an amount alert defined by a code and an amount.

- *Code*: Type a code for the alert. The code is used to mark the alert notification.
- *Threshold*: Type the amount triggering the alert.

2.4.22.3.1.2 Setting Up the Automated Reset of a Credit Limit Balance

You can reset a credit limit balance [manually \[page 682\]](#) or periodically. To reset the credit limit balance periodically, fill in or modify the following fields to set up the date and time.

Reference Date: Click  to display the calendar, and then select a date that you can combine with a reset frequency:

- *Every*
- *Every other*
- *Every 3rd*
- And other items

And the following list: *Day, Week, Month, Year*.

i Note

The *Reference Date* is used ONLY if you select either or both of the options:

- *The same day as the reference date*
- And *The same time as the reference date*

Instead of the reference date, you can use the other options.

The different options to select the date and time are the following:

- *The same day as the reference date*: If you click this option, the credit limit balance is reset depending on the *Reference Date*. See the note below (*).
- *The same day as the reference date or first day of next month*: If you click this option, the credit limit balance is reset depending on the *Reference Date* or the first day of the month following that of the reference date/time. See the note below (*).
- *the*: If you have selected the frequency *Every (3rd or 4th, for example) month or year*, this option resets the credit limit balance depending on the selected day of the month. This option is combined with the list of numbers (from 1 to 31), the list of items such as *Last, First, Second, Third, Fourth* and the list of weekdays and months.

Examples: The credit limit balance is reset Every 5th month the 11 of the month.

The credit limit balance is reset "Every year The Second Sunday of January".

- *on*: If you have selected the frequency *Every (3rd or 4th, for example) week or year*, this option resets the credit limit balance depending on the selected day of the week or month.

Examples: The credit limit balance is reset Every 4th week on Wednesday; the credit limit balance is reset Every year on the 1st of January.

- *at*: Allows you to select the time if you have selected any of the previous options. This option includes hours and minutes combined with AM (ante meridiem) or PM (post meridiem).

Example: The credit limit balance is reset Every day at 07:25 PM. You can select the same time as that of the Reference Date.

i Note

(*)

About the options *The same day as the reference date* and *The same day as the reference date or first day of next month*:

- If you select both of the *Every month* and *The same day as the reference date* options, the credit limit balance will be reset **every month on the configured reference date/time**.

However, if you select the 31st of the month as the reference date/time, the credit limit balance will be reset the 31st of every odd month but the 30th of every even month (or the 28th of February, for example, if February has 28 days).

- If you select both of the *Every month* and *The same day as the reference date or first day of next month* options, the credit limit balance will be reset **every month on the reference date/time or the first day of the next month depending on how many days the month has.**

❖ Example

For example, if you select the "**31st of the month**" as the reference date/time, the credit limit balance will be reset the 31st of every odd month but the 1st of the month following every even month; however, as February can have 28 or 29 days, the credit limit balance will always be reset the 1st of March if the Reference Date is the 31st of the month.

The table below shows you the dates on which the credit limit balance will be reset if you select the 31st of March as the reference date/time:

In the month of...	The credit limit balance will be reset...
April	The 1st of May
May	The 31st of May
June	The 1st of July
July	The 31st of July
August	The 31st of August
September	The 1st of October
October	The 31st of October
November	The 1st of December
December	The 31st of December
January	The 31st of January
February	The 1st of March
March	The 31st of March

Related Information

[Manually Resetting a Credit Limit Balance \[page 682\]](#)

2.4.22.3.1.3 Manually Resetting a Credit Limit Balance

You can reset a credit limit balance manually at any time.

Reset a Credit Limit Balance

1. [Open \[page 689\]](#) a subscriber account.
2. In the subscriber account tree, select the credit limit balance that you want to reset.
3. On the *Action* menu, select *Reset Credit Limit Balance*. The *Reset* dialog box opens.
4. Select *With default reset value* or select *With new reset value*, and then type the amount to reset the credit limit balance.

i Note

The *With default reset value* option is available only if you have filled in the *With credit init value of* field in the *Definition tab [page 679]* of the credit limit balance. In this procedure, the credit limit balance is reset with the value of this field.

5. Click *Reset*. A message informs you that the credit limit balance has been successfully reset.
6. Click *OK*.

2.4.22.4 Taxes

SAP Convergent Charging provides tax computation. You must set up tax information both in the [pricing catalog \[page 400\]](#) of the service provider and in master data related to the end customers.

- Pricing catalog master data: You define the tax information in the customized charges that represent the tax settings for the consumption of a customer service.
- In the [charge customized](#) of a charge plan, you define if the prices in its price plan are net or gross (the tax is removed from or added to the base amount). You define the invoicing tax system that applies to this customized charge and relevant options:
 - VAT rule and place of establishment of the service provider
 - Tax rate level
 - Flat tax rate
 - [Customer Info](#)
 - [Company Info](#)
 - [Transaction Info](#)
 - [Transaction Service Type](#)

EU VAT System	Base amount (net/gross)
Flat Tax System	Base amount (net/gross)
EZTax System	Taxing Jurisdiction Info

- In the [charges of an offer \[page 656\]](#) the settings are the same as those for the charge plan
- Customer master data: In the [subscriber accounts \[page 668\]](#) you define the taxation type (VAT, US, or none) and the taxation mode (who pays the tax). If the subscriber accounts are dedicated to convergent charging services based on subscriptions, you define if the balances of the prepaid accounts are tax included or excluded.

i Note

- If you select a tax system (EU VAT or US), the tax is calculated after the rating process. For more information, consult the [Application Help](#) about the tax calculation process.
- Taxes do not apply to refill plans and [refill record classes](#).

The table below shows you the main settings regarding the computation of taxes. This table does not describe all the possible combinations that you can set up. If you choose a combination which is not authorized by SAP Convergent Charging, the charging process is not performed. For example, if you choose the VAT taxation type in the subscriber account and the US EZTax system in the charge of a charge plan, the charging process is not performed for the service consumption relating to this subscriber account.

Charge in an offer			Subscriber Account				Postpaid Charged Item [page 543] /Prepaid Charged Item		
Tax system	Base amount	VAT rule	Tax rate level	Taxation type	Taxation mode	Taxation zone	Amount	Tax amount	Total amount
None	Net or Gross		From -1 to 5	None	None	NO_TAX	Base amount	0	Base amount
EU VAT	Net or Gross		From -1 to 5	VAT	None	NO_TAX	Base amount	0	Base amount
EU VAT	Net or Gross		From -1 to 5	VAT	SPSP ⁷⁵	BY_RULE	Base amount	0	Base amount
EU VAT	Net or Gross		From -1 to 5	VAT	SPSP	Any country	Base amount	Tax	Base amount + tax
EU VAT	Net or Gross		From -1 to 5	VAT	SPSP	Any country	Base amount - tax	Tax	Base amount
Flat Tax	Net or Gross	N/A	N/A	VAT	SPSP	Any country (Information not used)			
US (EZ-Tax)	N/A	N/A	N/A	US	SPSP	EZTax-AREA	Base amount	Tax	Base amount + tax

Subscriber Account			Charge in an offer			Postpaid Charged Item [page 543] /Prepaid Charged Item		
Taxation type	Taxation mode	Taxation zone	Taxation type	Base amount	Tax rate level	Amount	Tax amount	Total amount
None	None	NO_TAX	None	Net or Gross	From -1 to 5	Base amount	0	Base amount

⁷⁵ Service Provider Subject to Pay

Subscriber Account			Charge in an offer			Postpaid Charged Item [page 543]/ Prepaid Charged Item		
VAT	None	NO_TAX	VAT	Net or Gross	From -1 to 5	Base amount	0	Base amount
VAT	SPSP	BY_RULE	VAT	Net or Gross	From -1 to 5	Base amount	0	Base amount
VAT	SPSP	Any country	VAT	Net	From -1 to 5	Base amount	Tax	Base amount + tax
VAT	SPSP	Any country	VAT	Gross	From -1 to 5	Base amount - tax	Tax	Base amount
US	SPSP	EZTax-AREA	US	N/A	N/A	Base amount	Tax	Base amount + tax

❖ Example

Your company offers a service called 'Bilingual Dictionaries Online' which allows customers to purchase a subscription to an online dictionary. When purchasing a subscription, the customers receive an email to confirm that their subscription is ready for use. They are then be able to login to their subscription by going to the 'Bilingual Dictionaries Online'.

Each bilingual dictionary in 'Bilingual Dictionaries Online' is available separately by annual subscription. A 3-month subscription to one language costs £15 + VAT and a 12-month subscription to one language costs £45 + VAT.

In a price plan called "Bilingual Dictionaries Online", you use a Flat Function component to charge any customer £45 for each 12-month subscription to a bilingual dictionary. According to the table above, if you choose a VAT taxation type of 19,6% (Normal rate) and 'GB' as the country, the results for a 12-month subscription are the following:

Subscriber Account			Charge in an offer			Price Plan	Postpaid Charged Item/ Prepaid Charged Item		
Taxation type	Taxation mode	Taxation zone	Taxation type	Base amount	Tax rate level	Base amount ⁷ ₆	Amount	Tax amount	Total amount
None	None	NO_TAX	None	Net or Gross	0	£45	£45	0	£45
VAT	None	NO_TAX	VAT	Net or Gross	0	£45	£45	0	£45
VAT	SPSP	BY_RULE	VAT	Net or Gross	0	£45	£45	0	£45
VAT	SPSP	GB	VAT	Net	0	£45	£45	£8,82	\$53,82
VAT	SPSP	GB	VAT	Gross	0	£45	£37,63	£7,37	\$45

⁷⁶ In this example, **Base Amount** is the price for a 12-month subscription that you type in the **Fixed Amount** field of the Flat Function component.

Subscriber Account			Charge in an offer			Price Plan	Postpaid Charged Item/ Prepaid Charged Item		
US	SPSP	EZTax-AREA	US	N/A	N/A	£45	£45	Tax	\$45 + tax

Additional Information

Consult the [Application Help](#) for more information about the tax calculation feature and process.

Consult the SAP CC [Tuning Guide](#) for more information about the *Customizing* activities relevant for the tax management services.

2.4.22.5 Working with Subscriber Accounts

Related Information

[Creating a Subscriber Account \[page 686\]](#)

[Finding a Subscriber Account \[page 687\]](#)

[Opening an Existing Subscriber Account \[page 689\]](#)

[Modifying a Subscriber Account \[page 690\]](#)

[Setting Up a Subscriber Account \[page 690\]](#)

[Saving a Subscriber Account \[page 698\]](#)

[Deleting a Subscriber Account \[page 700\]](#)

[Reporting a Subscriber Account \[page 699\]](#)

[Using the Action Menu \[page 700\]](#)

2.4.22.5.1 Creating a Subscriber Account

i Note

Use this procedure to create a subscriber account.

To create a subscriber account

1. From the menu bar in the main window, select **File > New > Subscriber Account**. The *Choose Owner* dialog box opens.
2. In the *Owner of Object* drop-down menu, select the owner of the subscriber account.
3. Click **OK**. The *New Subscriber Account* window opens.
4. [Set up \[page 690\]](#) the subscriber account.
5. Verify the subscriber account structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 698\]](#) the subscriber account.

⚠ Caution

Do not manually create a subscriber account if SAP Convergent Charging is already interfaced with a CRM or an external provisioning system responsible for the management of subscriber accounts.

2.4.22.5.2 Finding a Subscriber Account

To search for a subscriber account in the [customer master data \[page 374\]](#) configured in SAP CC, you perform the operation in two halves of the *Choose a Subscriber Account* window:

- The top part of the window is the filter area, which allows you to find a subscriber account by using filter criteria.
- The bottom area of the window is the results area, which displays the search results that you perform.

Tasks

You can find subscriber accounts with or without search criteria.

- If you do not use search criteria, click  to start the search and view the results.
- If you use search criteria, set up the *Basic* tab, and then click  to start the search. The subscriber accounts are displayed in the results area. To display more columns of information in the results area, click , and then select which types of information you want to display. Click  to reset the filter and delete the result list.

Filter Area

Basic Tab

The *Basic* tab allows you to search for subscriber accounts depending on an identification code, a subscriber, or a service provider.

Code: Is the identifier of the subscriber account. In the drop-down list, select a search comparator such as *Equals*, *Is Like*, *Starts With*, *Ends With*, or *Contains*. In the next field, type the string that you want to search in the back-end database. For example, if you want to find all subscriber accounts containing the letters **eric**, you select the *Contains* option, and then type **eric**.

Subscriber: Is the end customer that holds an account. The drop-down list is described just above. Type the string that you want to search for in the database.

Service Provider: Is the owner of the [pricing catalog \[page 400\]](#). The drop-down list is described just above. If you are associated to a catalog, this field is automatically filled in with the name of the related catalog and cannot be modified. Otherwise, you type the string that you want to search for in the database.

Customer Management Area: Is the [customer management area](#) that is responsible for a subset of subscriber accounts when the system landscape includes several SAP ERP/FI-CA or SAP CRM systems. Select *Any* or the appropriate name.

Advanced Tab

To search for some subscriber accounts, the *Advanced* tab allows you to create a table with one or more search criteria based on additional information items that are set in the subscriber accounts (see [Subscriber Account: Additional Information \[page 695\]](#)).

Actions: To add a row to the table, click the *More* button. To delete a row from the table, click the *Less* button.

i Note

- If the criteria table comprises several rows and if you want to delete a row, the *Remove* dialog box opens to display the identifier names. Select the row that you want to delete from the table, and then click *OK*.
- If you choose the *Is Like* comparator when building criteria rows, you can type "*" in the right-hand field to represent a number of characters and "?" to represent a single character.

Each row of the table consists of three fields. To set up a row, do the following:

1. In the first field, select a search criterion such as *Add. Info (Date)*, *Add. Info (Number)*, or *Add. Info (String)* in the list of identifiers.
2. In the second field, select a search comparator such as *Equals*, *Is Like*, *Starts With*, for example.
3. In the third field, select or type the string that you want to search in the database.

Results Area

Use the following icons:



: To start a new search whether you use search criteria or not.



: To delete the results list and reset the filter.



: To move to the next page. This button is available when the results list is large.



: To move to the previous page. This button is available when the results list is large.

Related Information

[Opening an Existing Subscriber Account \[page 689\]](#)

2.4.22.5.3 Opening an Existing Subscriber Account

You can open an existing subscriber account:

- Saved in the back-end database
- Saved in an XML file

To open the existing subscriber account saved in the database

1. From the menu bar in the main window, select **File > Open > Subscriber Account**. The *Open Subscriber Account* dialog box opens.
2. [Search \[page 687\]](#) for the subscriber account, select it, and then click **OK**. The subscriber account window opens.

To open the existing subscriber account saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File**. The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

2.4.22.5.4 Modifying a Subscriber Account

⚠ Caution

Do not modify a subscriber account created by a CRM or another provisioning system interfaced with SAP CC. Refer to the [caution about subscriber accounts \[page 668\]](#).

You can modify, add, or remove accounts in a previously saved subscriber account.

To modify a subscriber account

1. [Open \[page 689\]](#) the subscriber account.
2. [Set up \[page 690\]](#) the subscriber account.
3. Verify the subscriber account structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save \[page 698\]](#) the subscriber account

2.4.22.5.5 Setting Up a Subscriber Account

[Create](#), [open](#), or [modify](#) a subscriber account before setting it up. A *Subscriber Account* window must be open.

→ Remember

For optimal performance, do not exceed the recommended maximum sizes explained in SAP Note [2478958](#) . Refer to the provided guidance.

In a *Subscriber Account* window, a subscriber account is graphically represented by a tree, which can consist of prepaid accounts, external accounts, and credit limit balances depending on the business requirements of the subscriber account.

Set Up a Subscriber Account

1. In the tree display area of the *Subscriber Account* window, make sure that the subscriber account icon



is selected; otherwise, select it.

2. In the right pane of the subscriber account window, identify the subscriber account.
 - In the *Name* field, type the unique identifier of the subscriber account.
 - In the *Description* field, describe the function of the subscriber account if necessary.
3. Set up the tabs of the subscriber account:
 - [Definition \[page 693\]](#)
 - [Subscriptions \[page 700\]](#)
 - [Mapping Tables \[page 694\]](#)
 - [Range Tables \[page 694\]](#)
 - [Additional Information \[page 695\]](#)
 - [Default Charging \[page 695\]](#)
 - [Tax \[page 696\]](#)
4. If necessary, [add \[page 691\]](#) one or more prepaid accounts, and then [set them up \[page 672\]](#).
5. If necessary, [add \[page 691\]](#) one or more external accounts, and then [set them up \[page 677\]](#).
6. If necessary, [add \[page 691\]](#) one or more credit limit balances, and then [set them up \[page 679\]](#).

Note

You can [remove \[page 692\]](#), cut, copy, and paste a component of a subscriber account tree by right-clicking the component and selecting *Cut*, *Copy*, or *Paste*.

2.4.22.5.5.1 Adding a Component to a Subscriber Account



You can add one or more prepaid accounts, external accounts, or credit limit balances to the nodes of the subscriber account tree. Prepaid accounts, external accounts, and credit limit balances are the leaves of the tree.

Add a Component to a Subscriber Account



1. In the subscriber account tree, click the root or the node which you want to add a component to.
2. On the *Components* toolbar, click the component that you need to add to the tree. You can select one of the following components:



- *Prepaid Account*

-  *External Account*

-  *Credit Limit Balance*

The component is automatically added to the corresponding node.

3. Set up the component.

i Note

You can [remove \[page 692\]](#), cut, copy, and paste a component of a subscriber account tree by right-clicking the component and selecting *Cut*, *Copy*, or *Paste*.

Related Information

[Setting Up a Subscriber Account \[page 690\]](#)

2.4.22.5.5.2 Removing a Component

⚠ Caution

Do not delete a prepaid account created by a CRM or another provisioning system interfaced with SAP CC. Refer to the [caution about subscriber accounts \[page 668\]](#).

Use this procedure to remove a component from a subscriber account tree.

Remove a Component from a Subscriber Account

1. In the subscriber account tree, click the component that you want to remove.
2. From the menu bar in the main window, select **Action** **Remove Component**⁷⁷. The component is removed.

i Note

- Removing an account from a subscriber account is not possible if the account is used in the [charging mapping of a subscription \[page 738\]](#).
- You can cut, copy, and paste a component of a subscriber account tree by right-clicking the component and selecting *Cut*, *Copy*, or *Paste*.

⁷⁷ You can also right-click to open the shortcut menu, and then select *Remove*.

2.4.22.5.5.3 Subscriber Account: Definition

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

On the *Definition* tab, you identify the [subscriber account \[page 668\]](#) and view the identifier of the [pricing catalog \[page 400\]](#) owner.

Definition (Tab)

Fill in or modify the *Definition* tab.

Subscriber: Type an account identifier for the subscriber who contracts a commercial agreement with the service provider company that offers chargeable services or products. The subscriber is a person or a party. A subscriber can use or not these chargeable services (or products).

Contracting Service Provider: Displays the identifier of the [pricing catalog owner \[page 400\]](#).

2.4.22.5.5.4 Subscriber Account: Subscriptions

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

On the *Subscriptions* tab, you can view, create, modify, and open [subscriptions \[page 700\]](#) relating to the subscriber account.

Subscriptions (Tab)

Fill in or modify the *Subscriptions* tab.

i Note

You must save the new subscriber account before creating a new subscription.



Select a subscription in the list, and then click the icon to open the subscription.



Click to create a new subscription that will automatically be linked to the current subscriber account.



Click to refresh the list of subscriptions.

2.4.22.5.5.5 Subscriber Account: Mapping Tables

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

On the *Mapping Tables* tab, you can view, create, or open mapping tables [page 469] relating to the subscriber account.

Mapping Tables (Tab)

Fill in or modify the *Mapping Tables* tab.



Select a subscriber mapping table in the list and then double-click to open it.



Click to create a new subscriber mapping table which will automatically be linked to the current subscriber account.



Click to refresh the list of subscriber mapping tables. This icon is especially used after you create a new subscriber mapping table in the subscriber account window.

2.4.22.5.5.6 Subscriber Account: Range Tables

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

On the *Range Tables* tab, you can view, create, or open range tables [page 503] relating to the subscriber account.

Range Tables (Tab)

Fill in or modify the *Range Tables* tab.



Select a subscriber mapping table in the list and then double-click to open it.



Click to create a new subscriber mapping table which will automatically be linked to the current subscriber account.



Click to refresh the list of subscriber range tables. This icon is especially used after you create a new subscriber mapping table in the subscriber account window.

2.4.22.5.5.7 Subscriber Account: Additional Information

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

The *Additional Information* tab allows you to define some custom information that is only descriptive and not reused by SAP Convergent Charging at a stage of the process.

❖ Example

For example, additional information can be the author's name of the subscriber account, the author's code, the creation date/time, and another custom information or reference. If necessary, you can retrieve this information for use in an external system.

i Note

In an integrated *SAP Solution* scenario with several SAP ERP or SAP CRM systems, the Core Tool user interface does not display the reserved **SAP_CMA** additional information items.

Refer to the [customer management area](#) that is set in this subscriber account.

Click the *Definition* tab.

Tab: Additional Information

Fill in or modify the *Additional Information* tab.

Use the configuration table and its icons to add some additional information items.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String*, or *Date*.

Value: Type the additional information according to the selected type.

2.4.22.5.5.8 Subscriber Account: Default Charging

Create [page 686] or modify [page 690] a subscriber account before setting up this tab. In the tree display

area of the *Subscriber Account* window, click  to view this tab.

The [Default Charging](#) tab allows you to define the default policy for the subscriber account. You choose an account to charge. Optionally, you choose credit limit balances if the related subscription specifies no charging mapping for the references identified in the charging plan.

Default Charging (Tab)

Fill in or modify the [Default Charging](#) tab.

Charged by Default On: Provides the list of [prepaid \[page 670\]](#) and [external \[page 675\]](#) accounts (postpaid) of the subscriber account. Select a default account that is assigned during charging operations.

Credit Limit Balances: This table displays the credit limit balances of the subscriber account. You can select no, one, or more default credit limit balances.

- **Code:** Displays the identification name of the credit limit balance.
- **Is Updated by Default:** Select the checkbox if you want the credit limit balance to be charged by default.

2.4.22.5.5.9 Subscriber Account: Tax

[Create \[page 686\]](#) or [modify \[page 690\]](#) a subscriber account before setting up this tab. In the tree display area of the [Subscriber Account](#) window, click  to view this tab.

Note

Depending on your SAP CC system configuration, the [Subscriber account tax](#) tab displays the settings for the Valued Added Tax (VAT) system, the EZTax system, or both systems. For more information, refer to your administrator and consult the SAP CC [Tuning Guide](#).

In SAP Convergent Charging, the tax is calculated by using information coming from both the customer data account holder (see [subscriber account \[page 668\]](#)) and the consumed service (see the [charges customized in a charge plan](#)).

The subscriber account specifies tax information about the place of taxation (country) while the charge in the charge plan specifies information about the level of tax to be applied (for example, normal tax, reduced tax, and so on) in case of EU VAT system.

The [Tax](#) tab allows you to select the tax settings of the accounts (prepaid and postpaid) belonging to the subscriber account.

Tax (Tab)

Fill in or modify the [Tax](#) tab.

Prepaid Account Balance: Defines if balances of [prepaid account\(s\) \[page 670\]](#) include or not the tax. This configuration is only available in a subscriber account dedicated to charging services based on subscriptions. Select one of the following balance types:

- **Tax Included:** The balances include the tax. The tax amount is calculated from the base amount according to the [tax settings of the charge customized in an offer \[page 656\]](#) (net or gross price).
- **Tax Excluded:** The balances include no tax (default). The SAP CC system does not compute the tax for a service usage. The total amount is equal to the base amount calculated by processing the price plan of the charges of an offer.

Taxation Type (or Tax System): Defines the invoicing tax system to be applied to the tax computation related to the service consumption for this subscriber account. Select one of the following types:

- **VAT:** The EU VAT system applies to the subscriber account (or Flat Tax system).
- **US:** The EZTax system applies to the subscriber account.
- **None:** No tax system applies to the subscriber account (the balances include no tax).

i Note

- In the **Taxation Mode**, the options **Account Holder Subject to Pay** and **Account Holder Exempted** are reserved for managing the tax of [external \(postpaid\) accounts \[page 675\]](#). Do not use the modes in a prepaid environment where prepaid accounts are charged.
- These options are not compliant with a charge customized in an offer that specifies that the prices defined in the price plan are [gross](#).

Taxation Mode: Defines who pays the tax. Select one of the following modes:

- **Service Provider Subject to Pay:** The tax is paid by the service provider.
- **Account Holder Subject to Pay:** The tax is paid by the holder of an external postpaid account. The holder can be different from the subscriber of the subscriber account. The holder must pay the tax in his or her country. Refer to the note above.
- **Account Holder Exempted:** The tax is calculated for information but not applied to billing. Refer to the note above.
- **None:** The tax calculation is not applied.

You set up the following fields depending on the selected **Taxation Type**.

If You Use the EU VAT System

The **Value Added Tax** area displays the following:

- **Tax Zone:** Allows you to select one of the following:
 - The country code ISO 3166 of the taxation place of the holders of [prepaid \[page 670\]](#) or [external \[page 675\]](#) accounts in the subscriber account. These holders must have the same country code as in the version of SAP Convergent Charging.
 - **No Tax:** This means that no tax applies to the accounts (prepaid and postpaid) of the subscriber account.
 - **Determined by a VAT Rule:** This means that the [VAT rule specified in the charge customized in a charge plan](#) applies if any. If no rule is specified in this charge, no tax applies to the accounts (prepaid and postpaid) of the subscriber account.

When **Determined by a VAT Rule** is selected, the **Customer Country** and **Business Category** fields display the related values.

- **Customer Country:** Select or view the country code ISO 3166 (FR, DE, IT, GB, ES, and so on) from the holders of the prepaid accounts and external accounts in the subscriber account. These holders must have the same country code as in the version of SAP Convergent Charging.
- **Business Category:** Select or view the business category (B2B services or B2C services):
 - **B2B:** The holder of the subscriber account is a company.
 - **B2C:** The holder of the subscriber account is a private individual.

If You Use the EZTax System

i Note

For more information about EZTax, refer to the EZTax® Telecom Users Manual provided by BillSoft®.

The US Telco Tax area is available on the tab if you select the US **Taxation Type** and if you select a **Taxation Mode** (service provider or account holder). The options of this area are the same as those of the **Charge tax tab in a charge plan**:

- **Origination:** Type the origination location of the transaction to be taxed.
- **Termination:** Type the termination location of the transaction to be taxed.
- **Service Address:** Type the service address of the transaction to be taxed.
- **Customer Type:** Select one of the types of customers involved in the transaction.
- **Incorporated Code:** Select if the customer involved in the transaction is inside or outside of the incorporated area.
- **Client Resale:** Select if the service transaction is final (Sale) or must be resold (Resale).

2.4.22.5.6 Saving a Subscriber Account

Once you have created or modified a subscriber account, and then verified its structure, you are ready to save it. You can save the subscriber account to either the database or as an XML file on your hard disk.

To save a new subscriber account to the database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. The **Subscriber Account Creation** dialog box opens to inform you that the subscriber account has been successfully saved.
3. Click **OK**.

To save an existing subscriber account to the database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. The **Subscriber Account Modification** dialog box opens to inform you that the subscriber account has been successfully modified.

3. Click [OK](#). The new version of the subscriber account is saved as the only current version.

To save a subscriber account as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click [OK](#). The [Save](#) dialog box opens.
3. Select a directory to save the subscriber account.
4. In the [File name](#) field, type the name of the file.
5. Click [Save](#). The subscriber account is saved as an XML file in your selected directory.

2.4.22.5.7 Reporting a Subscriber Account

You can view all information relating to the current subscriber account such as:

- Subscriber account: Code, Subscriber, and Service provider
- Prepaid account: Code, Amount, and Threshold
- External account: Code, External account code, and External billing system
- Credit limit balance: Code, Amount, and Reset credit value

Report a Subscriber Account

1. [Open \[page 689\]](#) a subscriber account.
2. On the toolbar in the main window, click the [Subscriber Account Report](#) icon  or use the [Action](#) menu⁷⁸. The [Subscriber Account Report](#) dialog box opens to display a summary of the subscriber account.
3. Check the report, and then click [Close](#).

Related Information

[Working with Subscriber Accounts \[page 686\]](#)

⁷⁸ From the menu bar in the main window, you can also select **Action > Subscriber account report**.

2.4.22.5.8 Deleting a Subscriber Account

⚠ Caution

Do not delete a subscriber account created by a CRM or another provisioning system interfaced with SAP CC. Refer to the [caution about subscriber accounts \[page 668\]](#).

⚠ Caution

There is no “undo” function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

To delete a subscriber account

1. From the menu bar in the main window, select **File > Delete > Subscriber Account**. The *Delete Subscriber Account* dialog box opens.
2. [Search \[page 687\]](#) for the subscriber account to delete.
3. Select the subscriber account.
4. Click *Delete*. A deletion dialog box asks if you want to delete the subscriber account.
5. Confirm the charge deletion by clicking *Yes*. A dialog box confirms the successful deletion.

2.4.22.6 Using the Action Menu

Use the *Action* menu of the user interface to manage your subscriber accounts.

Possible configuration tasks:

- [Adding a Component to a Subscriber Account \[page 691\]](#)
- [Removing a Component \[page 692\]](#)
- [Reporting a Subscriber Account \[page 699\]](#)

Possible business operations and tasks:

- [Refilling a Prepaid Account \[page 675\]](#)
- [Manually Resetting a Credit Limit Balance \[page 682\]](#)

2.4.23 Subscriptions

→ Remember

Subscriptions cannot be used in stateless mode even if menus and commands are available in the graphical user interface.

⚠ Caution

Subscriptions are part of the former Data Model (DM). As of release 2.0, a newer data model provides you with [provider contracts](#) and a lot of new concepts.

→ Tip

The subscription concept in this documentation does not relate to the features and capabilities of [Subscription Order Management](#) in [SAP S/4HANA for Customer Management](#).

In master data for the end customers of the service provider company, a subscription:

- Is related to one and only one [subscriber account \[page 668\]](#)⁷⁹
- Is an [offer \[page 611\]](#) subscribed to by an end customer (subscriber) as part of a business agreement

Before creating a subscription, you must create at least one subscriber account. When you create a subscription as a sales representant, the charges that are described as mandatory in the offer are automatically activated. You can then activate optional charges and suboffers in the subscription according to the business agreement with the subscriber (end customer) and the service provider company that your represent.

Before Starting

i Note

- Before modifying a subscription, [read the caution and the note \[page 714\]](#) about the preexisting and postexisting features.
- Before modifying a date in a subscription, [read the note \[page 719\]](#) about refunds in subscriptions relating to offers that include RECURRING RATE components.

Before [creating \[page 710\]](#) and [setting up \[page 715\]](#) a subscription, you must be familiar with the following:

- Main [creation stages \[page 701\]](#) of a subscription
- [Structure \[page 703\]](#) of a subscription
- [Changes \[page 706\]](#) that you can make to a subscription
- [Pricing and date management \[page 707\]](#)
- [Third-party payment management \[page 701\]](#)
- [Activation or deactivation \[page 709\]](#) of a charge in a subscription
- [User accesses \[page 752\]](#) for setting up a master charge in a subscription
- [Version change \[page 750\]](#) of a subscription

2.4.23.1 Subscription Creation Stages

The following list summarizes the main stages in creating a subscription:

⁷⁹ The relation between subscription and subscriber account is set up on the [Charge Mapping \[page 748\]](#) tab of a charge.

1. General characteristics
2. Structure
3. Pricing and dates management
4. Charge activation or deactivation
5. Charge characteristic redefinition
6. User accesses

General characteristics

When you create a subscription, you specify its code, dates, and who will subscribe to.

i Note

General characteristics are set up on the [Definition \[page 719\]](#) tab of subscriptions.

Structure

The [structure \[page 703\]](#) of a subscription is similar to that of an offer; however, in a subscription, you can subscribe to multiple suboffers and multiple charges.

Charge dependencies

If a subscription contains dependent charges, you can modify the existing dependent relationships between them. For each dependent charge, you need to specify which charge in the subscription is assigned the role of the [master charge \[page 563\]](#).

i Note

Charge dependencies are set up on the [Subscription Dependencies \[page 727\]](#) tab of subscriptions.

Pricing and dates management

You [manage pricing and dates \[page 707\]](#) according to your needs: you can suspend, resume, freeze, or cancel subscriptions.

Charge activation or deactivation

You [activate or deactivate \[page 709\]](#) charges depending on whether the charges are optional or mandatory.

Redefinition of charge characteristics

The setup of charges used in a subscription is similar to the setup chosen in the original offer. However, you can still redefine certain characteristics that will only be valid in the subscription.

When you create a subscription, you can set up activated charges in the following ways:

If the price plan in the associated offer contains	You can
Parameters that can be redefined (selected as <i>External</i> in the <i>Visibility</i> field of the <i>Charge</i> window)	Redefine [page 743] the parameter values
Counters	Modify [page 742] the values of counters
Translation tables	Add [page 744] content to the translation tables

User accesses

In a subscription containing one or more charges, you can create one or more user accesses for each master charge. By creating more than one user access for the same customer, you allow the customer to use the service under various identities.

i Note

User accesses are set up on the [User Accesses \[page 747\]](#) tab of suboffers in subscriptions.

2.4.23.2 Subscription Structure

Like their associated offers, subscriptions are represented in the graphical interface as a multilevel tree structure.

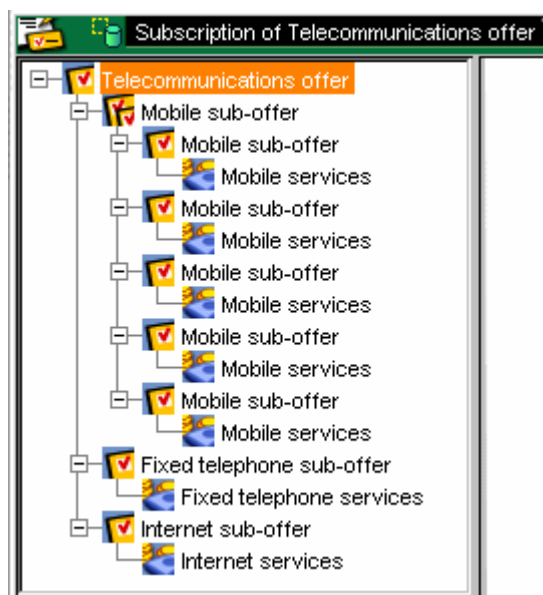
The structure of a subscription and its corresponding offer is the same except in the following cases:

- Some charges or suboffers may be subscribed more than once (see illustration)
- A customer may choose not to subscribe to optional charges or suboffers

Original Offer



Subscription



Mandatory suboffers and charges are automatically declared “subscribed to”: You only specify how many times you want them to be subscribed to.

i Note

The mandatory and optional options are set on the [Definition tab of suboffers \[page 730\]](#) and [charges \[page 741\]](#) in the original offer.

Multiple subscription

If the subscribed offer contains rules specifying a maximum subscription quantity of more than 1 for a suboffer, the structure will contain a specific element representing a group of suboffer subscriptions. This element is

referred to as a multiple subscription and is represented by the icon .

i Note

The multiple subscription is defined on the [Definition \[page 729\]](#) tab of multiple suboffers.

Multiple charge

When setting up a suboffer in a subscription, you can subscribe to an activated charge as many times as you need. This means that the activated charge is represented in the tree as many times as necessary.

i Note

Multiple charges are set up on the [Charges \[page 732\]](#) tab of suboffers.

❖ Example

Setting the activated charge number

Learn.com proposes several training module offers charged by subscription. The company is in contact with the regional organization EcoDevCouncil, which sponsors a number of associations. This sponsorship constitutes a variable percentage of training costs accumulated by the association. The company has adapted its offers to this clientele, with the Associations Module comprising two charges:

- Training Module Subscription charge
- Sponsorship charge, to calculate the amount to be paid by EcoDevCouncil

Learn.com sells this offer to a large company, AMGen, which profits from double sponsorship by EcoDevCouncil and a private foundation. The Sponsorship charge will be activated twice in the AMGen subscription.

2.4.23.3 Example of a Subscription

Learn.com proposes a Complete Module complex offer, consisting of the Basic Module, Document Download, and Server Access suboffers.

Techlingua wishes to subscribe to this offer but does not want to pay registration or membership fees. In addition, Techlingua requests a discount on the subscription fee. After negotiation, the following proposal is accepted:

- 10 Basic Module subscriptions, with no module registration fee
- 1 Document Download subscription
- 5 Server Access subscriptions, with no membership fee
- 5% discount on the subscription fee
- Overall subscription fees fixed at \$20

The Complete Module complex subscription for Techlingua looks like this:

Subscription elements	Subscription number	Content	Note
Basic Module suboffer	10	2 activated charges (instead of 3)	Registration Fee charge not activated
Basic Download suboffer	1	1 charge	
Server Access suboffer	5	1 activated charge (instead of 2)	Membership Fee charge not activated
Module Discount charge	1		Activated charge with a rate of 5% (parameter)
Subscription Fee charge	1		Subscription Fee charge activated and redefined at \$20

2.4.23.4 Subscription Changes

After you have customised and saved a subscription, you can further modify it to suit your changing needs.

Price changes

Existing subscriptions follow changes made in the pricing terms linked to the offer.

For example, the basic subscription price in the subscription charge may change and, in turn, affect signed offer contracts containing it. Contracts with a current frozen price period or specific terms (parameter values) are not affected except if the price plan is modified, in which case the subscriptions will be affected. With regard to frozen prices, updated prices are applied at the end of the freeze period. You must manually change the subscription values if specific subscription terms have been applied.

Structure changes

You can change the composition of a subscription in the following ways:

- Increase the quantity of subscribed charges or suboffers
- Subscribe to additional optional suboffers
- Activate optional charges
- Change charge dependency links

However, you cannot remove subscriptions to suboffers or charges, even after their expiration date. In this case, you can only make changes to the attributes of the subscription.

Attribute changes

You can change the attributes of a subscription in the following ways:

- Add or remove existing user accesses from charges
- Modify the agents or sponsors declared in charges
- Modify certain dates such as expiration, suspension, resumption, and frozen

You can change the effective dates of charges or subscriptions as long as the charge or subscription has not been activated by an event. You can change an expiration date but only if the subscription has not yet expired.

Setup changes

If necessary, you can modify parameters, counters, and translation tables inside activated charges and subscriptions.

2.4.23.5 Pricing and Date Management

The pricing that is planned in the offer and the subscription is usually applied without interruption during the entire period that the subscription is valid. The pricing begins on the subscription effective date and ends on the subscription expiration date.

i Note

The pricing and dates management is set up on the [Dates \[page 721\]](#) tab of subscriptions and [subscription suboffers \[page 731\]](#). For charges, the pricing and dates management is set up on the [Definition \[page 741\]](#) tab.

Certain events can interrupt the pricing functioning such as suspension of service and contract cancellation, for example. You can adapt pricing functions to meet customer demands by acting at a global subscription level or processing one charge at a time. The following table lists the possible actions:

Level	Action
Subscription	Suspend/resume
	Freeze prices/unfreeze
	Cancel
Charge	Activate/deactivate

Suspending and resuming subscriptions

In suspending a subscription to an offer or a suboffer, you can temporarily interrupt all existing rating. Usage rate and recurring rate calculations are stopped during this period. This system is useful for customers who do not use the service purchased for a fixed period; for example, when they are on holiday. When periodically interrupting costs, prorata rates may be applied if allowed for when setting up recurring rates in the price plan.

Rating on the subscription automatically restarts on the planned resumption date.

i Note

Recurring rates without prorata have the following behavior:

- If the resumption of a subscription occurs during the same period as its suspension, no recurring rate is generated. A recurring rate is only generated for the next period.
- If the resumption of the subscription occurs during another period, the recurring rate is generated for the current period.

Freezing subscription prices

By freezing a subscription price, you can guarantee your customer the stability of prices for a given period. You can update prices in the corresponding offers but these changes are not released to customers. At the end of the price freeze period, the updated prices of the offer are applied.

Canceling subscriptions

If a contract is unexpectedly terminated by the customer, you can cancel the subscription by manually changing the cancellation date. This cancellation is irreversible. If the cancellation is before the End Obligation Date, a related Early Cancellation One-Shot Rate is triggered if specified in the price plan. Otherwise, the one-shot cancellation fees are calculated.

You can use this function each time a customer interrupts their contract before the normal expiration date. For example, a customer may subscribe to an option, then decide to cancel it early.

[Click here](#) to see an example of managed pricing and dates in a subscription.

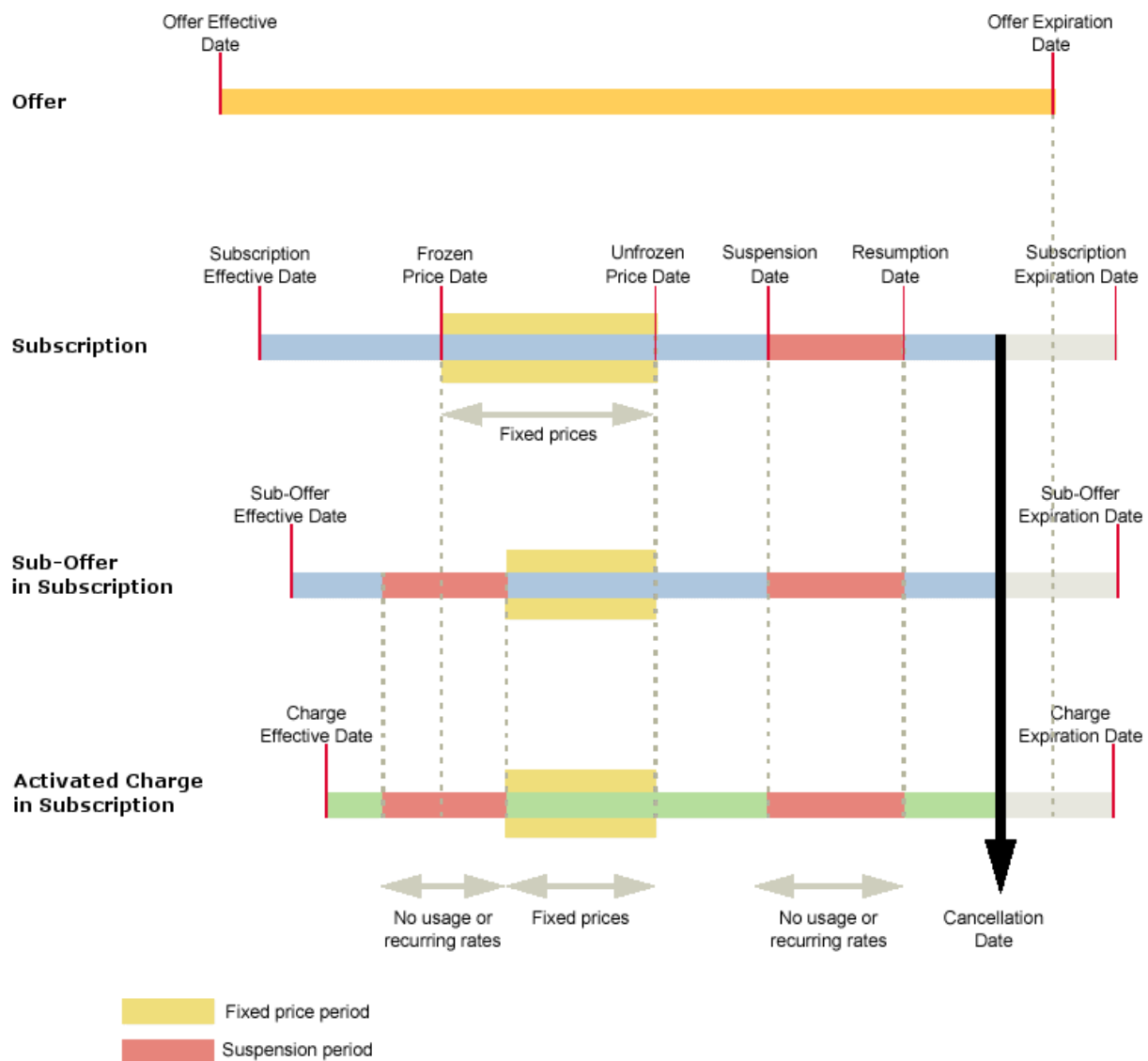
2.4.23.6 Pricing and Date Management: Example

The figure below illustrates the main concepts linked to the management of pricing and dates in a subscription. It shows a subscription to an offer containing a suboffer and a charge.

During this subscription, several events occur:

- A period of suspension for the suboffer then later for the offer itself, during which no usage or recurring rates can occur
- A period of fixed (frozen) prices
- An early cancellation, which may or may not attract early cancellation fees, depending on how the offer is set up

An End Obligation Date can also be specified for the subscription. If the customer cancels the subscription before this date, penalties will apply such as extra fees. Penalties will not apply if the customer cancels the subscription after the End Obligation Date.



2.4.23.7 Charge Activation or Deactivation

In a subscription, you can [activate \[page 750\]](#) charges that are defined as [optional \[page 648\]](#) in the original offer. Once a charge is activated, you can deactivate the charge by programming a [charge expiration date \[page 741\]](#).

This feature enables you to activate “special request” charges for a given period and allows you to offer your customers individual discounts.

Activating mandatory charges

You need to determine the start date for mandatory charges when you save a subscription. This way, you can satisfy customers who want to apply certain charges at a later date, without further action on your part.

Activating optional charges

You do not need to specify the date when you save the subscription and until you do, the charge will not be active. Optional charges can only be activated manually.

❖ Example

Desynchronized activation

The training organization Techlingua signs a contract with Learn.com for the Complete Organization Module to enable it to start a new in-house training program. Techlingua wishes the subscription to start three months after signing the contract. To ensure this, Learn.com enters a Subscription charge effective date in the Techlingua subscription. The date is three months later than the effective subscription date.

2.4.23.8 Working with Subscriptions

Related Information

[Creating a Subscription \[page 710\]](#)

[Opening an Existing Subscription \[page 713\]](#)

[Modifying a Subscription \[page 714\]](#)

[Setting Up a Subscription \[page 715\]](#)

[Deleting a Subscription \[page 718\]](#)

[Saving a Subscription \[page 717\]](#)

[Setting Up the Tabs of a Subscription \[page 718\]](#)

2.4.23.8.1 Creating a Subscription

A subscription:

- Is related to one and only one [subscriber account \[page 668\]](#)
- Is an offer subscribed to by a customer as part of a contract

The structure of a subscription is similar to the offer which the subscription is linked to. You can choose which optional charges you want to activate in the subscription and which charges you want to activate to more than once.

The elements of the *Subscription* window enable you to create a subscription.

To create a subscription

1. From the menu bar in the main window, select **File > New > Subscription**. The *Choose an Offer* window opens.
2. In the *Owner* drop-down menu, select the owner of the offer.
3. In the *Offers* folder, select the offer to subscribe to.
4. Click *OK*. The *Choose a subscriber account* window opens.
5. [Search \[page 687\]](#) for the subscriber account which is linked to the subscription.
6. Select the subscriber account, and then click *OK*. The subscription window opens.
7. [Set up \[page 715\]](#) the subscription.
8. Verify the subscription structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
9. [Save \[page 717\]](#) the subscription.

2.4.23.8.2 Finding a Subscription

To search for a subscription in the [Customer Master Data \[page 374\]](#) configured in SAP CC, you perform the operation in two halves of the *Choose a Subscription* window:

- The top part of the window is the *Filter* area, which allows you to find subscriptions by using filter criteria. The information in the *Basic* and *Advanced* tabs is combined during the search operation.
- The bottom area of the window is the *Results* area, which displays the search results that you perform.

Tasks

You can find subscriptions with or without search criteria.

- If you do not use search criteria, click  to start the search and view the results.
- If you use search criteria, set up the *Basic* and *Advanced* tabs, and then click  to start the search. The subscriptions are displayed in the results area. To display more columns of information in the results area, click , and then select which types of information you want to display. Click  to reset the filter and delete the result list.

Filter area

Basic tab

The *Basic* tab allows you to search for subscriptions depending on an identification code, a subscriber, or a service provider.

Code: Is the identifier of the subscriber account. In the drop-down list, select a search comparator such as *Equals*, *Is Like*, *Starts With*, *Ends With*, or *Contains*. In the next field, type the string that you want to search in the back-end database. For example, if you want to find all subscriptions containing the letters *eric*, you select the *Contains* option, and then type *eric*.

Offer Code: click the *Search* button  to find an offer. The *Choose an Offer* dialog box opens. In the *Owner* drop-down menu, select the owner of the offer. When the catalog of the owner is displayed, select the offer, and then click *Open*. The corresponding offer window opens.

Subscription Type: The type of a subscription depends on its *rating mode* [page 719]. To search for subscriptions depending on their type, select one of the following options:

- *Any*: Searches for any subscriptions
- *Offline*: Searches for subscriptions which are *rerated* [page 790] through the BART Tool component⁸⁰
- *Online*: Searches for subscriptions which are rated in real time
- *Online and Offline*: Searches for subscriptions which are both online and offline

Rerating Lock State [page 719]: The subscription is locked or not depending on the rerating process. To search for subscriptions depending on their state, select one of the following options:

- *Any*: Searches for any subscriptions
- *Locked*: Searches for subscriptions which are being rerated or for subscriptions for which an error occurred during the rerating process
- *Not Locked*: Searches for subscriptions which are not being rerated

Advanced tab

To find subscriptions, the *Advanced* tab allows you to create a table with one or more search criteria such as *Effective Date*, *Expiration Date*, or *Suspension Date*. To add a row to the table, click the *More* button. To delete a row from the table, click the *Less* button.

i Note

- If the criteria table comprises several rows and if you want to delete a row, the *Remove* dialog box opens to display the identifier names. Select the row that you want to delete from the table, and then click *OK*.
- If you choose the *Is Like* comparator when building criteria rows, you can type “*” in the right-hand field to represent a number of characters and “?” to represent a single character.

Each row of the table consists of three fields. To set up a row, do the following:

1. In the first field, select a search criterion such as *Effective Date*, *Expiration Date*, or *Suspension Date* in the list of identifiers.
2. In the second field, select a search comparator such as *After*, *Before*, *After or Equals*, *Before or* for example.

⁸⁰ For more information about BART Tool, click [here](#) [page 6]

3. In the third field, select or type the string that you want to search in the database.

Results area

Use the following icons:



: To start a new search whether you use search criteria or not.



: To delete the results list and reset the filter.



: To move to the next page. This button is available when the results list is large.



: To move to the previous page. This button is available when the results list is large.

2.4.23.8.3 Opening an Existing Subscription

The elements of the [Choose a Subscription](#) window allow you to find the subscription that you want to open from your database.

i Note

Because subscriptions are managed chronologically, you can open a previous version of a subscription. After you have saved a subscription, you can access previous versions of it that exist in the database. However, if you modify and save a previous version of a subscription, all later versions of it are deleted.

To open a previous version of a subscription, open the subscription as described in this topic. When the subscription is open, click the [Change Version](#) icon  on the toolbar in the main window. The [Change Version](#) dialog box opens. Select a version of the subscription from the list, and then click [View](#).

You can only delete a previous version of a subscription by modifying it, specifying an effective date earlier than the effective date of the original version, and then save the subscription.

You can open:

- An existing subscription saved in the database
- An existing subscription saved in an XML file

To open an existing subscription

1. From the menu bar in the main window, select **File > Open > Subscription** . The [Open Subscription](#) dialog box opens.
2. [Search \[page 711\]](#) for the subscription.

3. Select the subscription, and then click [OK](#). The subscription window opens.

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the [Open Parameters](#) dialog box, the [Open as Sub-Element of Current Object](#) option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select  [File](#)  [Open](#)  [From File](#) . The [Open](#) window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click [Open](#). The [Open Parameters](#) dialog box opens.
4. Select the [Open as New Object](#) option.
5. Select the object that you want to insert.
6. Click [Open](#). A window displays the object as a new object.

2.4.23.8.4 Modifying a Subscription

The modifications you can make to a subscription differ depending on whether it has been saved or not.

Caution

If your configuration of SAP Convergent Charging uses the [prerating and postrating features \[page 362\]](#), certain modifications to the subscription may mean that the postrating result will differ from the prerating result, causing a rating error.

Do not make the following modifications:

- Modifying a parameter or a translation table in any part of a subscription and saving the subscription to a date before the last prerating
- Modifying the cancellation date, the suspension date, or the expiration date in a subscription or a subscription suboffer with a date before the last prerating
- Modifying the cancellation date or the expiration date in an activated charge and saving the subscription to a date before the last prerating
- Adding a master or dependent charge, activating it, with the effective date before the last prerating
- Modifying dependencies between charges and saving the subscription to a date before the last prerating
- Modifying the client/partner or service provider in any part of a subscription

Note

If your configuration of SAP Convergent Charging uses the prerating and postrating features⁸¹ and if there are unresolved prerating events for the subscription, modifying the subscription may lead to a postrating result that differs from its corresponding prerating result.

If a message informs you that there are unresolved prerating events in the database, it is recommended to wait until they have been postrated or until the rating record list has been cleared; otherwise, this may lead to a rating error. However, if you think the modification is safe to be made, SAP Convergent Charging will allow you to continue with the creation of a new version of the subscription.

i Note

When changes are made in offers, the related subscriptions are updated only for the changes applying to counters or parameters which are assigned the state *Not Redefined* in the subscriptions.

To modify a subscription

1. [Open \[page 713\]](#) a subscription.
2. Set up [Setting Up a Subscription \[page 715\]](#) the subscription.
3. Verify the subscription structure by clicking the Verify icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save \[page 717\]](#) the subscription.

2.4.23.8.5 Setting Up a Subscription

[Create \[page 710\]](#), [open \[page 713\]](#), or [modify \[page 714\]](#) a subscription before setting it up. A *Subscription* window must be open.

⚠ Caution

Before modifying a subscription, read the [caution \[page 714\]](#).

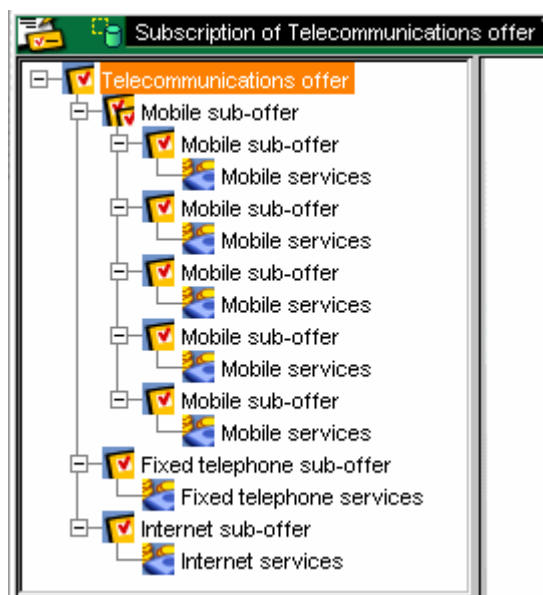
Like an [offer \[page 626\]](#), a subscription is graphically represented in the subscription window by a tree with the same structure as the original offer:

⁸¹ The note is equally true for the [session-based rating \[page 364\]](#) feature. For example, if there are pending sessions, modifying the subscription may result in errors.

Original Offer



Subscription



In the subscription tree, the icons are the following:



: Represents:

- The subscription to the original offer when the icon is located at the root of the tree
- The subscription to an original suboffer when the icon is located anywhere in the tree



: Represents a multiple suboffer, which is a suboffer represented by the icon as many times as the suboffer is subscribed.



: Represents a charge.

i Note

Remember that to have a multiple suboffer  in a subscription, you must have set up the [minimum and maximum orders \[page 640\]](#) of the suboffer in the related offer.

i Note

A dimmed icon in the subscription tree means this suboffer or charge is defined as optional in the offer and not activated yet. To include it in the subscription, you need to manually activate it.

To set up a subscription

1. In the left pane of the subscription window, click the subscription root .
2. In the right pane of the *subscription* window, identify the subscription. In the *Name* field, type the unique identifier of the subscription. In the *Description* field, describe the function of the subscription if necessary.
3. Set up the following tabs of the subscription: [Definition \[page 719\]](#), [Dates \[page 721\]](#), [Charges \[page 721\]](#), [Counters \[page 722\]](#), [Parameters \[page 722\]](#), [Translation Tables \[page 723\]](#), [Tier Tables \[page 725\]](#), [Additional Infos \[page 727\]](#), [Dependencies \[page 727\]](#).
4. If necessary, set up the multiple suboffers of the subscription. For each multiple suboffer, click  in the left pane, and then [set up \[page 729\]](#) the multiple suboffer.
5. If necessary, set up the suboffers of the subscription. For each suboffer, click  in the left pane of the subscription window, and then [set up \[page 729\]](#) the suboffer.
6. If necessary, set up the charges of the subscription. For each charge, click  in the left pane of the subscription window, and then [set up \[page 647\]](#) the charge.
7. If necessary, [activate or deactivate suboffers \[page 749\]](#) or [charges \[page 750\]](#).

i Note

If the *Counters*, *Parameters*, or *Translation Table* tabs of a subscription are unavailable (dimmed), this means a counter, a parameter, or a translation table was not created in the original offer.

2.4.23.8.6 Saving a Subscription

Once you have created or modified an subscription, and then verified its structure, you are ready to save it. You can save the reusable subscription either into the back-end database or as an XML file on your hard disk.

To save a new subscription to the database

1. From the menu bar in the main window, select **File** > **Save** > **In the Database** . The *Create a Subscription* dialog box opens to inform you that the subscription has been successfully created.
2. Click *OK*.

To save a new version of an existing subscription into the database

1. From the menu bar in the main window, select **File** > **Save** > **In the Database** . The *Choose Date* dialog box opens.

2. Select a date from which the subscription modifications will be effective, and then click [OK](#). The [Subscription Modification](#) confirmation box opens to inform you that the subscription has been successfully modified.
3. Click [OK](#).

Note

Refer to the notes for [modifying \[page 714\]](#) a subscription.

To save a subscription as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click [OK](#). The [Save](#) dialog box opens.
3. Select a directory to save the subscription.
4. In the [File name](#) field, type the name of the file.
5. Click [Save](#). The subscription is saved as an XML file in your selected directory.

2.4.23.8.7 Deleting a Subscription

Before you delete a subscription, you must first delete all objects which reference it.

Caution

There is no “undo” function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

To delete a subscription

1. From the menu bar in the main window, select **File > Delete > Subscription**. The [Delete Subscription](#) window opens.
2. [Search \[page 711\]](#) for the subscription.
3. Once you have located the subscription that you want to delete, select the subscription row, and click [Delete](#). A deletion dialog box asks if you want to delete the subscription.
4. Click [Yes](#) to delete the subscription. A dialog box confirms that the subscription has been successfully deleted.

2.4.23.8.8 Setting Up the Tabs of a Subscription

Related Information

[Subscription: Definition \[page 719\]](#)

[Subscription: Dates \[page 721\]](#)

[Subscription: Charges \[page 721\]](#)

[Subscription: Counters \[page 722\]](#)

[Subscription: Parameters \[page 722\]](#)

[Subscription: Translation Tables \[page 723\]](#)

[Subscription: Tier Tables \[page 725\]](#)

[Subscription: Additional Information \[page 727\]](#)

[Subscription: Dependencies \[page 727\]](#)

2.4.23.8.8.1 Subscription: Definition

[Create \[page 710\]](#) or [modify \[page 714\]](#) a subscription before [setting it up \[page 715\]](#). In the left pane of the

subscription window, click the subscription root  to view, and then open the [Definition](#) tab.

The [Definition](#) tab allows you to:

- Define a subscription by specifying its code, dates, and specifying who will subscribe to. When defining the subscription, the following fields are mandatory: [Code](#), [Subscriber](#), and [Effective Date](#). Non-mandatory fields can be filled in at a later date if necessary.
- Define the mode for rating or rerating the subscription.

→ Remember

About refunds in subscriptions relating to offers that include RECURRING RATE components.

In a subscription, if you change the [Expiration Date](#) or the [Cancellation Date](#) to a date in the past, a refund is automatically generated depending on the periodic basis set up to trigger the recurring rate.

For example, a subscription relates to an offer including a recurring rate that triggers a subscription fee of \$5 the 1st of every month. In the subscription, the [Expiration Date](#) is the 5th of July. You decide to change the [Expiration Date](#) to the 5th of April. Thus, the total refund for May, June, and July will be an amount of \$15.

There is no refund for the other components such as usage rate and one-shot rate.

Definition tab

Fill in or modify the [Definition](#) tab.

[Code](#): Type a unique identifier for the subscription.

Offer: Displays the name of the original offer. Click  if you want to view and modify the original offer.

Subscriber Account: Displays the service provider and the code of the subscriber account to which the subscription is related.

- **Contracting Service Provider:** Displays the identifier of the contracting service provider.
- **Code:** Displays the identifier of the subscriber account. Click  if you want to view and modify the subscriber account.

Period: Define the dates for starting and terminating the subscription.

- **Effective Date:** Click the calendar button , and then select a date from the grid on which the subscription will start.
- **Expiration Date:** You can fill in this non-mandatory field.

Rating Mode: Defines the mode for rating the subscription. Select either or both of the following modes:

- **Online (Rerating Disabled):** An online subscription is rated in real time by SAP Convergent Charging only. An online subscription cannot be rerated.
- **Offline:** An offline subscription is rated or **rerated in batch mode** [page 790] by the **BART Tool** [page 6] component.
 - **Batch Rating Group:** Provides the list of batch rating groups. The list is available if at least the **Offline** mode is selected. A batch rating group is a group of subscriptions, and the subscriptions are rated at the same time. Each offline subscription belongs to a batch rating group. Select the batch rating group you want to assign to the subscription. For example, the list of batch rating groups⁸² consists of geographic areas (California, Ohio, Texas, for example).

Rerating State: Codes and status are displayed only in **Offline** mode. They are not displayed if both **Offline** and **Online** modes are selected.

- **Rerating Lock Code:** Displays the lock code of the subscription when the subscription is being rerated. After the subscription is rerated, the code is deleted from the field. The code remains displayed if the subscription has not been unlocked yet or if an error occurred during the rerating process.
- **Last Rerating Lock Code:** Displays the lock code of the last rerating process.
- **Last Rerating Status:** Displays the status of the last rerating process. You can use the code associated to the status to **find the subscriptions** [page 711] that have failed during the rerating process. The status are the following:
 - **alreadyLockedFailure:** The rerating process failed because the subscription was locked by the last rating operation or by another rerating operation
 - **counterRestorationFailure:** The restoration process failed during the last rerating operation because subscription counters were not correctly restored
 - **billingFailure:** The rerating process has failed because of a billing issue
 - **restorationSuccess:** The restoration process was successful during the last rerating operation
 - **unlockfailure:** The subscription has not been unlocked
 - **selectionSuccess:** The selection of the subscription was successful
 - **reratingSuccess:** The rerating process was successful during the last rerating operation

⁸² The list is created by your administrator with the **Admin+** [page 1002] tool.

- **Suggested Rerating Date:** Displays the rerating date that has been suggested by the external billing system during the last rerating session. This field is empty if the rerating date has not been modified by the external billing system.

2.4.23.8.8.2 Subscription: Dates

Create [page 710] or modify [page 714] a subscription before setting it up [page 715]. In the left pane of the

subscription window, click the subscription root  to view, and then open the *Dates* tab.

For more information about subscription dates, refer to pricing and management [page 707] and the illustrated example [page 708].

→ Remember

Read the note [page 719] about changing the *Expiration Date* or the *Cancellation Date* to an earlier date in the past.

Dates tab

Fill in or modify the *Dates* tab.

Frozen Price Date: Select the date on which pricing will be frozen for the offer (prices are fixed).

Unfrozen Price Date: Select the date from which pricing will be unfrozen for the offer.

Cancellation Date: Select the date on which the subscription is cancelled by the subscriber or service provider.

End Obligation Date: Select the date before which early cancellation fees must apply (depending on the contract) if a subscriber cancels the subscription.

Suspension Date: Select the date on which the consumption of the service is blocked by the server and the recurring rates [page 570] are not triggered.

Resumption Date: Select the date from which the consumption of the service is made available again by the server.

2.4.23.8.8.3 Subscription: Charges

Create [page 710] or modify [page 714] a subscription before setting it up [page 715]. In the left pane of the

subscription window, click the subscription root  to view, and then open the *Charges* tab.

In a subscription, the list of the activated charges is displayed with the number of times each charge is activated. You can set the number of times each charge will be subscribed.

Charges tab

Fill in or modify the *Charges* tab.

Available Charges: Displays the charge name.

Quantity: Type the number of times the charge will be subscribed. The charge is represented as many times as necessary in the subscription tree.

2.4.23.8.8.4 Subscription: Counters

Create [page 710] or modify [page 714] a subscription before setting it up [page 715]. In the left pane of the

subscription window, click the subscription root  to view, and then open the *Counters* tab.

At the subscription root, you can redefine a shared counter that was created in the original offer.

The list of the shared counters created for the original offer is displayed on the *Counters* tab. Each row in the list represents a shared counter that you can redefine.

Counters tab

Fill in or modify the *Counters* tab.

State: Provides a drop-down list. Select *Redefined* if you want to redefine the value of the counter.

Name: Displays the counter name.

Description: Displays the description of the counter.

Value: After you select *Redefined* in the *State* column, type the new value for the counter.

i Note

- When you save the subscription, even though you have redefined a shared counter at subscription root level, you will find that the state of the counter has reverted to *Not Redefined*. The modification is taken into account immediately by the system; therefore, the counter value remains dependent of the rating process.
- You can continue redefining shared counters at subscription root level after the subscription has been saved.

2.4.23.8.8.5 Subscription: Parameters

Create [page 710] or modify [page 714] a subscription before setting it up [page 715]. In the left pane of the

subscription window, click the subscription root  to view, and then open the *Parameters* tab.

At the subscription root, you can redefine a shared parameter that was created in the original offer.

The list of the shared parameters created for the original offer is displayed on the [Parameters](#) tab. Each row in the list represents a shared parameter that you can redefine.

Parameters tab

Fill in or modify the [Parameters](#) tab.

State: Provides a drop-down list. Select [Redefined](#) if you want to redefine the value of the parameter.

Name: Displays the parameter name.

Description: Displays the description of the parameter.

Type: Displays the type of the parameter.

Value: After you select [Redefined](#) in the [State](#) column, type the new value for the parameter.

i Note

You can continue redefining parameters at subscription root level after the subscription containing it has been saved. The new value will be applied on the effective date when saving the subscription.

2.4.23.8.8.6 Subscription: Translation Tables

Create [\[page 710\]](#) or modify [\[page 714\]](#) a subscription before [setting it up \[page 715\]](#). In the left pane of the

subscription window, click the subscription root  to view, and then open the [Translation Tables](#) tab.

At the subscription root, you can add content to a translation table. The additions and modifications that you make apply only inside this subscription and do not affect the data in the original translation table.

→ Recommendation

It is strongly recommended that you do not add more than 200 rows to the table so as not to reduce the performance of SAP Convergent Charging.

Translation Tables tab

Fill in or modify the [Translation Tables](#) tab.

Instance Name: Provides the list of all the translation table instances created at offer level. Select the translation table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a translation table in the *Instance* Name list, you can create additional content that you add to the original content. The additional content does not modify the original translation table.

You can add one or more rows to the translation table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information

from external .CSV type files by clicking .

Use the icons to fill in the translation table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.

Use the following icon...	To...
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.8.8.7 Subscription: Tier Tables

Create [\[page 710\]](#) or modify [\[page 714\]](#) a subscription before [setting it up \[page 715\]](#). In the left pane of the

subscription window, click the subscription root  to view, and then open the *Tier Tables* tab.

At the subscription root, you can add content to a tier table. The additions and modifications that you make apply only inside this subscription and do not affect the data in the original tier table.

→ Recommendation

It is strongly recommended that you do not add more than 200 rows to the tier table so as not to reduce the performance of SAP Convergent Charging.

Tier Tables tab

→ Remember

When setting up a tier table, you can:

- Replace the default group by a new group
- Create discontinuous intervals
- Arrange the rows of a group in any order

At subscription level, remember that the interval $]-\infty, +\infty[$ is not mandatory and the intervals that you define in the tier table of the offer are processed before the intervals of the original tier table.

Fill in or modify the *Tier Tables* tab.

Instance Name: Provides the list of all the tier table instances created at offer level. Select the tier table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a tier table in the *Instance* Name list, you can create additional content that you add to the original content. The additional content does not modify the original tier table.

You can add one or more rows to the tier table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking .

Use the icons to fill in the tier table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a Search in table dialog box is displayed. In the Search field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the Match case option. In the Search in column(s) check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.

Use the following icon...	To...
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.8.8 Subscription: Additional Information

Create [\[page 710\]](#) or [modify \[page 714\]](#) a subscription before [setting it up \[page 715\]](#). In the left pane of the

subscription window, click the subscription root  to view, and then open the *Additional Information* tab.

The *Additional Information* tab allows you to create information that is only descriptive and not reused by SAP Convergent Charging at a stage of the process. For example, you can create a table with the author's name of the subscription, the author's code, the creation date and other information. If necessary, you can retrieve this information by using an external system.

Additional Information tab

Use the table and its icons to create additional information.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String* or *Date*.

Value: Type the additional information according to the selected type.

2.4.23.8.8.9 Subscription: Dependencies

Create [\[page 710\]](#) or [modify \[page 714\]](#) a subscription before [setting it up \[page 715\]](#). In the left pane of the

subscription window, click the subscription root  to view, and then open the *Dependencies* tab.

The *Dependencies* tab allows you to:

- Modify the existing dependencies between master charges and dependent charges
- Prioritize the dependency links

→ Remember

You can use dependent charges as master charges except in the following cases:

- A dependent charge with a sponsor or discount role cannot be used as a master charge
- A dependent charge with a commission role can only be master to a dependent charge with a commission role

i Note

The *Dependencies* tab is unavailable if your subscription contains only [master charges \[page 563\]](#).

Dependencies tab

Use the table and its icons to assign master charges to dependent charges. Be careful with the order in which the dependencies are listed in the table.

Override Offer Level Dependencies: Select this option to modify the existing dependencies between master and dependent charges.

→ Remember

After modifying dependencies and saving the subscription, you can no longer modify this option.



: Click to add a dependency row to the table.



: Click to delete a dependency row from the table.



: Click to move a row up. This changes the priority order of dependencies.



: Click to move a row down. This changes the priority order of dependencies.

Dependent: Provides the list of dependent charges used in the subscription. From the drop-down list, select a dependent charge.

Master: Provides the list of master charges used in the subscription. From the drop-down list, select the charge that you want to link to the dependent charge.

2.4.23.9 Working with Multiple Suboffers in a Subscription

Related Information

[Setting Up a Multiple Suboffer in a Subscription \[page 729\]](#)

2.4.23.9.1 Setting Up a Multiple Suboffer in a Subscription

[Create \[page 710\]](#), [open \[page 713\]](#) or [modify \[page 714\]](#) a subscription before setting up a multiple suboffer. A *Subscription* window must be open.

If you have a multiple suboffer  in your subscription, you can specify the number of times the suboffer is subscribed.

To set up a multiple suboffer

1. In the *Subscription* tree of an open offer, make sure that the multiple offer  to set up is selected; otherwise, select it.
2. In the right pane of the *Subscription* window, in the *Quantity* drop-down list⁸³ of the *Definition* tab, select the number of times the suboffer will be subscribed.

2.4.23.10 Working with Suboffers in a Subscription

Related Information

[Setting Up a Suboffer in a Subscription \[page 729\]](#)

[Setting Up the Tabs of a Subscription Suboffer \[page 730\]](#)

2.4.23.10.1 Setting Up a Suboffer in a Subscription

[Create \[page 710\]](#), [open \[page 713\]](#), or [modify \[page 714\]](#) a subscription before setting up a suboffer. A *Subscription* window must be open.

⁸³ The *Quantity* drop-down list displays the list of numbers ranging from the minimum order to the maximum order that you set up on the *Definition [page 640]* tab of the suboffer.

To set up a suboffer in a subscription



1. In the left pane of the subscription window, click
2. Set up the following tabs of the suboffer: [Definition \[page 730\]](#), [Dates \[page 731\]](#), [Charges \[page 732\]](#), [Counters \[page 732\]](#), [Parameters \[page 733\]](#), [Translation Tables \[page 733\]](#), [Tier Tables \[page 735\]](#), [Subscription Suboffer: Additional Information \[page 737\]](#).
3. If necessary, [activate or deactivate \[page 749\]](#) the suboffer.

i Note

If the *Counters*, *Parameters* or *Translation Table* tabs of a subscription are unavailable (dimmed), this means a counter, parameter or translation table was not created in the original offer.

2.4.23.10.2 Setting Up the Tabs of a Subscription Suboffer

Related Information

[Subscription Suboffer: Definition \[page 730\]](#)
[Subscription Suboffer: Dates \[page 731\]](#)
[Subscription Suboffer: Charges \[page 732\]](#)
[Subscription Suboffer: Counters \[page 732\]](#)
[Subscription Suboffer: Parameters \[page 733\]](#)
[Subscription Suboffer: Translation Tables \[page 733\]](#)
[Subscription Suboffer: Tier Tables \[page 735\]](#)
[Subscription Suboffer: Additional Information \[page 737\]](#)

2.4.23.10.2.1 Subscription Suboffer: Definition

[Create \[page 710\]](#), or [modify \[page 714\]](#) a subscription before [setting up \[page 729\]](#) a suboffer. In the left pane



of the *Subscription* window, click a suboffer to view, and then open the *Definition* tab.

In a subscription, you define a suboffer by specifying its *Effective Date*, and specifying who will subscribe to.

Definition tab

Fill in or modify the *Definition* tab.

Code: This field is empty and not used.

Offer: Displays the name of the original offer. Click  if you want to view and modify the original suboffer.

Subscriber Account: Displays the service provider and the code of the subscriber account to which the subscription is related.

- *Service Provider*: Displays the identifier of the service provider.
- *Code*: Displays the identifier of the subscriber account. Click  if you want to view and modify the subscriber account.

Effective Date: Click the calendar button , and then select a date from the grid on which the subscription to the suboffer will start.

Expiration Date: You can fill in this non-mandatory field, which can be filled in at a later date if necessary.

2.4.23.10.2.2 Subscription Suboffer: Dates

Create [page 710], or modify [page 714] a subscription before [setting up \[page 729\]](#) a suboffer. In the left pane of the *Subscription* window, click a suboffer  to view, and then open the *Dates* tab.

For more information about subscription dates to a suboffer, refer to [pricing and management \[page 707\]](#) and [the illustrated example \[page 708\]](#).

Dates tab

Fill in or modify the *Dates* tab.

Frozen Price Date: Select the date on which pricing will be frozen for the suboffer (prices are fixed).

Unfrozen Price Date: Select the date from which pricing will be unfrozen for the suboffer.

Cancellation Date: Select the date on which the subscription to the suboffer is cancelled by the subscriber or service provider.

End Obligation Date: Select the date before which early cancellation fees must apply (depending on the contract) if a subscriber cancels the subscription to the suboffer.

Suspension Date: Select the date on which the consumption of the service is blocked by the server and the [recurring rates \[page 570\]](#) are not triggered.

Resumption Date: Select the date from which the consumption of the service is made available again by the server.

2.4.23.10.2.3 Subscription Suboffer: Charges

Create [page 710], or modify [page 714] a subscription before setting up [page 729] a suboffer. In the left pane

of the *Subscription* window, click a suboffer  to view, and then open the *Charges* tab.

In a suboffer of a subscription, you can subscribe to an activated charge as many times as necessary. In the subscription tree, the activated charge is represented as many times as you subscribe to the activated charge. Each charge can be set up independently of the others.

i Note

- Only the activated charges can be subscribed many times. If a charge is deactivated, activate [page 750] this charge before subscribing to.
- For more information about subscribing to a charge, refer to charge activation or deactivation [page 709].

Charges tab

Fill in or modify the *Charges* tab.

Available Charges: Displays the name of each activated charge.

Quantity: Type the number of times that the charge is subscribed. The charge is represented as many times as necessary in the subscription tree.

2.4.23.10.2.4 Subscription Suboffer: Counters

Create [page 710], or modify [page 714] a subscription before setting up [page 729] a suboffer. In the left pane

of the *Subscription* window, click a suboffer  to view, and then open the *Counters* tab.

In a suboffer of a subscription, you can redefine a shared counter that was created in the original suboffer.

The list of the shared counters created for the original suboffer is displayed on the *Counters* tab. Each row in the list represents a shared counter that you can redefine.

Counters tab

Fill in or modify the *Counters* tab.

State: Provides a drop-down list. Select *Redefined* if you want to redefine the value of the counter.

Name: Displays the counter name.

Description: Displays the description of the counter.

Value: After you select *Redefined* in the *State* column, type the new value for the counter.

i Note

- When you save the subscription, even though you have redefined a shared counter at subscription root level, you will find that the state of the counter has reverted to *Not Redefined*. The modification is taken into account immediately by the system; therefore, the counter value remains dependent of the rating process.
- You can continue redefining shared counters at subscription root level after the subscription has been saved.

2.4.23.10.2.5 Subscription Suboffer: Parameters

Create [page 710], or modify [page 714] a subscription before setting up [page 729] a suboffer. In the left pane of the *Subscription* window, click a suboffer  to view, and then open the *Parameters* tab.

In a suboffer of a subscription, you can redefine a shared parameter that was created in the original suboffer.

The list of the shared parameters created for the original suboffer is displayed on the *Parameters* tab. Each row in the list represents a shared parameter that you can redefine.

Parameters tab

Fill in or modify the *Parameters* tab.

State: Provides a drop-down list. Select *Redefined* if you want to redefine the value of the parameter.

Name: Displays the parameter name.

Description: Displays the description of the parameter.

Type: Displays the type of the parameter.

Value: After you select *Redefined* in the *State* column, type the new value for the parameter.

i Note

You can continue redefining parameters in the suboffer after the subscription containing it has been saved.

2.4.23.10.2.6 Subscription Suboffer: Translation Tables

Create [page 710], or modify [page 714] a subscription before setting up [page 729] a suboffer. In the left pane of the *Subscription* window, click a suboffer  to view, and then open the *Translation Tables* tab.

In a charge of a subscription, you can add content to a translation table. The additions and modifications that you make apply only inside this subscription and do not affect the data in the original translation table.

Translation Tables tab

Fill in or modify the *Translation Tables* tab.

Instance Name: Provides the list of all the translation table instances created at original suboffer level. Select the translation table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a translation table in the *Instance* Name list, you can create additional content that you add to the original content. The additional content does not modify the original translation table.

You can add one or more rows to the translation table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information

from external .CSV type files by clicking .

Use the icons to fill in the translation table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.

Use the following icon...	To...
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.10.2.7 Subscription Suboffer: Tier Tables

Create [page 710], or modify [page 714] a subscription before setting up [page 729] a suboffer. In the left pane

of the *Subscription* window, click a suboffer  to view, and then open the *Tier Tables* tab.

In a charge of a subscription, you can add content to a tier table. The additions and modifications that you make apply only inside this subscription and do not affect the data in the original tier table.

Tier Tables tab

→ Remember

When setting up a tier table, you can:

- Replace the default group by a new group
- Create discontinuous intervals

- Arrange the rows of a group in any order

At subscription level, remember that the interval $]-\infty, +\infty[$ is not mandatory and the intervals that you define in the tier table of the offer are processed before the intervals of the original tier table.

Fill in or modify the *Tier Tables* tab.

Instance Name: Provides the list of all the tier table instances created at suboffer level. Select the tier table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a tier table in the *Instance* Name list, you can create additional content that you add to the original content. The additional content does not modify the original tier table.

You can add one or more rows to the tier table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking .

Use the icons to fill in the tier table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.

Use the following icon...	To...
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.10.2.8 Subscription Suboffer: Additional Information

Create [\[page 710\]](#), or [modify \[page 714\]](#) a subscription before [setting up \[page 729\]](#) a suboffer. In the left pane of the *Subscription* window, click a suboffer  to view, and then open the *Additional Information* tab.

The *Additional Information* tab allows you to create information that is only descriptive and not reused by SAP Convergent Charging at a stage of the process. For example, you can create a table with the author's name of the suboffer in the subscription, the author's code, the creation date, and other information. If necessary, you can retrieve this information by using an external system.

Additional Information tab

Use the table and its icons to create additional information.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Name: Type the name of the additional information.

Type: Provides the list of the additional information types. Select one of the following types: *Number*, *String* or *Date*.

Value: Type the additional information according to the selected type.

2.4.23.11 Working with Charges in a Subscription

Related Information

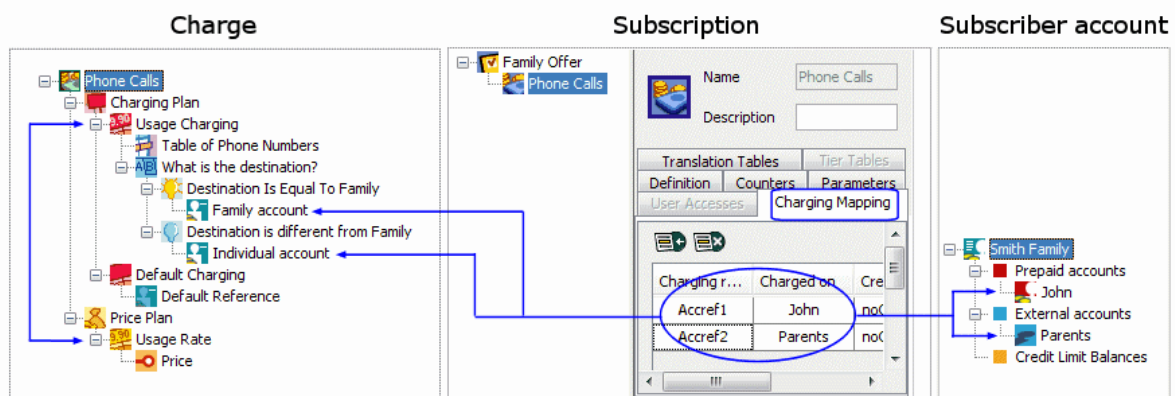
[Charging Mapping \[page 738\]](#)

[Setting Up a Charge in a Subscription \[page 740\]](#)

[Setting Up the Tabs of a Subscription Charge \[page 741\]](#)

2.4.23.11.1 Charging Mapping

As shown in the illustration below, the [charging mapping \[page 748\]](#) is included in subscriptions. It is a table describing the links between charging references declared in a [charging plan](#) and charged accounts of a [subscriber account \[page 668\]](#).



How the charging process operates

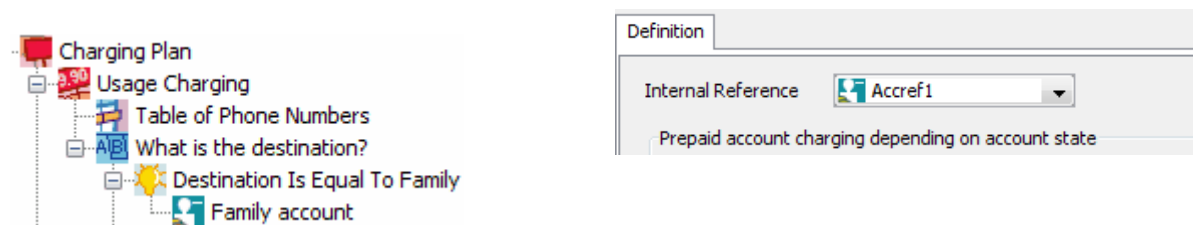
After the related [Usage Rate \[page 573\]](#) in the price plan has triggered the rating function to calculate dynamically the price amount, the charging process carries out the following steps to determine the account(s) to credit or debit:

1. The charging process checks that the charging reference assigned to the [Charging component](#) exists in the subscription mapping.
2. If the charging reference exists, the account of the subscriber linked to the charging reference is charged or refilled with the calculated amount of the Usage Rate. **The charging process is complete.**
3. Otherwise, if the charging reference does not exist in the mapping subscription, the charging process checks that the charging reference is the default charging reference.

4. If the charging reference is the default charging reference, the account of the subscriber linked to the default charging reference is charged with the calculated amount of the Usage Rate. **The charging process is complete.**
5. Otherwise, if the charging reference is not the default charging reference, the charging process replaces the charging reference by its backup reference saved in the [Internal Reference Dictionary](#).
6. The backup reference becomes the charging reference. The charging process starts the cycle again to step 1⁸⁴

Examples of charging processes

The three following examples refer to the illustration earlier in this topic. In this illustration, the [Internal Reference](#) component `Family account` is associated to the [Reference](#) `Accref1` (which is set on the [Definition](#) tab of the [Internal Reference](#) component `Family account`):



❖ Example

The [Internal Reference](#) component `Family account` is associated to the [Reference](#) `Accref1`.

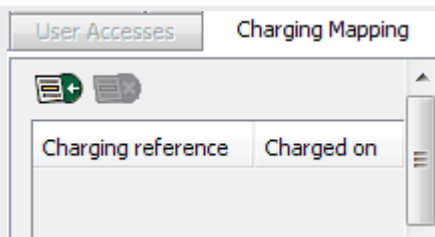
Charging Mapping	
Charging reference	Charged on
Accref1	John
Accref2	Parents

When a call is rated and the charging plan identifies `Accref1`, the charging process checks that the charging reference `Accref1` exists in the subscription mapping. As `Accref1` is linked to the account "Parents" of the subscriber "Smith Family", this account will be charged any amount calculated by the Usage Rate in the price plan.

❖ Example

The [Internal Reference](#) component `Internal Reference` is associated to the [Reference](#) `Accref1`, but the subscription mapping is empty.

⁸⁴ The charging process carries out the treatment as many times as necessary to find either a backup reference existing in the subscription mapping or the default charging reference of the internal reference dictionary.



When a call is rated and the charging plan identifies `Accref1`, the charging process checks that the reference `Accref1` exists in the subscription mapping. Because the subscription mapping is empty, the default account of the subscriber "Smith Family" is charged the calculated amount of the price plan.

❖ Example

The *Internal Reference* component `Family` account which was associated to the Reference `Accref1` is modified to be associated to the Reference "Accref3"; however, the subscription mapping is not modified, and the *Internal Reference Dictionary* of the charging plan contains the following list of references:

Charging reference	Charged on
Accref1	John
Accref2	Parents

Charging reference name	Backup reference
Accref1	Default Charging Reference
Accref2	Accref1
Accref3	Accref2

When a call is rated and the charging plan identifies "Accref3", the charging process does the following:

1. It checks that "Accref3" exists in the subscription mapping.
2. As "Accref3" does not exist in the subscription mapping, the charging process checks that "Accref3" is the default charging reference.
3. As "Accref3" is not the default charging reference, the charging process replaces "Accref3" by its backup reference ("Accref2") saved in the Internal reference dictionary.
4. The charging process checks that "Accref2" exists in the subscription mapping. As "Accref2" exists in the subscription mapping, the calculated amount of the price plan is charged to the related account "John" of the subscriber "Smith Family".

2.4.23.11.2 Setting Up a Charge in a Subscription

Create [page 710], open [page 713], or modify [page 714] a subscription before setting up a charge. A *Subscription* window must be open.

To set up a charge in a subscription

1. In the left pane of the subscription window, click .
2. Set up the following tabs of the charge: [Definition \[page 741\]](#), [Counters \[page 742\]](#), [Parameters \[page 743\]](#), [Translation Tables \[page 744\]](#), [Tier Tables \[page 745\]](#), [User Accesses \[page 747\]](#), [Charging Mapping \[page 748\]](#).
3. If necessary, [activate or deactivate \[page 750\]](#) the charge.

Note

- If the [User Access](#) tab of an activated charge is unavailable, this means the charge is a dependent charge.
- If the [Counters](#), [Parameters](#), or [Translation Table](#) tabs of an activated charge are unavailable, this means a counter, a parameter or a translation table was not created or used in the original charge.

2.4.23.11.3 Setting Up the Tabs of a Subscription Charge

Related Information

[Subscription Charge: Definition \[page 741\]](#)

[Subscription Charge: Counters \[page 742\]](#)

[Subscription Charge: Parameters \[page 743\]](#)

[Subscription Charge: Translation Tables \[page 744\]](#)

[Subscription Charge: Tier Tables \[page 745\]](#)

[Subscription Charge: User Accesses \[page 747\]](#)

[Subscription Charge: Mapping \[page 748\]](#)

2.4.23.11.3.1 Subscription Charge: Definition

[Create \[page 710\]](#) or [modify \[page 714\]](#) a subscription before [setting up \[page 740\]](#) a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the [Definition](#) tab.

In a subscription, you define a charge by specifying its validity dates, who will use it, and which accounts will be charged.

When defining a charge, different fields are mandatory depending on what type of charge it is. Non-mandatory fields can be filled in at a later date if necessary.

Definition tab

Fill in or modify the *Definition* tab.

i Note

The field *Service Provider* is empty and not mandatory because the default service provider is the one you have defined in the related offer. However, if you want to type a new service provider in a subscription, keep in mind that any change of the service provider in the related offer will no longer apply to the subscription.

Charge: Displays the name of the original charge. Click  if you want to view and [modify \[page 583\]](#) the original charge.

i Note

About currencies.

- The list of currencies is available only if the [Multicurrency \[page 584\]](#) option is associated to the related offer. If the related offer is associated to a specific currency, the subscription is associated to the same currency, and the list of currencies is unavailable.
- The currency cannot be changed once the subscription has been created.

Currency: Provides the list of currencies. Select the currency that you want to associate to the subscription.

Effective Date: Click the calendar button , and then select a date from the grid on which the subscription to the charge will start.

Expiration Date: Date on which the subscription to the charge is no longer valid. This field is not mandatory.

Cancellation Date: Select the date on which the subscription to the charge is cancelled by the subscriber. Cancellation may trigger a [One-Shot Rate component \[page 573\]](#) if it is scheduled in the charge.

2.4.23.11.3.2 Subscription Charge: Counters

[Create \[page 710\]](#), or [modify \[page 714\]](#) a subscription before [setting up \[page 740\]](#) a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the *Counters* tab.

In a charge of a subscription, you can redefine a counter that was created in the original charge.

The list of the counters created for the original charge is displayed on the *Counters* tab. Each row in the list represents a counter that you can redefine.

Counters tab

Fill in or modify the *Counters* tab.

State: Provides a drop-down list. Select *Redefined* if you want to modify the value of the counter.

Name: Displays the counter name.

Description: Displays the description of the counter.

Value: After you select *Redefined* in the *State* column, type the new value for the counter.

i Note

- When you save the subscription, even though you have redefined a charge counter, you will find that the state of the counter has reverted to *Not Redefined*. The modification is taken into account immediately by the system; therefore, the counter value remains dependent of the rating process.
- You can continue redefining counter values in a charge after the subscription containing it has been saved.

2.4.23.11.3.3 Subscription Charge: Parameters

Create [page 710], or modify [page 714] a subscription before setting up [page 740] a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the *Parameters* tab.

In a charge of a subscription, you can redefine a parameter that was created in the original charge.

The list of the parameters created for the original charge is displayed on the *Parameters* tab. Each row in the list represents a parameter that you can redefine.

Parameters tab

Fill in or modify the *Parameters* tab.

State: Provides a drop-down list. Select *Redefined* if you want to modify the value of the parameter.

Name: Displays the parameter name.

Description: Displays the description of the parameter.

Type: Displays the type of the parameter. *Special types* [page 574] are converted to string type.

Value: After you select *Redefined* in the *State* column, type the new value for the parameter.

i Note

You can continue redefining parameters in a charge after the subscription containing it has been saved.

2.4.23.11.3.4 Subscription Charge: Translation Tables

Create [page 710], or modify [page 714] a subscription before setting up [page 740] a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the *Translation Tables* tab.

In a charge of a subscription, you can add content to a translation table. The additions and modifications that you make only apply inside this subscription and do not affect the data in the original translation table.

Translation Tables tab

Fill in or modify the *Translation Tables* tab.

Instance Name: Provides the list of all the translation table instances created at original suboffer level. Select the translation table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a translation table in the *Instance Name* list, you can create additional content that you add to the original content. The additional content does not modify the original translation table.

You can add one or more rows to the translation table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information

from external .CSV type files by clicking .

Use the icons to fill in the translation table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.

Use the following icon...	To...
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or . When you click , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.11.3.5 Subscription Charge: Tier Tables

Create [page 710], or modify [page 714] a subscription before setting up [page 740] a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the *Tier Tables* tab.

Tier Tables tab

→ Remember

When setting up a tier table, you can:

- Replace the default group by a new group
- Create discontinuous intervals
- Arrange the rows of a group in any order

At subscription level, remember that the interval $]-\infty, +\infty[$ is not mandatory and the intervals that you define in the tier table of the offer are processed before the intervals of the original tier table.

Fill in or modify the *Tier Tables* tab.

Instance Name: Provides the list of all the tier table instances created at suboffer level. Select the tier table which you want to add content to.

Instance: Ignore this field which is not available on this tab.

Specific Instance: Once you have selected a tier table in the *Instance Name* list, you can create additional content that you add to the original content. The additional content does not modify the original tier table.

You can add one or more rows to the tier table, and then fill in the cells of each row with appropriate values. Instead of manually typing all of the information in the columns, you can import existing information from

external .CSV type files by clicking .

Use the icons to fill in the tier table:

Using the Icons

Use the following icon...	To...
	Add a new row to the configuration table.
	Delete a row from the table.
	Add a new group to the table.
	Delete a group from the table.
	Move a row up.
	Move a row down.
	Import data into the table according to the CSV format.(*)
	Clear all the table.
	Search for a numerical or string value in the table. The search stops when the first occurrence has been found. When the search is successful, the cell is highlighted. To find the next occurrence, use  or  . When you click  , a <i>Search in table</i> dialog box is displayed. In the <i>Search</i> field, type the value to search for or select a value in the list. If you want to do a case-sensitive search, click the <i>Match case</i> option. In the <i>Search in column(s)</i> check boxes, select the columns where you want to search for the numerical or string value.

Use the following icon...	To...
	Search for the next occurrence towards the top of the table if the previous search with the icon  was successful. The search is performed from left to right, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the beginning of the table is reached, a message informs you that the value has not been found.
	Search for the next occurrence towards the bottom of the table if the previous search with the icon  was successful. The search is performed from right to left, row by row. Each time that you click  , the cell is highlighted if the search is successful. When the end of the table is reached, a message informs you that the value has not been found.

2.4.23.11.3.6 Subscription Charge: User Accesses

Create [\[page 710\]](#), or modify [\[page 714\]](#) a subscription before [setting up \[page 740\]](#) a charge in a subscription.

In the left pane of the subscription window, click a charge  to view, and then open the *User Accesses* tab.

In a subscription containing one or more charges, you can create one or more user accesses for each master charge. By creating more than one user access for the same customer, you allow the customer to use the service under various identities.

❖ Example

John Smith uses three different identities to access a telephone service depending on his location. His unique identifiers consist of his phone numbers at home, at work and at his hotel. At invoice or reporting time, all the transactions made under each of his identities can be aggregated.

→ Remember

You can assign user accesses to master charges only. At least one user access is required per [Usage Rate component \[page 573\]](#) included in master charges.

For more information about accesses, click [here \[page 752\]](#).

User Accesses tab

Fill in or modify the table of user accesses.



: Click to [create](#) and [set up \[page 758\]](#) a new access. By default, the access window is filled in with the identifiers of the subscription and the charge.

Start Date: Displays the beginning of the time period during which the user access is assigned to the subscription charge.

End Date: Displays the end of the time period during which the user access is assigned to the subscription charge.



Access: Displays the name of the access user. Click [modify](#) and [set up \[page 758\]](#) the user access.

i Note

The [User Accesses](#) tab is not refreshed automatically when modifying or saving an access. To refresh the tab, click a component in the offer tree, and then click the charge relating to the tab.

2.4.23.11.3.7 Subscription Charge: Mapping

[Create \[page 710\]](#), or [modify \[page 714\]](#) a subscription before [setting up \[page 740\]](#) a charge in a subscription.



In the left pane of the subscription window, click a charge [to view](#), and then open the [Charging Mapping](#) tab.

In a charge of a subscription, you can assign an account and credit limit balances of a [subscriber account \[page 668\]](#) to a reference of a [charging plan](#). When a calculation is carried out in the [price plan \[page 570\]](#), the charging plan charges the calculated amount to the account and optionally to the credit limit balances of the subscriber account according to the charging mapping.

If neither the reference defined in the charging plan nor its back-up reference is linked to an account in the subscription mapping, the charged account will be the default account of the subscriber account.

Charging Mapping tab

Use the table and its icons to create links between charging references and accounts.



: Click to add a row to the table.



: Click to delete a row from the table.

Fill in each row that you add to the table:

Charging Reference: Select the charging reference defined in the charging plan.

Charged On: Select the prepaid or external account defined in the subscriber account. The charged account is debited each time the charging plan identifies the corresponding Charging Reference.

Credit Limit Balance: Select the credit limit balance defined in the subscriber account. The credit limit balance is debited each time the charging plan identifies the corresponding Charging Reference.

2.4.23.12 Using the Action Menu

Related Information

[Subscribing to a Suboffer \[page 749\]](#)

[Activating a Charge \[page 750\]](#)

[Changing the Version of a Subscription \[page 750\]](#)

[Sorting Charges \[page 751\]](#)

[Hiding Expired Charges \[page 751\]](#)

2.4.23.12.1 Subscribing to a Suboffer

In a subscription, you can activate a suboffer that is defined as [optional \[page 640\]](#) in the original offer. Once the subscription is activated, you can [set it up \[page 729\]](#) if necessary.

Before performing this task, you must:

- [Open \[page 713\]](#) an existing subscription
- Or [create \[page 710\]](#) a new subscription

To activate a suboffer in a subscription

1. In the subscription tree, right-click the dimmed suboffer icon .
2. Select Subscribe To Suboffer. The dimmed suboffer icon changes to an activated state .

This procedure can also be used to activate subscription multiple suboffers from dimmed  to activated .

→ Remember

You can only deactivate a suboffer or a multiple suboffer in a new subscription that have not saved yet.

To deactivate an activated suboffer or multiple suboffer

1. Right-click the activated suboffer or the multiple suboffer.
2. Clear the [Subscribe To Suboffer](#) command.

2.4.23.12.2 Activating a Charge

In a subscription, you can activate a suboffer that is defined as [optional \[page 640\]](#) in the original offer. Once the subscription is activated, you can [set it up \[page 740\]](#) if necessary.

Before performing this task, you must:

- [Open \[page 713\]](#) an existing subscription
- Or [create \[page 710\]](#) a new subscription

i Note

In a subscription, you must [activate \[page 749\]](#) the suboffer before activating its charges.

To activate a charge in a subscription

1. In the subscription tree, right-click the dimmed charge icon .
2. Select [Activate Charge](#). The dimmed charge icon changes to an activated state .

→ Remember

You can only deactivate a charge in a new subscription that has not saved yet. No charge can be deactivated in an existing subscription.

To deactivate an activated charge

1. Right-click the activated charge.
2. Clear the [Activate Charge](#) command.

2.4.23.12.3 Changing the Version of a Subscription

The procedure is the same for changing the version of an object (refer below if necessary).

Change the Version of an Object

When you open an object, you can access its versions by clicking the [Change Version](#)  icon on the toolbar.

Modifying and saving an object modifies the [Change Version](#) list by adding a new version, deleting one or more existing versions, or overwriting some existing versions.

i Note

If you save an object with a specified date/time in the past, the system deletes all its versions whose date/time is later than the specified date/time.

2.4.23.12.4 Sorting Charges

If a subscription contains a large number of charges, you can sort all the charges in alphabetical order depending on both the [Name](#) and [Description](#) fields.

i Note

If all the charges have the same name, fill in the [Description](#) field to differentiate the charges.

To sort charges in a subscription

1. [Open \[page 713\]](#) an existing subscription.
2. On the [Action](#) menu of the main window, select [Sort Charges](#).

When the sort is complete, if you filled in the [Description](#) field, the subscription tree displays all the charge names sorted and concatenated with the value of the [Description](#) field. For example, Training - Internet, Training - Intranet, Training - Network.

2.4.23.12.5 Hiding Expired Charges

In a subscription, you can choose to not display charges that are no longer valid because of their expiration date. Hiding expired charges makes the subscription tree more readable when it is complex.

To hide expired charges in a subscription

1. [Open \[page 713\]](#) an existing subscription.

2. On the [Action](#) menu of the main window, select [Hide expired charges](#).

2.4.24 Accesses

In SAP Convergent Charging 5.0, an access grants a license to an end customer of the service provider to access and use its customer services. In return for this service usage, the access identifies the business agreement that is charged for this consumption.

An access specifies:

- Technical data that includes:
 - A technical identifier of the customer service ([Service ID \[page 758\]](#))
 - A technical identifier under which an end customer consumes the service ([Setting Up an Access \[page 758\]](#))
- Business agreement data: Each [charge of a subscription \[page 721\]](#) that is configured to price usage rates corresponding to the consumption of the customer service.

At runtime, the SAP CC system uses the access information to determine the fees to charge and to identify the [subscription \[page 700\]](#).

⚠ Caution

Accesses related to provider contracts are automatically created and maintained by the SAP CC system. Creating, modifying, or deleting accesses may result in inconsistencies between these two systems. We strongly recommend that you do not modify or delete existing accesses except under support supervision.

In a subscription containing one or more charges, you can create one or more user accesses for each master charge. By creating more than one user access for the same customer, you allow the customer to use the service under various identities.

A user access consists of a user (service) identifier, a service identifier, and a master charge from the subscription. The combination of the user and service identifiers must be unique for a given period of time within the SAP CC system (this combination can however be simultaneously defined for several distinct periods of time).

❖ Example

As outlined in the Training Services subscription, the company Techlingua would like to grant server access to five people. Some of these five people travel regularly and therefore need to consult this server from their company workstations or mobile phones. For these people, Techlingua sets up two accesses:

- One access via the workstation
- One access via the mobile phone number

i Note

If you are associated to a [pricing catalog \[page 400\]](#), you can only open accesses relating to this catalog.

→ Remember

A "No access" message returned by SAP CC indicates either that:

- the ID pair is not assigned to any access at all
- the ID pair exists but none of its assignment periods include the consumption date

Access version and chronology

The pair User Service Identifier (USID)/Service Identifier identifies each user access in the back-end database. Furthermore, SAP Convergent Charging allows you to assign user accesses to subscriptions depending on time periods. The same user access can be divided chronologically into time periods that do not overlap. You can assign each time period of the same user access to a different or same subscription. For example, you can divide the user access USI1/SI1 into two time periods:

- First time period: From 01 January to 01 February
- Second time period: From 02 February to an unspecified date

You can then assign each time period of the user access USI1/SI1 to a different subscription.

Because user accesses are arranged into a chronological order, the time periods cannot overlap but can be discontinuous. For example, you can divide the user access USI2/SI2 into third periods:

- First time period: From 01 May to 01 June
- Second time period: From 01 August to 01 September
- Third time period: From 01 November to 01 December

Note

- The access chronology is optional. You can select a subscription and a charge without selecting a time period. This option means that the user access can be assigned to the subscription or the provider contract for an unlimited time period.
- You can create user accesses that are related to no subscriptions in order to keep user accesses for later use.

Example

A customer wants to change a 5 free MMS plan into a 20 free MMS plan on January 1st. In this example, the price plan includes the same service (MMS). Processing possible delayed MMS messages requires to divide the same user access into time periods. This case requires January 1st as the end date of the first user access while the start date of the second access is after January 1st.

Where to create or modify user accesses

Note

You cannot manually create or modify a user access in a provider contract.

You can [create](#) or [modify](#) user accesses at two levels:

- From the *File* menu
- In a subscription

2.4.24.1 Working with Accesses

Related Information

[Creating an Access](#)

[Opening an Existing Access](#)

[Selecting an Access \[page 756\]](#)

[Modifying an Access](#)

[Setting Up an Access \[page 758\]](#)

[Deleting an Access \[page 759\]](#)

[Saving an Access \[page 759\]](#)

2.4.24.1.1 Creating an Access

You can create or modify a user access from the *File* menu.

→ Remember

You can assign user accesses to master charges only.

From the File menu

To create a user access from the File menu

1. From the menu bar in the main window, select **File > New > Access**. The *Choose owner* dialog box opens.
2. In the *Owner of Object* drop-down menu, select the owner of the access.
3. Click *OK*. The *New Access* window opens.
4. [Set up \[page 758\]](#) the user access.
5. Verify the user access structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 759\]](#) the user access.

In a subscription

→ Remember

After [creating a subscription \[page 710\]](#), the *User Accesses* tab is available only after you save the subscription.

Before adding a user access to a [master charge in a subscription \[page 721\]](#), you must:

1. [Create a master charge \[page 580\]](#) containing a usage rate.
2. [Create an offer \[page 623\]](#) containing the charge
3. [Create a subscription \[page 710\]](#) to the offer and [save \[page 717\]](#) the subscription.
4. Select the master charge  in the subscription tree.

To create a user access in a subscription

1. Make sure that the subscription is open; otherwise, [open the subscription \[page 713\]](#) and select the master charge to which you want to assign a user access.
2. Click the *User Accesses* tab.
3. On the *User Accesses* tab, click  to add a user access to the table. The *New Access* window opens.
4. [Set up \[page 758\]](#) the user access.
5. Verify the user access structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 759\]](#) the user access.

2.4.24.1.2 Opening an Existing Access

You can open an existing user access:

- From the *File* menu
- In a subscription

To open an existing user access from the File menu

1. From the menu bar in the main window, select **File > Open > Access** . The *Open Access* dialog box opens.
2. [Select \[page 756\]](#) the user access that you want to open. The access window is displayed.

To open an existing user access in a subscription

1. [Open \[page 713\]](#) the subscription.
2. Select the master charge from which you want to modify a user access.
3. Click the [User Accesses](#) tab.
4. On the [User Accesses](#) tab, select the user access that you want to modify by clicking the icon  in the [Access](#) column of the table. The access dialog box opens.

2.4.24.1.3 Selecting an Access

You must [open](#) or [modify](#) an existing user access to open the [Select an Access](#) window.

Select an Access window

The [Select an Access](#) window consists of two areas:

- The top half is the filter area, which allows you to select a user access by using filter criteria.
- The bottom half of the window is the results area, which displays the search results that you perform.

Once a search is complete and the results are displayed, select a user access, and then click [OK](#).

i Note

You can select a user access with or without using a filter. Use the arrows  if you want to hide or show the filter area or the results area.

Filter area

The [Basic](#) tab allows you to find user accesses depending on search criteria. Each pair (User Service Identifier, Service Identifier) identifies a unique object "user access" in the database.

[User Service Identifier](#): Provides a list of search comparators such as [Equals](#), [Is Like](#)⁸⁵, [Starts With](#), [Ends With](#), or [Contains](#). Select a search comparator, and then type in the last field the string that you want to search in the database. For example, if you want to find all user service identifiers containing the string `John`, you select the [Contains](#) option, and then type `John`.

[Service Identifier](#): Provides a list of search comparators such as [Equals](#), [Is Like](#), [Starts With](#), [Ends With](#), or [Contains](#). Select a search comparator, and then type in the last field the string that you want to search in the

⁸⁵ If you choose the [Is Like](#) comparator, you can type "*" to represent a number of characters and "?" to represent a single character.

database. For example, if you want to find all service identifiers containing the string `John`, you select the *Contains* option, and then type `John`.

Results area

This area displays the results search. Click the icon  to display the type of information that you want to view.



: Click to start a search.



: Click to delete the results list.



: Click to move to the previous page if the results list is large.



: Click to move to the next page if the results list is large.

2.4.24.1.4 Modifying an Access

You can open an existing user access:

- From the *File* menu
- In a subscription

To modify an existing user access from the File menu

1. *Open* the user access.
2. *Set up* [page 758] the user access.
3. Verify the user access structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. *Save* the user access.

To modify a user access in a subscription

1. *Open* [page 755] the user access.
2. *Set up* [page 758] the user access.
3. Verify the user access structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.

4. [Saving an Access \[page 759\]](#) the user access.

2.4.24.1.5 Setting Up an Access

[Create](#), [open](#), or [modify](#) a user access before setting it up. An [Access Window](#) must be open.

To set up a user access, you first identify it, and then if necessary, you define time periods during which the user access is assigned to one or more charges relating to subscriptions. You perform the operation in two halves of this window.

i Note

The fields [User Service Identifier](#) and [Service Identifier](#) are unavailable (dimmed) when you modify a user access.

Top Half of the Access Window

Fill in or modify the fields below.

[User Service Identifier](#): Type the identifier of the end customer (aka user) who will use the usage-based service. For example, a technical ID such as an MSISDN number or an IP address.

[Service Identifier](#): Type the identification code of the service consumed by the end customer. For example, Telecommunications or Internet services.

Bottom Half of the Access Window

Fill in or modify the table to define time periods.



: Click to add a new row to the table.



: Click to delete a row from the table.

A user access can be assigned to one or more charges relating to subscriptions during a time period delimited by a start date/time and an end date/time. The start date/time is mandatory except for the first time period. The end date/time is mandatory except for the last time period.

i Note

You can:

- Leave the table empty. This means that the user access is assigned to no charge. This option allows you to create user accesses for later use.
- Add only a row to the table, and then select a subscription and a charge without selecting a time period. This option means that the user access is assigned to a charge for an unlimited time period.

Start Date: Click  to select the beginning of the time period during which the user access is assigned to the charge.

End Date: Click  to select the end of the time period during which the user access is assigned to the charge.

Subscription: Click  to choose a provider contract to which you want to assign the user access. After you select the provider contract, click  to view it if necessary.

Charge: Once you have selected the subscription, click  to display the charges relating to it, and then click the master charge to which you want to assign the user access.

2.4.24.1.6 Saving an Access

Once you have created or modified a user access, you are ready to save it. You can save the user access to either the database or as an XML file on your hard disk.

To save a user access to the database

1. From the menu bar in the main window, select **File > Save > In the Database**. The *Access Creation* dialog box opens to inform you that the user access has been successfully saved.
2. Click *OK*.

To save a user access as an XML file

1. From the menu bar in the main window, select **File > Save > In a File**. The *Save* dialog box opens.
2. Select a directory to save the user access.
3. In the *File name* field, type the name of the file.
4. Click *Save*. The user access is saved as an XML file in your selected directory.

2.4.24.1.7 Deleting an Access

Use this procedure to delete a user access.

To delete a user access

1. From the menu bar in the main window, select **File > Delete > Access**. The *Delete Access* dialog box opens.
2. [Select \[page 756\]](#) the user access that you want to delete.
3. Click *Delete*. A deletion dialog box asks if you want to delete the user access.
4. Confirm the user access deletion by clicking *Yes*. A dialog box confirms the successful deletion.

2.4.25 Users

SAP CC Core Tool uses your logon and password to give you a unique user ID. Only user administrators can configure [new users \[page 764\]](#) for SAP Convergent Charging 5.0.



An **SAP CC user** in SAP Convergent Charging (SAP CC) is:

- A **person**, an *individual user* who works with the user interfaces delivered with the SAP Convergent Charging software product.
- A **machine**, a *service user* that connects to and communicates with the SAP Convergent Charging systems through different technical interfaces.

SAP Convergent Charging manages the security for the SAP CC systems and gradually controls the accesses for the individual users and service users.

This machine or this person is:

- Authorized to work with the SAP Convergent Charging systems.
- Granted with [one or more roles \[page 761\]](#) in the organization.
- Assigned or not to a [unique pricing catalog \[page 400\]](#) to define some restrictions on the following master data:
 - Data that belongs to this service pricing catalog, which is owned by the service provider for the services to monetize
 - Data that is related to the end customers (subscriber accounts, for example) and that is associated to the pricing catalog for these services. It belongs to the end customers of the service provider company.

i Note

To restrict access and control rights to users, you can also associate a [list of authorized accesses \[page 766\]](#) with each user.

When the *Core Tool* user interface is running, you cannot log on to it by using another user name/ID. To change the user ID, you must close Core Tool and relaunch it with the user ID and password of the new user.

More Information

Consult the SAP CC [Security Guide](#) for more information and user assistance.

Related Information

[User Roles \[page 761\]](#)

[Working with SAP CC Users \[page 763\]](#)

2.4.25.1 User Roles

In SAP Convergent Charging, **roles are predefined levels of authorizations** that grant SAP Convergent Charging users specific access and control rights in the SAP CC systems. Permitted operations depend on these levels.

The various roles that are available and the level of authority associated with each role is listed in the table below.

As a user administrator (or system administrator), you [manage \[page 763\]](#) the users and their granted roles to conform to your global security policy.

→ Remember

- If you are assigned a user administrator role, inform your system administrator before changing your password. The system administrator must update a specified configuration file (refer to the [Installation and Upgrade Guide](#)) each time you change your password.
- You are not allowed to modify provider contracts in Core Tool in a production system landscape. You can only view the provider contract. To modify a provider contract, you must use a CRM application or an external provisioning system connected to SAP Convergent Charging.

Role	Authorized Domain	Authorized Action
Administrator	All	- User management Operations: - Audit management - Bulk operation management - Rerating management - Refresh rating instance - Export/import public holidays - Specific tasks when using administrative tools of SAP CC (refer to the SAP CC)
User Administrator	Users	- Create and delete SAP CC users - Modify password or user roles - Lock and unlock a user

Role	Authorized Domain	Authorized Action
Customer Sales Representative (CSR)	Provider contracts, accesses, subscriber mapping tables, subscriber range tables, subscriptions	Customer master data - Create, modify, and delete customer master data [page 374] or subscription. Master data Display these objects in the pricing catalogs (master data [page 373]) and in business data [page 376].
Marketing	Charge plans, Refill plans, offers	Create, modify, and delete objects in the pricing catalogs (master data [page 373]) and in business data [page 376] .
Process Manager	Business functions	Use the operations via the Web Services technical interface to trigger business and technical operations such as: - Provider contract activation - Charged item bulk loading - Subscriptions
Batch Rating Administrator	Batch rating and charging	- Log on to the BART user interfaces: BART Tool [page 6] and BART+ [page 1003] - Perform all actions related to batch operations (refer to the SAP CC BART Tool [page 6] documentation) - Connect the SAP CC BART Server system to the SAP CC Core Server system (refer to the SAP CC Tuning Guide)
Remote Support	All	Read-only rights relating to the data and configuration of SAP CC (refer to the SAP CC Security Guide)
Message Charging Client	The Message TCP technical interface	Allow a service user to establish an authenticated connection to the Message TCP technical interface of SAP CC (refer to the SAP CC Security Guide). The login and the password are required only if the MESSAGE_API_AUTHENTICATION_REQUIRED parameter is set to true (refer to the SAP CC System Parameter Reference).

2.4.25.2 Changing Your Password

You use the *Changing Password* window:

- When you want to change your password
- When a new password is required⁸⁶

To change your password, you access the *Changing Password* window from the menu bar in the main window.

On the menu bar, select **File** > *Change Password* to open the *Changing Password* window.

i Note

All the rules regarding passwords are determined and set up by your SAP CC system administrator. The administrator configures the system to apply the global security policy of your company. For more information, refer to the administrator for SAP Convergent Charging 5.0 in your SAP system landscape.

Changing Password (Window)

Fill in the *Changing Password* window.

Old Password: Type the old password that you want to change.

New Password: Type your new password.

Retype New Password: Retype your new password.

→ Tip

You can contact your user administrator to reset your password.

Related Information

Concepts

[Password Management Policy](#)

2.4.25.3 Working with SAP CC Users

As a user, you cannot neither view nor change any user settings. Only the user administrator and the system administrator can manage these settings and grant some roles to you for example. Note that they can reset your user password.

- [Changing Your Password \[page 763\]](#)

⁸⁶ The *Changing Password* window can be displayed depending on the rules defined by your administrator.

As a user administrator or a system administrator, you manage your SAP CC users with the Core Tool user interface.

New User Configuration	User Operations	User Maintenance
• Creating a User for SAP CC [page 764] • Setting Up a User [page 766] • Saving a User [page 769]	Basic • Granting Roles to a User [page 767] • Assigning a User to a Unique Pricing Catalog [page 768] • Locking or Unlocking a User [page 768] User's password: • Forcing a Password Change for an Individual User [page 768] • Changing or Resetting Passwords for Your Users [page 769]	• Opening an Existing User [page 765] • Modifying a User [page 765] • Deleting a User [page 770]

2.4.25.3.1 Creating a User for SAP CC

i Note

Only system administrators and user administrators are authorized to create users for SAP Convergent Charging.

When you create an SAP CC user, you must do the following:

- Choose whether or not to add password protection.
- [Grant \[page 767\]](#) at least one role to the new SAP CC user.
- [Assign or not \[page 768\]](#) this new user to a pricing catalog.

→ Tip

If you create a user for the [Web Services](#) technical interface of SAP Convergent Charging, refer to the [SAP CC 5.0 Security Guide](#) for more information and user assistance.

Create an SAP CC User

1. From the menu bar in the main window, select **File > New > User**. The *New User* window is displayed.
2. [Set up \[page 766\]](#) the new user for SAP CC.
3. [Save \[page 769\]](#) the user.

Related Information

[User Roles \[page 761\]](#)

[Users \[page 760\]](#)

2.4.25.3.2 Opening an Existing User

i Note

Only administrators and user administrators are authorized to view users.

You can open an existing SAP CC user saved in the back-end database.

Open an Existing User Saved in the Database

1. From the menu bar in the main window, select **File > Open > User**. The *Open User* dialog box is displayed.
2. Select the SAP CC user that you want to open, and then click *OK*. The window of the selected user is displayed.
3. [View \[page 766\]](#) or edit the user settings.

Related Information

[Modifying a User \[page 765\]](#)

[Deleting a User \[page 770\]](#)

2.4.25.3.3 Modifying a User

i Note

Only administrators and user administrators are authorized to view/modify users for SAP Convergent Charging.

Modify an Existing User

1. [Open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.
2. [Set up \[page 766\]](#) this user.
3. [Save \[page 769\]](#) the SAP CC user.

Related Information

[Granting Roles to a User \[page 767\]](#)

[Assigning a User to a Unique Pricing Catalog \[page 768\]](#)

2.4.25.3.4 Setting Up a User

[Create \[page 764\]](#) or [open \[page 765\]](#) an SAP CC user before setting it up. A *User* window must be open.

User (Window)

Fill in or modify the *User* window.

Log On: Type the unique identifier of the new user for your SAP Convergent Charging system landscape. This identifier will be used by the user to log on to the SAP CC user interfaces (Cockpit, Core Tool) or to connect to SAP CC systems. SAP CC systems authenticate users by checking their user credentials (ID/name, password).

With Password: This field is available only when you create a user for the first time. Click this option to create the password authentication for the new user, and then type the initial password in the *Password* field.

Password: Type a legible password for the user if you have clicked the *With Password* option.

SAP CC systems authenticate users by checking their user credentials (ID/name, password).

Catalog: Only available when the user administrator that creates a new user or modifies an existing one is not associated to a catalog. Select the [unique pricing catalog \[page 400\]](#) to assign to the SAP CC user for whom you want to define some restrictions on master data related to a service provider (pricing catalog) or related to its end customers (subscriber accounts, provider contracts, and so on).

Modify Password: This field is available after an SAP CC user is created and saved in the back-end database. Click this option to modify the user's password, and then type the password in the *Password* field.

Lock User: This field⁸⁷ is available only after a user is created and saved in the database. Click this option if you want to lock the user. If locked, no operation is possible as long as the user is locked. Only an administrator or a user administrator can unlock a user.

⁸⁷ This field must be configured by your administrator to be displayed in the window. For more information, refer to your administrator.

Force Password Modification: This field⁸⁸ is only relevant for individual users and is used to force these typical users to change their passwords next time they log on to an SAP CC user interface. This field is automatically checked:

- After an individual user is created
- Every time the password of an individual user has been changed

Security Profile:

- **Individual user:** This option applies a strong password policy for the user. We recommend using this option for individual users. The strong password policy includes:
 - Password expiration and locking policy if the system is configured according to the security policy for user passwords.
 - High complexity for password encryption. You can configure it at system level.
- **Service User:** This option deactivates the strong password policy for the user. Password expiration and locking policy are not applied. The complexity of password encryption is adapted to service (technical) users. You can configure it at system level. We recommend not using this option for individual users.

i Note

- If you change the security profile of the user, the complexity of password encryption is not modified immediately. It changes when the user changes the password.
- If the user isolation feature is enabled, you cannot change your own security profile. For further information about this feature, refer to the SAP CC [Security Guide](#).

Roles: Click one or more checkboxes corresponding to the [roles \[page 761\]](#) that you want to assign to the user for SAP Convergent Charging. The roles granted to the user define the subset of authorizations to perform certain operations.

Related Information

[Users \[page 760\]](#)

2.4.25.3.5 Granting Roles to a User

As a user administrator (or system administrator), you must assign or reassign [roles \[page 761\]](#) to an SAP CC user.

Grant Roles to an SAP CC User

1. [Create \[page 764\]](#) or [open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.

⁸⁸ This field must be configured by your administrator to be displayed in the window. For more information, refer to your administrator.

2. In the *User* window, [set up \[page 766\]](#) this user by clicking the necessary *Roles* checkboxes. This selection defines the associated authorizations and permitted operations.
3. [Save \[page 769\]](#) the SAP CC user.

2.4.25.3.6 Assigning a User to a Unique Pricing Catalog

As a user administrator, you can assign an SAP CC user to a [unique pricing catalog \[page 400\]](#).

❖ Example

Set up this assignment to a service user that is dedicated to the communications through the *Web Services (WS)* technical interface.

Set up the assignment to an individual user who must be associated and restricted to a single catalog and must not see any other data.

Assign an SAP CC User to a Pricing Catalog

1. [Create \[page 764\]](#) or [open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.
2. In the *User* window, [set up \[page 766\]](#) this user by selecting the relevant pricing catalog in the *Catalog* field to define the association and restriction.
3. [Save \[page 769\]](#) the SAP CC user.

2.4.25.3.7 Locking or Unlocking a User

As a user administrator, you can lock or unlock your users for SAP Convergent Charging.

Lock an SAP CC User

1. [Open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.
2. In the *User* window, [set up \[page 766\]](#) this user by clicking the *Lock User* checkbox.
3. [Save \[page 769\]](#) the SAP CC user.

2.4.25.3.8 Forcing a Password Change for an Individual User

As a user administrator (or system administrator), you can force an individual user to change the user's password next time they log on to an SAP CC user interface.

Force the Password Change

1. [Open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.
2. In the *User* window, [set up \[page 766\]](#) this user by clicking the *Force Password Modification* checkbox.
3. [Save \[page 769\]](#) the SAP CC user.

2.4.25.3.9 Changing or Resetting Passwords for Your Users

As a user administrator (or system administrator), you can change or reset a user password for SAP Convergent Charging.

Reset a User Password

1. [Open \[page 765\]](#) an SAP CC user in the *Core Tool* user interface.
2. In the *User* window, [set up \[page 766\]](#) this SAP CC user by clicking the *Modify Password* checkbox and typing a new password or a reinitialization password.
3. [Save \[page 769\]](#) the SAP CC user.
4. Inform your individual SAP CC user about the changes or contact the relevant stakeholder about changes for a service user that is used by interfaced systems or applications.

2.4.25.3.10 Saving a User

i Note

Only administrators and user administrators are authorized to save users for SAP Convergent Charging.

Use this procedure to save an SAP CC user into the back-end database.

Save a User into the Database

1. From the menu bar in the main window, select **File > Save > In the Database** or click the *Save into Database* button on the toolbar. A confirmation message is displayed.
2. Click *OK*.

2.4.25.3.11 Deleting a User

Note

Only administrators and user administrators are authorized to delete users.

To delete an existing user, complete the following steps.

Delete an Existing User

1. From the menu bar in the main window, select **File > Delete > User**. The *Delete User* dialog box is displayed.
2. Select the user you want to delete, and then click *Delete*. A message is displayed and asks you to confirm that you want to delete the selected user.
3. Verify the selected user and choose one of the following actions:
 - To abandon the deletion, click *No*.
 - To delete the selected user, click *Yes*. If you click *Yes*, the user is deleted and the *User Deletion* dialog box opens to inform you that the user has been successfully deleted.
4. Click *OK*.

Caution

You cannot delete your own user.

2.4.26 Audits



An **audit** in SAP Convergent Charging (SAP CC) is an administration object that facilitates your manual inspections by configuring a custom audit filter. You can [create \[page 771\]](#) an audit object to search efficiently for audited user operations in the back-end database. According to the criteria of the audit object, you can [search for \[page 825\]](#) and [view \[page 825\]](#) all user operations that can be audited by the SAP CC system. User operations are treatments that are processed by the SAP CC system as requested by the SAP CC users (service users, individual users).

For example, creating an object is a user operation.

Audit data recordings are stored in the database if the audit functions are enabled in the SAP CC Core Server system. For more information, refer to your administrator and consult the SAP CC [Tuning Guide](#).

The elements of the *Audit* window enable you to create an audit object. Using specific filters, an audit allows administrators to query the database of the SAP CC system for a user operation search. You can retrieve specific user operations by using a filter. The filter consists of criteria rows that specify the characteristics of the audited user operations you want to retrieve.

You can audit:

- Any operation that modifies the back-end database
- Any operation that modifies the state of the SAP CC system
- Any operation that relates to security (SAP CC user authentication)
- Any unsuccessful operation

→ Remember

- The operations that do not modify the database can be audited only if they have failed.
- You can audit bulk operations.
- You can audit mass and bundle operations as sets of single operations. Multiple audited operations relate to the same mass (or bundle) operation.
- You cannot audit the single charging operations, but you can audit the rerating operations.

Refer to the SAP CC [Application Help](#) for more information and user assistance about:

- The audit concept, features, and functions
- The specificities and conditions
- The notes and recommendations

Related Information

[Viewing Operations \[page 825\]](#)

2.4.26.1 Working with Audits

Related Information

[Creating an Audit \[page 771\]](#)

[Opening an Existing Audit \[page 772\]](#)

[Modifying an Audit \[page 773\]](#)

[Setting Up an Audit \[page 773\]](#)

[Deleting an Audit \[page 775\]](#)

[Saving an Audit \[page 775\]](#)

2.4.26.1.1 Creating an Audit

Use one of these procedures to create an audit. After creating an audit, you can [search \[page 825\]](#) for audited operations based on this audit object.

To create an audit

1. From the menu bar in the main window, select **File > New > Audit**. The *New Audit* window opens.
2. [Set up \[page 773\]](#) the audit.
3. Verify the audit structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save](#) the audit.

You can create an audit by opening an existing audit and copying it.

To create an audit from an existing audit

1. From the menu bar in the main window, select **File > Open > Audit**. The *Choose an Audit* dialog box opens.
2. Select the audit to copy.
3. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding audit window opens.
4. Rename the audit in the *Code* field, and then make other changes as necessary - see [modifying an audit \[page 773\]](#) for details.
5. Verify the audit structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
6. [Save \[page 775\]](#) the audit.

2.4.26.1.2 Opening an Existing Audit

You can open:

- An existing audit saved in the database
- An existing audit saved in an XML file

To open an existing audit saved in the database

1. From the menu bar in the main window, select **File > Open > Audit**. The *Open Audit* dialog box opens.
2. Select an audit.
3. Click *Open*. The corresponding audit window opens.

To open an existing audit saved in an XML file

Opening an existing object saved in an XML file

When you open an XML file, the window displays the object as a new object, to which you must assign a new identifier if you want to save the object to the back-end database.

i Note

- If several versions of the object are already stored in XML files, you can open only the oldest version.
- In the *Open Parameters* dialog box, the *Open as Sub-Element of Current Object* option is used only when you want to [insert the price plan \[page 593\]](#) of a charge into an existing charge.

Open an Existing Object Saved in an XML File

1. From the menu bar in the main window, select **File > Open > From File** . The *Open* window opens.
2. Open the directory in which the object is saved, and then select the object file.
3. Click *Open*. The *Open Parameters* dialog box opens.
4. Select the *Open as New Object* option.
5. Select the object that you want to insert.
6. Click *Open*. A window displays the object as a new object.

2.4.26.1.3 Modifying an Audit

You can modify the date on which the audit starts, its description, and all fields on the *Filters* tab. Once you save your changes, you cannot access the previous versions of an audit.

To modify an audit

1. [Open \[page 772\]](#) an audit.
2. [Set up \[page 773\]](#) the audit.
3. Verify the audit structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save \[page 775\]](#) the audit.

2.4.26.1.4 Setting Up an Audit

[Create \[page 771\]](#), [open \[page 772\]](#), or [modify \[page 773\]](#) an audit before setting it up. An *Audit* window must be open.

Audits are triggered cyclically to extract user operations from the database; therefore, an audit is defined by:

- The start date of the first audit
- The frequency of the next audits
- The set of filters that are used for extracting specific user operations

Audit window

Fill in or modify the *General* tab and the *Filters* tab in the audit window.

General tab

Code: Type the unique identifier of the audit.

Description: Type a description of the audit if necessary.

Original Date: Click  to select the start date of the first audit. By default, the current date is displayed.

Frequency: Provides the list of time periods to trigger the next audits. Select one of the following frequencies: *Daily*, *Weekly*, *Biweekly*, *Monthly*, *Bimonthly*, *Quarterly*, *Semiannual*, or *Yearly*.

Depending on the frequency that you choose, the three fields below display the dates of the last audit and the next audit.

Beginning of Last Audit: Displays the date on which the last audit started.

End of Last Audit: Displays the date on which the last audit stopped or will stop.

Next Audit Date: Displays the date on which the next audit starts.

Filters tab

The *Filters* tab allows you to create audit criteria for extracting user operations from the database.

Fill in or modify the table.



: Click to add a row to the table.



: Click to delete a row from the table.

Operation: Select the type of the user operation to be audited.

User: Select the name of the user to be audited.

Type: Select "successful operations" or "failed operations".

Operand: Select *any value* to audit all the operands, or select *literal value* to audit the operands that match a particular value. Operands are the external or internal references of objects to be audited.

i Note

About operand definitions.

- The external reference of an object is its user-defined name such as the name of the chargeable item class or the name of the charge plan.
- The internal reference of an object is its key in the database.

2.4.26.1.5 Saving an Audit

Once you have created or modified an audit, and then verified its structure, you are ready to save it. You can save the audit to either the database or as an XML file on your hard disk.

To save a new audit to the database

1. From the menu bar in the main window, select ► **File** ► **Save** ► **In the Database** ►. The *Audit Creation* dialog box opens.
2. Click **OK**.

To save an audit as an XML file

1. From the menu bar in the main window, select ► **File** ► **Save** ► **In a File** ►. A confirmation dialog box opens.
2. Click **OK**. The *Save* dialog box opens.
3. Select a directory to save the audit.
4. In the *File name* field, type the name of the file.
5. Click **Save**. The audit is saved as an XML file in your selected directory.

2.4.26.1.6 Deleting an Audit

Use this procedure to delete an audit.

To delete an audit

1. From the menu bar in the main window, select ► **File** ► **Delete** ► **Audit** ►. The *Delete Audit* dialog box opens.

2. Select the audit to be deleted.
3. Click [Delete](#). A dialog box opens asking you to confirm your choice.
4. Confirm the audit deletion by clicking [Yes](#). A dialog box confirms that the audit has been successfully deleted.

2.4.27 Change Lists and Transport Requests

You create a change list when you want to transport a consistent subset of catalog objects to target SAP CC systems (as destinations) by using:

- A transport request triggered with SAP CC Core Tool
- Or a transport operation in SAP Solution Manager (with [Transport Organizer Web UI](#) and an SAP CTS+ plugin)

The content of a change list export can also be reimported into SAP Convergent Charging using the [Import](#) feature.

→ Recommendation

Whenever several related catalog objects must be retrieved together, exporting the whole change list is strongly recommended: it is easier than exporting the objects separately, and it also helps you to preserve the integrity of your catalog, as each export or import operation handles the entirety of the change list's object set.

→ Remember

In SAP Convergent Charging, a change list is not just a "list of changes". A change list is a real object. It includes many cross-referenced objects and versions.

A **change list** is a "container" including some master data that the SAP CC user selects in order to transport data between systems. The selectable data is:

- Offer
- Pricing macro
- Translation table
- Tier table
- Mapping table class
- Mapping table
- Range table class
- Range table
- Chargeable item class
- Charged item class
- Charged item aggregation policy
- Charge
- Charge plan
- Refill item class
- Refill record class

- Refill logic
- Refill plan
- Allowance event class
- Allowance logic
- Allowance plan
- Monitoring plan

i Note

A change list contains all the versions of the data objects. Any change to these versions after creating the change list has no impact on its content.

A change list can also include dependent objects such as:

- Billable Item Mapping
- Consumption Item Mapping
- Allowance Interface
- Counter Name Dictionary
- Refill Record Mapping
- Spending Status Description

i Note

Dependent objects can be included in a change list automatically. For example, adding a charge plan to a change list may include the charges, the mapping tables, the range tables, and the other objects directly and indirectly referenced by this charge plan.

Related Information

[Catalog Transport](#)

2.4.27.1 Working with Change Lists

Related Information

[Creating a Change List \[page 778\]](#)

[Setting Up a Change List \[page 780\]](#)

[Saving a Change List \[page 781\]](#)

[Finding a Change List \[page 779\]](#)

[Opening an Existing Change List \[page 779\]](#)

[Exporting a Change List and Included Data \[page 785\]](#)

[Deleting a Change List \[page 782\]](#)

2.4.27.1.1 Creating a Change List

Use the following procedure to create a change list.

i Note

Once you have saved a change list, you can no longer modify it.

Create a Change List

1. From the menu bar in the main window, select **File > New > Change List**. The *New Change List* window opens.
2. [Set up \[page 780\]](#) the change list.
3. Verify the change list structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
4. [Save \[page 781\]](#) the change list. If you save the change list to the database, you are asked to [configure and process \[page 782\]](#) the transport requests that you need.

→ Tip

You can create an change list by opening an existing change list and copying it.

Create a Change List from an Existing Change List

1. From the menu bar in the main window, select **File > Open > Change List**. The *Choose a Change List* dialog box opens.
2. [Search for \[page 779\]](#) the change list.
3. Select the change list to copy.
4. Select the *Open a Copy* checkbox, and then click *Open*. The corresponding *Change List* window opens.
5. [Set up \[page 780\]](#) the change list.
6. Verify the change list structure by clicking the *Verify* icon  on the main window toolbar. Correct all elements underlined in red.
7. [Save \[page 781\]](#) the change list.

2.4.27.1.2 Opening an Existing Change List

The *Choose a Change List* dialog allows you to find the change list that you want to open from the back-end database.

Open a Change List saved in the Database

1. From the menu bar in the main window, select **File > Open > Change List**. The *Open Change List* dialog box opens.
2. [Search for \[page 779\]](#) the change list that you want.
3. Select the change list, and then click *Open*. The *Change List* window opens.

2.4.27.1.3 Finding a Change List

To search for a change list, you perform the operation in two halves of the *Choose a Change List* dialog:

- The top part of the dialog is the filter area, which allows you to find a change list by using filter criteria. The information in the *Basic* and *Advanced* tabs is combined during the search operation.
- The bottom area of the dialog is the results area, which displays the search results that you perform.

You can find change lists with or without using search criteria. If you do not use search criteria, click  to start the search. If you use search criteria, set up the *Basic* and *Advanced* tabs, and then click  to start the search. The change lists are displayed in the results area. To display more columns of information in the results area, click , and then select the types of information you want to display.

The Choose a Change List dialog

Use the following icons:



: To start a new search whether you use search criteria or not.



: To delete the results list and reset the filter.



: To move to the next page. This button is available when the results list is large.



: To move to the previous page. This button is available when the results list is large.

Basic Tab

The *Basic* tab allows you to search for change lists depending on a name.

Name: Is the identifier of the change list. In the drop-down list, select a search comparator such as *Equals*, *Is Like*, *Starts With*, *Ends With*, or *Contains*. In the next field, type the string that you want to search in the back-end database. For example, if you want to find all provider contracts containing the letters **eric**, you select the *Contains* option, and then type **eric**.

Advanced Tab

To find change lists, the *Advanced* tab allows you to create a table with one or more search criteria based on additional information. To add a row to the table, click the *More* button. To delete a row from the table, click the *Less* button.

i Note

- If the criteria table comprises several rows and if you want to delete a row, the *Remove* dialog box opens to display the identifier names. Select the row that you want to delete from the table, and then click *OK*.
- If you choose the *Is Like* comparator when building criteria rows, you can type "*" in the right-hand field to represent a number of characters and "?" to represent a single character.

Each row of the table consists of three fields. To set up a row, do the following:

1. In the first field, select a search criterion such as *Add. Info (String)*, *Add. Info (Number)*, or *Add. Info (Date)* in the list of identifiers.
2. In the second field, select a search comparator such as *Equals*, *Is Like*, or *Starts With* for example.
3. In the third field, select or type the string that you want to find in the database.

2.4.27.1.4 Setting Up a Change List

Create [page 778] a new change list before setting it up. A *Change List* window must be open.

To set up a change list, you first identify it, and then you add the data objects to the list.

Name: Type the unique identifier of the change list.

Description: Type a description of the change list if necessary.

User Login: The SAP CC user who created the change list.

Creation Date: The date and time at which you have saved the change list. Note that this date/time is only displayed after saving the change list.

Objects

The *Objects* area allows you to add objects to the change list from a catalog, remove any object from the change list, and view the snapshot of objects after saving the change list.



Click to add a new object to the list. This button opens the *Choose Object* window, in which you select the owner of the catalog and the object to add to the list. You can also select the *Include the Dependent Objects* option that adds all the dependent objects of the selected object to the list.



: Click to remove the selected objects from the list.

i Note

You can only remove objects that are not dependent on other objects.



: Click to open the selected object and view its snapshot. You can click this button only after saving the change list.

Code: The identifier of the object.

Type: The type of the object.

2.4.27.1.5 Saving a Change List

Save a New Change List to the Database

1. From the menu bar in the main window, select **File > Save > In the Database**.
2. The *Change List Creation* dialog box opens to inform you that the change list has been successfully created and that you can [configure and process \[page 782\]](#) the transport requests that you need.
3. Click *Configure* if you want to configure transport requests. Otherwise, click *No*.

Save a Change List as an XML File

1. From the menu bar in the main window, select **File > Save > In a File**. A confirmation dialog box opens.
2. Click *OK*. The *Save* dialog box opens.
3. Select a directory to save the change list.
4. In the *File name* field, type the name of the file.
5. Click *Save*. The change list is saved as an XML file in your selected directory.

⚠ Caution

Do not use this XML file with the *Transport Organizer Web UI* user interface of the SAP CTS system that is integrated with your SAP CC system.

2.4.27.1.6 Deleting a Change List

⚠ Caution

There is no “undo” function in SAP Convergent Charging. Before deleting an object, make sure that this action is necessary.

Use the following procedure to delete a change list.

Delete a Change List

1. From the menu bar in the main window, select **File > Delete > Change List**. The *Delete Change List* dialog box opens.
2. [Search \[page 779\]](#) for the change list to delete.
3. Select the change list to be deleted.
4. Click *Delete*. A dialog box opens asking you to confirm your choice.
5. Confirm the change list deletion by clicking *Yes*. A dialog box confirms that the change list has been successfully deleted.

2.4.27.2 Using the Action Menu

Use the *Action* menu of the user interface to manage your change lists and transport requests.

Related Information

[Managing the Transport Requests \[page 782\]](#)

[Exporting a Change List and Included Data \[page 785\]](#)

2.4.27.2.1 Managing the Transport Requests

Prerequisites

- You have saved the [change list \[page 776\]](#) in the back-end database system.

- The system administrator has defined and configured the list of transport destinations for sending the subset of object versions to a remote SAP CC system. If this operation is not already done, refer to the [Tuning Guide](#) for more information.
- Make sure that the system scheduler is configured if you want to schedule the execution of transport requests. For more information, refer to the [Tuning Guide](#).

Manage the Transport Requests

You can configure, run, schedule, monitor, or delete a transport request when:

- [Saving \[page 781\]](#) a change list to the back-end database.
- [Opening \[page 779\]](#) the main window of an existing change list by selecting *Configure Transport Requests* in the *Action* menu.

i Note

On the main window toolbar, you can click  to configure the transport requests related to the change list.

Transport Requests (Window)

The *Transport Requests* window allows you to execute the transport requests. If necessary, you can schedule the execution of the transport requests.

The buttons *Schedule* and *Execute* are available only if you select an item in the *Transport Destination Alias* column and if the scheduler and the list of transport destinations are correctly configured.

Change List: Displays the [change list \[page 776\]](#) to be sent to the transport destination. Click  to open the change list.

Use the following buttons:

Schedule: Schedules the transport requests for the selected transport destinations. This button is not available if the status of the selected transport destinations is “Scheduled” or “In process”.

Unschedule: Unschedules the transport requests of the selected transport destinations. This button is available only if the status of the selected transport destinations is “Scheduled”.

Execute: Executes the transport request according to the selected transport destinations. This button is not available if the status of the selected transport destinations is “In process”.

The transport requests table contains the following columns:

Transport Destination Alias: Displays the alias of the transport destination to which the change list (and related master data) is sent.

Creation Date: Displays the creation date and time of the transport request.

Execution Status: Displays the execution status of the transport request for the selected transport destination. The execution statuses mean the following:

- **None**: The change list has not been yet sent to the transport destination.
- **Scheduled**: The change list will be sent when the scheduler is triggered.
- **In Process**: The change list has been sent to the transport destination asynchronously, and the transport destination has not yet responded (or the response has not been received).
- **Successful**: The change list has been successfully sent to the transport destination.
- **Failed**: An error has occurred while sending the change list to the transport destination. Verify the error information ([Error Category](#), [Error Description](#)) and retry the operation or troubleshoot the issue.

Error Category: Displays the error category if the transport request failed to execute the change list according to the selected transport destination. The categories mean the following:

- **Authentication Failure**: A failure such as an invalid password, a wrong user ID, and so on, has occurred.
- **Communication Failure**: A failure such as a network issue has prevented the connection to the target SAP CC system.
- **Invalid**: A master data included in the change list is not configured correctly.
- **Incompatible Configuration**: The configuration of the target SAP CC system is not compatible with a master data included in the change list.
- **Illegal State or Temporary Illegal State**: The change list has not been sent to the target SAP CC system because of its state.

Error Description: Displays the error message if the transport request failed to execute the change list according to the selected transport destination. You can click the message to display a dialog with more information about the error, which is often an error code. See [Troubleshooting Transport Requests \[page 785\]](#).

Last Send Date: The date and time when the transport request was last sent.

Response Date: The date and time when the last response of the transport destination was received.

Transport Requests window buttons

Use the following buttons:

Save To File: To save the transport request and its associated destination statuses to a file. Click this button to open the directory in which you want to save the file. Type the name of the file, and then save the file. The execution history of the transport requests is stored in this saved file.

Refresh: To view the last status of the transport requests. Click this button when you want to refresh the status.

Close: To close the [Transport Status](#) window in the user interface.

Note

- Refreshing a transport request whose status is **In Process** re-sends the transport request and modifies the related **Last Send Date** information. A transport request is executed only once even it is sent many times.
- If a change list has been sent to a transport destination that does no more exist in the SAP system landscape, the associated transport request is dimmed (not available) and can no more be selected.

Related Information

[Change Lists and Transport Requests \[page 776\]](#)

2.4.27.2.1.1 Troubleshooting Transport Requests

As a system administrator or a pricing specialist, you troubleshoot some issues by investigating the discovered symptoms.

See the following situations:

Failure	Possible Reasons or Investigations
Authentication Failure	<i>Authentication Failure</i> can concern failures such as invalid password, wrong logon, and so on.
Communication Failure	<i>Communication Failure</i> can be due for example to a network issue preventing the connection to the target SAP CC system.
Invalid	<i>Invalid</i> means that a master data included in the change list is invalid and cannot be applied in the target SAP CC system.
Incompatible Configuration	<i>Incompatible Configuration</i> means that the configuration of the target SAP CC system is not compatible with a master data included in the change list.
Illegal State	<i>Illegal State</i> means that the change has not been applied because of the overall state of the target SAP CC system itself. Contact the system administrators.
Temporary Illegal State	<i>Temporary Illegal State</i> means that the change has not been applied because of the overall state of the target SAP CC system itself. This system state is temporary, please try again later.

2.4.27.2.2 Exporting a Change List and Included Data

Use this procedure to be able to transport consistent objects (master data, business data) with SAP CTS in SAP Solution Manager to the target SAP CC systems in your landscapes.

[Create \[page 778\]](#) or [open \[page 779\]](#) a change list before exporting it. A *Change List* window must be open.

Export a Change List Object to a File

1. From the menu bar in the main window, select **Action > Export Change List**. The *Save* dialog box opens.
2. Select a directory to export the change list as a file.

Caution

The file includes some business information and data from the pricing catalog and from the system.

3. In the [File name](#) field, type the name of the file.
4. Click [Save](#). The change list is exported as an XML file in your selected directory.

Next Steps

To transport the master data, use this exported XML file with the [Transport Organizer Web UI](#) user interface in SAP Solution Manager when the SAP CTS system is integrated with your SAP CC 5.0 Core Server system.

Otherwise, contact the individual who is responsible for the transport operations with SAP CTS.

→ Recommendation

To ease the attach operation, choose a file name as descriptive and as unique as possible to give SAP CTS users the possibility to attach the adequate change lists to the transport operations. Do not hesitate to use timestamps or any other information which can identify a file and avoid errors during the selection.

2.4.28 Edit

In the menu bar, the [Edit](#) menu groups some basic editing functions, user interface preferences, and the verification tool.

In the menu bar, the [Edit](#) menu enables you to:

- Edit the objects (cut, copy, paste).
- [Verify \[page 789\]](#) these objects.
- [Change your user interface preferences and options \[page 787\]](#). These settings are defined for the user interface and not for a particular SAP CC user.

[Copy \[page 786\]](#)

[Preferences \[page 787\]](#)

[Verify \[page 789\]](#)

Related Information

[Main Window \[page 386\]](#)

2.4.28.1 Copy

[Copying and Pasting a Catalog Object \[page 408\]](#)

2.4.28.2 Preferences

The preferences represent some of the options of Core Tool and are saved in the local configuration file of the user interface. The preferences only relate to the installed Core Tool user interface and not to a specific SAP user.

Depending on how you (or the system administrator) install Core Tool, the preferences can be:

- Shared by several SAP users if Core Tool is installed in a public folder. In this case, we highly recommend to check the preferences every time you start the Core Tool program to ensure that no change occurred since your last logon.
- Specific to each SAP user if Core Tool is installed in a private folder. For example, the home folder of a user.

→ Tip

For more information about the installation of the Core Tool user interfaces, refer to the SAP CC [Installation and Upgrade Guide](#).

For more information about the configuration of the Core Tool user interface, refer to the SAP CC [Tuning Guide](#).

Tasks

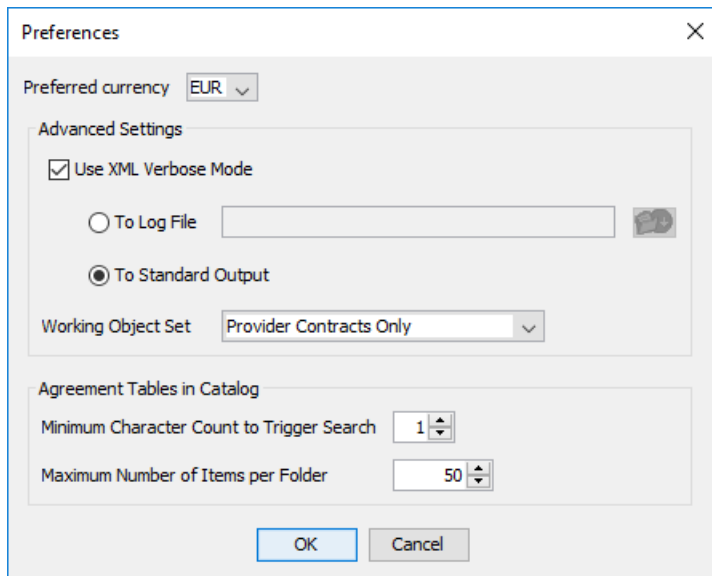
- [Setting Up the Preferences \[page 787\]](#)

2.4.28.2.1 Setting Up the Preferences

You can change some options of your installed Core Tool user interface by using the [Preferences](#) window in the [Edit](#) menu.

i Note

Before changing an option, read the topic for the [Edit menu \[page 786\]](#).



Window: Preferences

The [Preferences](#) window allows you to change:

- The default currency displayed in any list of currencies of Core Tool
- The destination of the XML messages exchanged by your Core Tool user interface and the SAP CC system
- The subset of master data that SAP CC users can work with throughout Core Tool
- The settings for agreement tables search and display in the catalog view

Preferred Currency: Provides the list of currencies. Select the currency that you want to use as the default one in Core Tool.

Advanced Settings

- **Use XML Verbose Mode:** Select one of the following options to save the XML log messages
 - **To Log File:** Stores the exchanged XML messages to a log file. Type the folder path and the file name where the XML messages will be saved or click  to select a file.
 - **To Standard Output:** Sends the exchanged XML messages to the console of your application. For MS Windows operating system, the console is not visible by default.
- **Working Object Set:** Provides the list of master data subsets featured by SAP Convergent Charging. Select a master data subset that you want to work with in the SAP system landscape:
 - **Provider Contracts and Subscriptions:** You work with [master data \[page 373\]](#) dedicated to convergent charging services based both on either provider contracts or subscriptions. You use this mode for the user interface if your SAP CC system stores data for both data models (DMs) or if the charging process is only based on subscriptions.

Your Core Tool user interface is able to manage all types of data.

- **Provider Contracts Only:** You work with master data dedicated to convergent charging services based on charge plans and allowance plans (in service pricing catalogs) and provider contracts for end customers.

Refer to the documentation: [SAP CC 5.0 Primary Help for Core Tool \(New Data Model Only\)](#). Select your software version.

As of release 2.0, SAP Convergent Charging supports two data models (DMs).

- New data model: reusable charges, charge plans, allowance plans (as of release 5.0), subscriber accounts, provider contracts with allowances
- Former data model: reusable charges, offers, subscriber accounts, subscriptions

Subscriber accounts are part of both data models.

i Note

If you change the working object set, a message informs you that Core Tool must be restarted to apply the new configuration.

- **Agreement Tables in Catalog:** In an integrated *SAP Solution*, determines the triggering of a search and the display of agreement tables in the catalog view:
 - **Minimum Character Count to Trigger Search:** Choose the number of characters to type to trigger a search for agreement tables in the SAP CC system (Core Server) and its back-end database.
 - **Maximum Number of Items per Folder:** Choose the number of subitems to be displayed in each item in the catalog view.

→ Recommendation

For a matter of GUI memory performances, the default values are set to:

- **1** for **Minimum Character Count to Trigger Search** (max. value is 99).
- **26** for **Maximum Number of Items per Folder** (max. value is 999).

It is preferable not to change these values.

→ Remember

As the catalog view is not dynamically refreshed, you need to close and re-open it if you change these values to have a consistent number of displayed items.

2.4.28.3 Verify

The Core Tool user interface provides you with tools to verify your data objects. Depending on the currently displayed window, this **Verify** submenu command may be dimmed.

The verification operations are crucial in SAP CC. Core Tool verifies the entered information and provides you with some guidance.

It identifies and highlights issues in red. Correct the elements that are underlined in red.

i Note

Consult the primary help for more information about the possible verifications, object by object.

→ Tip

Click the  **Verify** button on the main window toolbar [page 388].

2.4.29 Tools

In the menu bar, the [Tools](#) menu groups some useful tools.

The SAP CC Core Tool user interface provides you with useful functions for:

- Business operations (administration)
 - [Rerating \[page 790\]](#) consumption related to translation tables, offers and so on
 - [Refreshing \[page 803\]](#) the rater instances of the connected SAP CC system in a test system landscape
- Data maintenance
 - [Exporting \[page 818\]](#) or [importing \[page 818\]](#) public holidays
 - [Exporting \[page 821\]](#), [importing \[page 822\]](#), or [synchronizing \[page 823\]](#) currencies
 - [Editing](#) the counter dictionary
 - [Working \[page 804\]](#) with bulk operations
- Auditing operation
 - [Generating \[page 824\]](#) a license auditing file

Tool access

From the menu bar in the main window, select [Tools](#) and the operation you need.

2.4.29.1 Rerating

→ Remember

Rerating is not compliant with [shared allowances](#). When SAP Convergent Charging detects that a provider contract has created or used a shared allowance, the rerating process is rejected and an error message is displayed.

Business operation

During the production operation phase, as application administrator you may need to rerate data when exceptional mistakes or errors occur in offers, subscription, price plans, translation tables, and other data objects, resulting in incorrect transactions stored in the third-party billing system. Core Tool allows rerating all service usage events occurred within a default period of 70 days⁸⁹ preceding the current date.

⁸⁹ The period may be different in your SAP CC system. Get the current value of the COUNTER_SNAPSHOT_COUNT system parameter with the [Admin+](#) user interface. Refer to the SAP CC [Tuning Guide](#) for more information about the implementation of the rerating services in your system landscape.

❖ Example

Pricing errors can lead to erroneous rating calculations. For example, this situation can arise from an incorrect price plan, incorrect content in translation tables, or incorrect use of translation tables or pricing macros. This results in incorrect transactions stored in the third-party billing system.

Prerequisites

The [Chargeable Items Recharging](#) feature must be enabled. Refer to the [Application Help](#) for further information about this feature.

Authorization

You must have the [Administrator](#) role in your SAP CC user [\[page 760\]](#).

Rerating process

You initialize (and perform) the rerating process according to the following variants and options:

In an integrated [SAP Solution](#) scenario:

- With SAP CC BART Server: The BART Server system of SAP CC performs this process to rerate subscriptions and provider contracts in batch. You trigger this process from SAP CC Core Tool. BART Server works with SAP CC Core Server that works with SAP Convergent Invoicing in the SAP ERP/FI-CA system.
- With SAP Convergent Invoicing (in the SAP ERP/FI-CA system or SAP S/4HANA system) with consumption item management: SAP Convergent Invoicing in the SAP ERP system performs the rerating process. You can however trigger the rerating operations with the SAP CC Core Tool user interface or with SAP Convergent Invoicing. The rerating process only rerates provider contracts via the *Web Services* technical interface but does not rerate subscriptions.

In another scenario, SAP CC BART Server performs the rerating process and SAP CC Core Server must be interfaced with a third-party billing system. The implementation includes Java developments.

i Note

During the installation, you must select the configuration file of the SAP CC Core Server system to choose one of these options. For more information, refer to the SAP CC [Tuning Guide](#).

Rerating process managed by BART Server

The rerating process consists of nine steps performed by:

- The Core Server system (step 1, 2, 3, 4, 6, 7, 9)

- The BART Server system (step 8)
- The external billing system (step 5)

The steps are the following:

1. Selecting the subscription which must be rerated according to a search filter (for example, subscription, translation table, offer). If a [parent contract](#) or a [linked contract](#) is selected, all the collection linked contracts and their parent contract are included in this selection.
2. Sending the selected subscriptions to the BART Server system.
3. Synchronizing the bulkloaders to make sure that the billable items are sent to the external billing system before the beginning of the rerating operation.
4. Checking that the state of the subscriptions can be restored from the counter snapshots. If the state of a subscription cannot be restored, the subscription cannot be rerated and is erroneous.
5. Checking that the billable items can be reversed at a specified date, or proposing another date after the specified date if the billable items have already been billed.
6. Restoring the selected subscriptions to the state they had at the time of the specified date.
7. Sending the request to the external billing system for reversing the billable items generated by the selected subscriptions during the rerating period.
8. Rating the usage events related to each subscription.
9. Sending the rerated billable items to the external billing system.

When a translation table or a set of subscriptions is rerated, the related subscriptions are first restored, and then rerated by batch rating groups. The rerating process is completed when all the subscriptions have been successfully rerated.

i Note

- At step 8, the subscriptions are grouped by batch rating groups.
- The rerating process can only be stopped during step 6. Because the rerating process rates the batch rating groups of subscriptions, one after another, the rerating process stops after the current batch rating group is rerated.
- The rerating process is only available if the SAP Convergent Charging solution is configured to work together with SAP Convergent Invoicing. This process can be adapted to third party billing systems which are different from SAP Convergent Invoicing, but this configuration requires specific developments. For further information, please refer to your SAP consultants.
- For further information about the BART Server and the [BART Tool](#) components, refer to [the dedicated topic \[page 6\]](#).

Rerating process for SAP ERP/FI-CA

You can initialize the rerating process for SAP ERP/FI-CA by creating a rerating operation from the SAP CC Core Tool user interface. This operation enables SAP CC Core Server to send a list of provider contracts to SAP ERP/FI-CA for rerating purposes. When the operation is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server.

For more information about the rerating process, refer to the user assistance of SAP Convergent Invoicing (in the SAP ERP/FI-CA or SAP S/4HANA system. See [Help Resources \[page 383\]](#).

2.4.29.1.1 Working with Rerating Operations

Related Information

[Rerating from Provider Contracts \[page 793\]](#)

[Rerating from a Charge Plan \[page 794\]](#)

[Rerating from a Translation Table \[page 795\]](#)

[Rerating from a Tier Table \[page 796\]](#)

[Rerating from a Pricing Macro \[page 797\]](#)

[Rerating from a Mapping Table \[page 798\]](#)

[Rerating from a Subscriber Mapping Table \[page 799\]](#)

[Rerating from a Range Table \[page 800\]](#)

[Rerating from a Subscriber Range Table \[page 801\]](#)

[Viewing the Current Rerating Session \[page 802\]](#)

2.4.29.1.1.1 Rerating from Provider Contracts

Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Provider Contracts* window, you do the following:

1. Set up the rerating date, and then the search filter to find contracts to rerate depending on your criteria.
2. Rerate the contracts found by the search filter.

From the menu bar in the main window, select  **Tools**  **Rerating**  **From Provider Contracts** . The *Rerating from Provider Contracts* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁰ preceding the current date. Before being rerated, all the contracts found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a contract from the rerating date provided by the external billing system. In a set of contracts to rerate, all or part of billable items of any contract may have already been invoiced. For each of these contracts, the external billing system therefore provides a new date from which the contract can be rerated. If you do not select this option and if the billing system cannot rerate a contract from the date that you have selected, the rerating operation fails.

After you select a date, [set up](#) the search filter for finding the contracts to be rerated.

⁹⁰ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click *OK*. The *Operation Progress* dialog box opens to inform you that the provider contracts are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of provider contracts sent and the total number of provider contracts to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server. Click *Close* to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

2.4.29.1.1.2 Rerating from a Charge Plan

Note

- This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)
- Rerating is not compliant with a charge plan that uses shared allowances. If you try rerating this charge plan, the related dialog box informs you that the charge plan uses shared allowances, and you cannot start the rerating process because the *OK* button is not available. See the important note [about rerating \[page 790\]](#).

In the *Rerating from Charge Plan* window, you do the following:

1. Set up the rerating date, and then select a charge plan.
2. Rerate the contracts relating to the charge plan.

From the menu bar in the main window, select **Tools > Rerating > From a Charge Plan**. The *Rerating from Charge Plan* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹¹ preceding the current date. Before being rerated, all the contracts found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a contract from the rerating date provided by the external billing system. In a set of contracts to rerate, all or part of billable items of any contract may have already been invoiced. For each of these contracts, the external billing system therefore provides a new date from which the contract can be rerated. If you do not select this option and if the billing system cannot rerate a contract from the date that you have selected, then the rerating operation fails.

Charge Plan: Click  to display the catalog of service providers. Select a service provider, and then select a charge plan.

⁹¹ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the charge plan are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of charge plan sent and the total number of charge plan to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

2.4.29.1.1.3 Rerating from a Translation Table

i Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Translation Table* window, you do the following:

1. Set up the rerating date, and then select a translation table.
2. Rerate the subscriptions relating to the translation table.

From the menu bar in the main window, select **Tools > Rerating > From a Translation Table**. The *Rerating from Translation Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹² preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Translation Table: Click  to display the catalog of service providers. Select a service provider, and then select a translation table.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the

⁹² The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

translation table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of translation table sent and the total number of translation table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communications. Click [Close](#) to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

2.4.29.1.1.4 Rerating from a Tier Table

i Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Tier Table* window, you do the following:

1. Set up the rerating date, and then select a tier table.
2. Rerate the subscriptions relating to the tier table.

From the menu bar in the main window, select **Tools > Rerating > From a Tier Table**. The *Rerating from Tier Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹³ preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Tier Table: Click  to display the catalog of service providers. Select a service provider, and then select a tier table.

Buttons

OK: Click to send the selected subscriptions to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the tier table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of tier table sent and the total number of tier table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communications. Click [Close](#) to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹³ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.5 Rerating from a Pricing Macro

Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Pricing Macro* window, you do the following:

1. Set up the rerating date, and then select a pricing macro.
2. Rerate the subscriptions relating to the pricing macro.

From the menu bar in the main window, select **Tools > Rerating > From a Pricing Macro**. The *Rerating from Pricing Macro* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁴ preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Pricing Macro: Click  to display the catalog of service providers. Select a service provider, and then select a pricing macro.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the pricing macro are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of pricing macro sent and the total number of pricing macro to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹⁴ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.6 Rerating from a Mapping Table

Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Mapping Table* window, you do the following:

1. Set up the rerating date, and then select a mapping table.
2. Rerate the subscriptions relating to the mapping table.

From the menu bar in the main window, select **Tools > Rerating > From a Mapping Table**. The *Rerating from Mapping Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁵ preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Mapping Table: Click  to display the catalog of service providers. Select a service provider, and then select a mapping table.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the mapping table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of mapping table sent and the total number of mapping table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹⁵ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.7 Rerating from a Subscriber Mapping Table

i Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Subscriber Mapping Table* window, you do the following:

1. Set up the rerating date, and then select a subscriber mapping table.
2. Rerate the contracts relating to the subscriber mapping table.

From the menu bar in the main window, select **Tools** > **Rerating** > **From a Subscriber Mapping Table** . The *Rerating from Subscriber Mapping Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁶ preceding the current date. Before being rerated, all the contracts found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a contract from the rerating date provided by the external billing system. In a set of contracts to rerate, all or part of billable items of any contract may have already been invoiced. For each of these contracts, the external billing system therefore provides a new date from which the contract can be rerated. If you do not select this option and if the billing system cannot rerate a contract from the date that you have selected, then the rerating operation fails.

Subscriber Mapping Table: Click  to display the catalog of service providers. Select a service provider, and then select a subscriber mapping table.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the subscriber mapping table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of subscriber mapping table sent and the total number of subscriber mapping table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with SAP Convergent Invoicing. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹⁶ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.8 Rerating from a Range Table

Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Range Table* window, you do the following:

1. Set up the rerating date, and then select a range table.
2. Rerate the subscriptions relating to the range table.

From the menu bar in the main window, select **Tools > Rerating > From a Range Table**. The *Rerating from Range Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁷ preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Range Table: Click  to display the catalog of service providers. Select a service provider, and then select a range table.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the range table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of range table sent and the total number of range table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communication with the server. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹⁷ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.9 Rerating from a Subscriber Range Table

Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

In the *Rerating from Subscriber Range Table* window, you do the following:

1. Set up the rerating date, and then select a subscriber range table.
2. Rerate the subscriptions relating to the subscriber range table.

From the menu bar in the main window, select **Tools > Rerating > From a Subscriber Range Table**. The *Rerating from Subscriber Range Table* window opens. You perform the operation in this window.

Rerate From: Click , and then select a date within the period of 40 days⁹⁸ preceding the current date. Before being rerated, all the subscriptions found by the search filter are restored to the state they had at the selected date.

Adapt to External System Date: Select this option if you want to rerate a subscription from the rerating date provided by the external billing system. In a set of subscriptions to rerate, all or part of billable items of any subscription may have already been invoiced. For each of these subscriptions, the external billing system therefore provides a new date from which the subscription can be rerated. If you do not select this option and if the billing system cannot rerate a subscription from the date that you have selected, then the rerating operation fails.

Subscriber Range Table: Click  to display the catalog of service providers. Select a service provider, and then select a subscriber range table.

Buttons

OK: Click to send the selected contracts to SAP CC Core Server. The *Input* dialog box opens. Type the reason of the rerating operation, and then click **OK**. The *Operation Progress* dialog box opens to inform you that the subscriber range table are being sent to SAP Convergent Invoicing. A progress bar displays the instantaneous number of subscriber range table sent and the total number of subscriber range table to send (for example, 3,000/5,000). When the session is successfully completed, a message displays the rerating session identifier; otherwise, a message warns you that an error has occurred during the communications. Click **Close** to close the dialog box.

Cancel: Click to cancel all your changes, and then close the window.

⁹⁸ The default period can be changed. For more information, refer to the SAP CC [Tuning Guide](#).

2.4.29.1.1.10 Viewing the Current Rerating Session

i Note

This menu is available only if you change the configuration of the SAP CC Core Server system. For more information, refer to the SAP CC [Tuning Guide](#)

You can view the current rerating session. If no rerating session is in progress, a message displays that no rerating session is running. If a rerating session is in progress, the [Bulk Rerating](#) dialog box opens (see the process below if needed).

Bulk rerating

The [Bulk Rerating](#) dialog box displays information related to the rerating process in progress. This information is displayed in two different areas:

- The [Rerating Progress](#) area used to display information related to the different steps of the rerating process
- The [Subscription\(s\)/Contracts\(s\) Bulk Rerating Report](#) area used to display a global report containing details related to the rerating process

Rerating Progress

This area displays the following information:

- The lock code of the rerating process
- The different steps of the rerating process and their progress which display:
 - The number of charging contracts sent to the BART Server for rerating
 - The number of files of the bulk loader that are sent to the billing system
 - The number of charging contracts successfully locked
 - The number of days related to rerated CDRs (Consumption Detail Record)
 - The number of charging contracts successfully unlocked
- A progress bar which shows how the rerating process evolves over time

Subscription(s)/Contracts(s) Bulk Rerating Report

To display the global report of the rerating process, click the  button. The global report displays the status, the number, and the percentage of contracts relating to the rerating process. When the rating process is in progress, click  to refresh the list that displays the statuses of contracts and the progress rate.

The list of statuses is the following:

- [All](#): No filtering
- [Restored](#): Contracts for which counters were restored from a snapshot and which are ready to be rerated
- [Rerated](#): Contracts which were successfully rerated
- [Adapted](#): Contracts for which the billing system has suggested a date to reverse the charged items (this state is displayed if the user has chosen the [Adapt to External System Date](#) option)
- [Can be Adapted](#): Contracts for which the billing system has suggested a date to reverse the charged items (this state is displayed even if the user has not chosen the [Adapt to External System Date](#) option)

- **Snapshot failure:** Contracts for which counters could not be restored from a snapshot
- **Billing failure:** Contracts for which an error occurred in the billing system during the rerating process
- **Unlock failure:** Contracts which could not be unlocked
- **Prepaid Account Failure:** Contracts for which the rerating process has been triggered by a provider contract linked to a prepaid account (which is not expected to trigger the rerating process)

Buttons

Cancel: Click to cancel the rerating process. Before charging contracts are sent to the BART Server, you can cancel the rerating process. When charging contracts are being sent to the BART Server, you cannot cancel the rerating process, but you can only stop it. If you click the Stop button, the rerating process ends only when all the charging contracts of the current batch rating group are rerated. Therefore, the charging contracts of the next batch rating groups are not rerated.

Stop: Refer to the Cancel button.

Close: Click to close the dialog box. You can reopen the dialog box by using the menu ► **Tools** ► **Rerating** ► **View Current Rating Session Status** ►.

From the menu bar in the main window, select ► **Tools** ► **Rerating** ► **View Current Rating Session Status** ►.

2.4.29.2 Refresh Rating Instances

By default, when you modify or create a data object in the [pricing catalog \[page 400\]](#) such as an offer, a reusable charge, translation table, or a pricing macro, a few minutes are needed to update the convergent charging services in the connected SAP CC system. An internal scheduler ("Refresh Scheduler") or an external scheduler manages these data distribution operations inside the system.

If you need to update your SAP system quickly when working in a development or test system landscape, use this command [Refresh Rating Instances](#).

→ Tip

This command is also available in the SAP CC Admin+ user interface for administrators.

Refresh the Rater Instances of the SAP CC System

1. From the menu bar in the main window, select ► **Tools** ► **Refresh the Rating instances** ►. The **Question** dialog box is displayed to ask if you want to refresh all the rating instances⁹⁹ in the connected SAP CC system.
2. Click **Yes**. A confirmation message is displayed to inform you that the rater instances (and the bulkloader instances) have been refreshed in the SAP CC system.
3. Click **OK**.

⁹⁹ When SAP Convergent Charging (SAP CC) is connected to SAP Convergent Invoicing (in the SAP ERP/FI-CA or SAP S/4HANA system), the refresh operation forces also the update of the bulkloader instances in the SAP CC system.

Related Information

[Cached Structures Refreshing](#)

2.4.29.3 Bulk Operations

The SAP CC Core Tool user interface provides you with tools for processing [subscriptions \[page 700\]](#) in bulk mode.

You can [modify \[page 805\]](#) and [delete \[page 807\]](#) subscriptions in bulk.

Instead of modifying one object at a time, you first select a set of subscriptions according to criteria, and then apply the same changes to all the selected objects. For example, you select subscriptions, and then change some of their attributes.

Unlike a bulk process, a bulk operation cannot be resumed at the step where you stopped it.

Filtering

In each bulk operation, a filter allows you to define criteria to select subscriptions from customer master data.

❖ Example

For example, if you want to search for all the subscriptions containing the additional information **"Internet service"** related to the service provider **"FitPetHome"**, you must make a subscription filter that includes both the criteria [Additional Info](#) and [Service Provider](#).

2.4.29.3.1 Working with Bulk Operations

Related Information

[Modifying Subscriptions \[page 805\]](#)

[Deleting Subscriptions \[page 807\]](#)

2.4.29.3.1.1 Modifying Subscriptions

You can modify several [subscriptions \[page 700\]](#) at one time by performing a bulk operation on them.

From the menu bar in the main window, select **Tools > Bulk Operations > Modify Subscriptions**. The *Subscriptions Modification* window opens. For each bulk modification, you perform the operation in two halves of this window:

- The top half of the window allows you to identify and select the subscriptions to be modified
- The bottom half of the window allows you to describe the modification to apply to each of the selected subscriptions

Top half of the window

In the top half of the window, you do the following:

- Select the offer to identify the subscriptions
- Create the filter criteria to select the subscriptions; for example, all the subscriptions which contain a Telephone call charge where the Effective Date is after a specified date. If needed, you can combine several criteria. For example, you select all the subscriptions that have a cancellation date between two specified dates. You add two lines to the *Filter criteria* area by clicking the *More* button, and then you select the comparators *After* and *Before* to set the time period.

i Note

In the *Filter criteria* area, properties, counters, and additional information are items that can be compared with the row values to select subscriptions. Parameters cannot be used.

Offer: Click , and then select the offer to identify the subscriptions.

Filter Criteria: After you select the offer in the previous field, click the *More* button. A filter criteria row is added to the *Filter Criteria* area. In the first field of the filter criteria row, click , and then select all or part of the offer which will be used to filter the subscriptions. For example, you want to filter all subscriptions containing a telephone call charge. In the second, third, and fourth field of the filter criteria row, select the level of detail which will be used to filter subscriptions. To do that, you could select *Effective Date*, *After*, and then type a date. If necessary, add more filter criteria rows by clicking the *More* button. If you select an *Additional Information* field, type the date, the number, or the string to be searched for.

Bottom half of the window

In the bottom half of the window, you do the following:

- Select all or part of the offer related to subscriptions that you want to modify.
- Select the dates that you want to apply to the modification. This selection is useful to modify parameters only.

- Select the modification that you want to make on the subscriptions. For example, updating an Expiration Date.

Target: Click , and then select all or part of the offer related to subscriptions that you want to modify; for example, the Monthly Fees charge in those subscriptions. Parameters included in the offer or in the selected part of the offer will appear in the *Modification Criteria* area when clicking the *More* button

i Note

The fields *From* and *To* only apply to parameters that you select in the *Modification Criteria* area. Keep in mind that a parameter can take various values over time; therefore, when modifying a parameter, you specify the time period during which the modification will apply to the parameter. If the fields *From* and *To* are left blank, the parameter takes its new value from an unspecified date to an unspecified one.

From: Click , and then select a date from which the modification will apply to the selected parameters in the *Modification Criteria* area. For example, if the field is left blank, all the previous values taken over time by a parameter are deleted and replaced by the new parameter value until the date that you select in the *To* field.

To: Click , and then select a date until which the modification will apply to the selected parameters in the *Modification Criteria* area. For example, if the field is left blank, all the previous values taken over time by a parameter are deleted and replaced by the new parameter value from the date selected in the *From* field until an unspecified date.

Modification Criteria: After you select all or part of the offer in the *Target* field, click the *More* button. A modification criteria row is added to the *Modification Criteria* area. In the fields of the modification criteria row, select the element that you want to modify, the way it will be modified, and its value. For example, you can select *Expiration Date*, and then type a date, or you can select *Update*, and then type a value. If necessary, add more modification rows by clicking the *More* button.

Buttons

More: Click to add a row.

Less: Click to delete a row. The *Select Element to remove* dialog box opens. In the drop-down list, select the element that you want to delete, and then click *OK*.

OK: When clicking this button, a confirmation dialog box opens. Confirm the modification by clicking *Yes*. A dialog box opens and informs you how many subscriptions were modified by the bulk operation. Click *OK*.

Cancel: Click to cancel all your changes and close the window.

i Note

- If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features¹⁰⁰ and if there are unresolved prerating events for one of the subscriptions, modifying the subscription may mean that the postrating result will differ from the prerating result. If you attempt to modify a subscription with unresolved prerating events as part of a bulk subscription modification, you will be warned about the consequences of this action, though you will be permitted to continue with the modification process if you wish to.

¹⁰⁰ The notes are equally true for the [session-based charging \[page 364\]](#) feature. For example, if there are pending sessions, modifying the subscription may result in errors.

- If your configuration of SAP Convergent Charging uses the prerating and postrating feature, avoid doing the following bulk modifications:
 - Modifying a parameter and setting the From field to a date before the last prerating
 - Modifying the cancellation date, the suspension date, or the expiration date to a date before the last prerating
- As subscriptions are being modified, a progress bar in the confirmation dialog box displays the progress of the modification process. You can cancel the bulk modification at this point by clicking [Cancel](#). When the [Cancel](#) button becomes an [OK](#) button, the process is finished, and you can no longer cancel it.
- Modification (or the cancellation of modification) of a large number of subscriptions can take a long time.
- If the modification of a subscription fails, a message is displayed, and the bulk modification of the entire group of subscriptions is canceled.

2.4.29.3.1.2 Deleting Subscriptions

You can delete several [subscriptions \[page 700\]](#) at one time by performing a [bulk operation \[page 804\]](#) on them. You first select an offer to identify the related subscriptions, and then you use a filter to define which subscriptions will be deleted.

i Note

There is no “undo” function in SAP CC Core Tool. Before deleting multiple objects, make sure that this operation is necessary.

From the menu bar in the main window, select **Tools** > **Bulk Operations** > **Delete Subscriptions**. The **Subscriptions Deletion** window opens. You perform the operation in this window.

Subscriptions Deletion window

Fill in or modify the **Subscriptions Deletion** window.

Offer: Click , and then select an offer to identify the related subscriptions.

Filter Criteria: After you select an offer in the previous field, click the [More](#) button. A filter criteria row is added to the **Filter Criteria** area. In the first field of the filter criteria row, click , and then select the part of the offer used to filter the subscriptions to be deleted. In the second, the third, and the fourth field of the filter criteria row, select the level of detail used to filter subscriptions; for example, you could select [Expiration Date](#), [After](#), and then type a date. If necessary, add more filter criteria rows by clicking [More](#).

More: Click to add a row.

Less: Click to delete a row. The **Select Element to remove** dialog box opens. In the drop-down list, select the element that you want to delete, and then click [OK](#).

OK: When clicking this button, a confirmation dialog box opens to confirm the deletion. Click [Yes](#). A dialog box opens and informs you how many subscriptions were deleted by the bulk operation. Click [OK](#) to close the dialog box.

Cancel: Click to cancel all your changes and close the window.

i Note

- If your configuration of SAP Convergent Charging uses the [prerating and postrating \[page 362\]](#) features¹⁰¹ and if there are unresolved prerating events for one of the subscriptions, deleting the subscription may mean that the postrating result will differ from the prerating result. If you attempt to modify a subscription with unresolved prerating events as part of a bulk subscription modification, you will be warned about the consequences of this action, though you will be permitted to continue with the modification process if you wish to.
- As subscriptions are being deleted, a progress bar in the confirmation dialog box displays the progress of the modification process. You can cancel the bulk deletion at this point by clicking [Cancel](#). When the [Cancel](#) button becomes an [OK](#) button, the process is finished, and you can no longer cancel it.
- Deletion(or the cancellation of deletion) of a large number of subscriptions can take a long time.
- If the deletion of a subscription fails, a message is displayed, and the bulk deletion of the entire group of subscriptions is canceled.

2.4.29.4 Public Holidays

SAP Convergent Charging provides you with function for setting up public holidays known by the SAP CC system. Public holidays information is used by the SAP CC system when processing the pricing logic configured in the [price plan \[page 570\]](#), the [charging plan](#), or the [refill logic](#) during the charging and refilling processes.

i Note

Public holidays information is part of the [business data \[page 376\]](#) configured in the complete SAP CC system. It is not included in the [pricing catalog \[page 400\]](#) of a service provider.

Transport

You can transport this business data between SAP CC systems:

- [Export \[page 818\]](#) public holidays
- [Import \[page 818\]](#) public holidays

¹⁰¹ The notes are equally true for the [session-based charging \[page 364\]](#) feature. For example, if there are pending sessions, deleting the subscription may result in errors.

2.4.29.4.1 Setting Up Some Public Holidays

During the project implementation phase or the production operation phase, you maintain the public holidays defined in the SAP CC systems.

To set up the public holidays:

- [Export \[page 818\]](#) the public holidays from the system to an XML file.
- Edit the exported XML file and change it. For details and examples on the XML syntax to be used, see [XML File Format for the Public Holidays \[page 809\]](#).
- [Import \[page 818\]](#) the public holidays.

2.4.29.4.1.1 XML File Format for the Public Holidays

XML Syntax for the public holidays

Root XML Element

The main XML element is `<publicHolidays>`. One and only one `<publicHolidays>` element is allowed in the XML file.

Public Holidays

Use the `<holiday>` XML element to define a public holiday.

A public holiday has:

- An identification code that is used to identify the holiday. It must be unique among the codes of public holidays.
- A description, possibly given in many different languages.
- One or several groups if public holidays are grouped, none otherwise. See below for details on how to set up the groups.
- A type selected among the four types described in the table below.

Type	Description	Examples	XML Samples
<fixedDay>	A holiday with a date which does not vary over years. In the XML file, you specify the month and the day corresponding to the date of the holiday.	New Year's Day which always occurs on January 1.	<pre> <holiday code="NewYearsDay" "> <description lang="en" label="New Year's Day" /> <description lang="fr" label="Nouvel An" /> code="US" <group /> code="FR" <group /> code="DE" <group /> code="HR" <group /> code="BE" <group /> code="LU" <group /> code="CH" <group /> <fixedDay month="January" day="1" /> </ holiday> </pre>

Type	Description	Examples	XML Samples
<relativeDay>	A holiday that always occurs the same weekday of a given month. In the XML file, you specify the weekday, the month of the holiday and the position of the weekday in this month.	Thanksgiving which occurs the fourth Thursday of November in the United States.	<pre> <holiday code="Thanksgiving"> <description lang="en" label="Thanksgiving Day" /> <description lang="fr" label="Thanksgiving" /> <group code="US" /> <relativeDay month="November" weekday="Thursday" position="fourth" /> </holiday> </pre>

Type	Description	Examples	XML Samples
<easterRelative>	A holiday related to Easter (for the Catholic Church). In the XML file, you specify an offset defining when the holiday occurs relatively to Easter Sunday which is used as a reference date.	Easter Sunday for the Catholic Church (offset to zero)	<pre> <holiday code="EasterSunday"> <description lang="en" label="Easter Sunday" /> <description lang="fr" label="Dimanche de P&#xE2;ques" /> code="FR" <group /> code="HR" <group /> <easterRelativeDay offset="0" /> </ holiday> </pre>

Type	Description	Examples	XML Samples
		Easter Monday which occurs one day after Easter Sunday (offset to one)	<pre> <holiday code="EasterMonday"> <description lang="en" label="Easter Monday" /> <description lang="fr" label="Lundi de P&#xE2;ques" /> <group code="FR" /> <group code="DE" /> <group code="HR" /> <group code="BE" /> <group code="LU" /> <easterRelativeDay offset="1" /> </ holiday> </pre>

Type	Description	Examples	XML Samples
		Good Friday which occurs two days before Easter Sunday (negative offset to -2)	<pre> <holiday code="GoodFriday" > <description lang="en" label="Good Friday" /> <description lang="fr" label="Vendredi Saint" /> <group code="DE" /> <easterRelativeDa y offset="-2" /> </ holiday> </pre>

Type	Description	Examples	XML Samples
<enumeratedDay>	A holiday occurring at a different date each year, this date being known in advance. In the XML file, you specify the list of dates when the holiday is planned.	Chinese New Year's Day	<pre> <holiday code="ChineseNewYear"> <description lang="en" label="Chinese New Year" /> <description lang="fr" label="Nouvel An Chinois" /> <enumeratedDay> <date value="1999-02-16" /> <date value="2000-01-05" /> <date value="2001-01-24" /> <date value="2002-01-12" /> <date value="2003-02-01" /> <date value="2004-01-22" /> <date value="2005-02-09" /> <date </pre>

Type	Description	Examples	XML Samples
			<pre> value="2006-01-29" /> <date value="2007-02-18" /> <date value="2008-02-07" /> <date value="2009-01-26" /> <date value="2010-02-14" /> <date value="2011-02-03" /> <date value="2012-01-23" /> <date value="2013-02-10" /> <date value="2014-01-31" /> <date value="2015-02-19" /> <date value="2016-02-08" /> <date value="2017-01-28" /> <date value="2018-02-16" /> </pre>

Type	Description	Examples	XML Samples
			<pre> <date value="2019-02-05 " /> <date value="2020-01-25 " /> </ enumeratedDay> </ holiday> </pre>

Groups

You can define groups for public holidays with the `<group>` XML element.

The groups are used when you configure your price plans with the [Public Holidays Comparator](#) component and the [Public Holidays Splitter](#) component. They enable you to select in one operation all the public holidays belonging to the same group. See the [primary help of logic components \[page 831\]](#) for more information about the components.

A group has:

- A code, which is used for identifying the group. The code must be unique among the codes of all the groups.
- A description, possibly given in many different languages.

❖ Example

The following XML sample enables to define a group for Belgium.

```

<groupDescription code="BE">
    <description lang="en" label="Belgium" />
    <description lang="fr" label="Belgique" />
</groupDescription>

```

The following XML sample shows how the group is used for Easter Monday.

```

<holiday code="EasterMonday">
    <description lang="en" label="Easter Monday" />
    <description lang="fr" label="Lundi de P&#xE2;ques" />
    <group code="FR" />
    <group code="DE" />
    <group code="HR" />
    <group code="BE" />
    <group code="LU" />
    <easterRelativeDay offset="1" />
</holiday>

```

2.4.29.4.2 Exporting Public Holidays

You can export to an XML file the list of public holidays used in the logic components *Public Holidays Splitter* and *Public Holidays Comparison*. For more information on using these components, click [here \[page 831\]](#).

You use this operation to [set up \[page 809\]](#) or transport public holidays.

To export a list of public holidays

1. From the menu bar in the main window, select **Tools** > **Public Holidays** > **Export** . The *Save* dialog box opens.
2. Select a directory to which you export the list of public holidays.
3. In the *File name* field, type the name of the file.
4. Click *Save*.

2.4.29.4.3 Importing Public Holidays

You can import a list of public holidays saved in an XML file. Once imported, the list of public holidays deletes and replaces¹⁰² the one currently used in the components *Public Holidays Splitter* and *Public Holidays Comparison*. For more information on using these components, click [Working with Logic Components \[page 831\]](#).

You use this operation to [set up \[page 809\]](#) or transport public holidays.

To import a list of public holidays

1. From the menu bar in the main window, select **Tools** > **Public Holidays** > **Import** . The *Open* dialog box opens.
2. Open the directory in which the public holidays file is saved, and then select the file.
3. Click *Open*. A confirmation dialog box opens.
4. Click *Yes* to import the list of public holidays.

¹⁰² SAP SE strongly recommends that you consult your system administrator before importing a new list of public holidays.

Be careful when importing a new list of public holidays. After you import a new list, the old public holidays are replaced by the new ones with the exception of those already used in the charges set up before importing the new list. Besides, the old public holidays already used appear dimmed (unavailable) in the new list because not only they are no longer recognized by the SAP CC Core Server system but they are no longer active in the corresponding charges.

2.4.29.5 Currencies

SAP Convergent Charging assigns a currency to each computed amount.

You must configure currency information in the master data managed by SAP CC and related to the customer service pricing (see pricing catalog) and related to the end customers (see subscriber accounts, provider contracts) of the service provider.

Currencies are part of the business data configured in the complete SAP CC system. They are not included in the pricing catalog of a service provider.

SAP CC handles proprietary definitions for:

- Currencies (used to set up a reusable [charge \[page 584\]](#) for example)
- [ISO 4217 Currency Codes \[page 821\]](#)

i Note

If SAP Convergent Charging is connected to SAP ERP/FI-CA in an integrated SAP solution, the currencies are defined in the SAP ERP/FI-CA reference system and replicated to the SAP CC system in background. You can only configure the ISO 4217 currency codes known by SAP CC.

Currency

A currency is identified by a unique code¹⁰³ and defined by:

- The precision which represents the number of decimal places
- A legible name
- A code which can be:
 - An ISO 4217 currency code defined by the International Standards Organization
 - A proprietary code that is used to group some non-ISO currencies like "PNT" (Point) does not correspond to standard currencies

i Note

Relationship between major and minor currency units.

The minor currency unit has usually a value that is 1/100 of the major unit and sometimes 1/1000. For example, the Japanese sen is 1/100th of a yen. However, some currencies have no minor currency unit.

❖ Example

Currencies defined in SAP CC

In the following examples, even if their precision differs, the currencies are equivalent because they have the same ISO code:

- The currency named "EUR", based on the "EUR (978)" ISO code and is defined with two decimal precision

¹⁰³ You use currencies only based on ISO 4217 currency codes to configure the master data if SAP CC Diameter Server is part of the landscape as mediation system: Only numerical ISO 4217 three-digit codes are valid.

- The currency named "USD" is based on the "USD (840)" ISO code and is defined with two decimal precision
- Note the currency named "PNT", based on a virtual "PNT" code and is defined with no decimal precision

❖ Example

Currencies defined in SAP ERP/FI-CA and replicated in SAP CC

In the following examples, even if their precision differs, the currencies are equivalent because they have the same ISO code:

- The currency named "EUR" is based on the "EUR" ISO code and is defined with two decimal precision
- The currency named "EUR6", based on the "EUR" ISO code and is defined with six decimal precision
- The currency named "USDN" is based on the "USD" ISO code and is defined with five decimal precision
- The currency named "USD6" ("CC-CI BIT amount USD (6 Dec.)"), based on the "USD" ISO code and is defined with six decimal precision

Unique code in SAP CC

To read and understand a currency easily in the SAP CC Core Tool, it is highly recommended to use only the ISO 4217 alphabetic codes when configuring a new currency because mixing alphabetic and numeric codes could lead to incompatibility problems.

Precision of low-level computations

To maximize their precision, the SAP CC system performs low-level amount computations with twelve-digit precision. When stored in the business objects, the computed amounts are rounded according to the value of the `TRANSACTION_ROUNDING_MODE` system parameter and truncated according to the value of the `TRANSACTION_PRECISION` system parameter. The following rules are applied:

- If the `TRANSACTION_PRECISION` parameter is set to "-1", the precision of the stored amounts corresponds to the precision of their currency.
- If the `TRANSACTION_PRECISION` parameter is set to a number between 0 and 6, the precision of the stored amounts corresponds to the value of this parameter. The amounts can then have 0 or up to six decimal places.

❖ Example

If the `TRANSACTION_ROUNDING_MODE` parameter is set to `NEAREST`, the results are the following:

Computed amount	Stored amount	Stored amount
	<code>TRANSACTION_PRECISION = 6</code>	<code>TRANSACTION_PRECISION = -1</code>
EUR 1.00	EUR 1.00	EUR 1.00
EUR 1.234567	EUR 1.234567	EUR 1.24
EUR6 1.00	EUR6 1.00	EUR6 1.000000
EUR3 1.234567	EUR3 1.234567	EUR3 1.235

For further information about these parameters, refer to the SAP CC [System Parameter Reference](#) and to the SAP CC [Tuning Guide](#)

Improve the currency process performance

The defined SAP currencies are stored in the back-end database of SAP Convergent Charging. To improve performance, the different client applications and server instances of the SAP CC system (Core Server) handle a cached structure named “network currency book” containing the defined SAP currencies. Through a DAL (Data Access Layer) dedicated to currencies, the active updater instance performs any change to the list of currencies. For refreshing data, the master dispatcher instance is informed about any change to update its own currency book which is then forwarded to the other clients and server instances.

Transport

You can [export \[page 821\]](#) and [import \[page 822\]](#) the definitions of currencies and ISO 4217 currency codes.

If your SAP CC system is connected to SAP ERP/FI-CA system, you must [manually synchronize currencies \[page 823\]](#).

Maintenance

You must maintain this business data defined for an SAP CC system by [exporting \[page 821\]](#) and [importing \[page 822\]](#) this business data.

If SAP CC is connected to SAP ERP/FI-CA, you must [manually synchronize currencies \[page 823\]](#).

2.4.29.5.1 ISO 4217 Currency Codes

Every ISO 4217 currency must be configured and maintained in SAP CC. It is identified by a three-digit alphabetic code and defined by a three-digit numeric code, a minor currency unit, and a ratio.

2.4.29.5.2 Exporting Currencies

You can export in an XML file the list of currencies and [ISO 4217 Currency Codes \[page 821\]](#) stored into the back-end database system (SAP CC Core Database).

To export a list of currencies and a list of ISO codes

1. From the menu bar in the main window, select **Tools > Currencies > Export**. The *Save* dialog box opens.

2. Select a directory to which you want to export the lists of currencies and ISO 4217 currency codes.
3. In the *File name* field, type the name of the file.
4. Click [Save](#).

2.4.29.5.3 Importing Currencies

You can import a list of currencies and a list of definitions of ISO currency codes saved in an XML file. Note that importing currencies:

- Is only available for users which are assigned the marketing role
- Can modify the existing currencies or add new ones but cannot remove any existing currency
- Modifies currencies stored in the back-end SAP CC Core Database system
- Updates the currencies known by all the instances of SAP CC Core Server
- Updates the connected SAP CC Diameter Server systems
- Updates the connected SAP CC BART Server systems
- Updates all the Java client application based on the SAP CC Java Libraries and that is connected to the SAP CC system (A mediation system or a provisioning system)

The other running Core Tool user interfaces are not refreshed.

Caution

Currencies are used in the whole application and are shared by all the SAP CC users.

Because importing currencies can modify existing currencies and change the computation of all the amounts, we strongly recommend that you consult your administrator before performing this operation.

Note

- If SAP Convergent Charging is connected to the SAP ERP/FI-CA system which defines its own currencies, only the ISO 4217 currency codes are imported from the file. The list of currencies in the file are not taken into account when you import currencies.
- If you want to maintain the currencies known by SAP CC, perform your changes in the SAP ERP/FI-CA reference system and [synchronize both systems \[page 823\]](#).

To import a list of currencies and a list of ISO codes

1. From the menu bar in the main window, select  **Tools**  **Currencies**  **Import** . The *Open* dialog box opens.
2. Open the directory in which the XML file containing the currencies are saved, and then select this file.
3. Click [Open](#). A confirmation dialog box opens.
4. Click [Yes](#) to import the lists of currencies and ISO 4217 currency codes.

2.4.29.5.4 Synchronizing Currencies

You can synchronize the list of currencies defined in the Core Database of SAP Convergent Charging with a list of currencies defined in the SAP ERP/FI-CA reference system. Note that synchronizing currencies:

- Is only available for SAP CC users which are assigned the marketing role
- Is only available when SAP Convergent Charging is connected to the SAP ERP/FI-CA reference system
- Only takes into account the definitions of the currencies (the definitions of the ISO 4217 are not modified)
- Can add new currencies and modify or remove the existing currencies
- Modifies currencies stored both in the Core Database of SAP Convergent Charging and in the data caches used by the different running server instances

⚠ Caution

Currencies are used in the whole application and shared by all the SAP CC users. Because synchronizing currencies can modify existing currencies, we strongly recommend that you consult your administrator before performing this operation. If a currency is removed from the list of currencies:

- This currency is unknown to SAP Convergent Charging, and a message is displayed every time a business object tries to use this currency
- You cannot use this currency when creating new business objects (master data)
- The charging and refilling operations based on business objects which use this currency are not possible and fail

Tasks

You can synchronize currencies when:

- The currencies have been changed in the SAP ERP/FI-CA reference system
- The SAP CC user cannot see the appropriate currencies in the list when configuring master data in the Core Tool user interface

Prerequisite

The SAP CC system is connected to the SAP ERP/FI-CA system.

Procedure

To synchronize a list of currencies

1. From the menu bar in the main window, select ► **Tools** ► **Currencies** ► **Synchronize** .
 - When the synchronization of currencies is successful, an information dialog opens and displays the number of synchronized currencies

- When the synchronization of currencies fails, an information dialog opens and displays the reason of failure
- 2. [Export \[page 821\]](#) the lists.
- 3. Verify that the list of ISO 4217 currency codes is up-to-date and complete regarding to the list of currencies. Add necessary ISO 4217 currency codes and [import \[page 822\]](#) the file.

2.4.29.6 Generate License Auditing File

You can generate a license auditing file for the SAP Global License Auditing System (SAP GLAS).

i Note

You cannot generate a license auditing file if the SAP Convergent Charging license corresponds to a temporary license.

To generate a license auditing file for SAP GLAS:

1. From the menu bar in the main window, select ► *Tools* ► *License auditing file* ► *Generating a license auditing file* ►.
2. The *Save* dialog box opens.
3. Select a directory to which you want to generate the license auditing file.
4. In the *File name* field, type the name of the file.
5. Click *Save*.

Related Information

[Viewing Metrics \[page 829\]](#)

2.4.30 Window

In the menu bar, the *Window* menu allows opening the following work windows:

[Viewing a Catalog \[page 825\]](#)

[Viewing Operations \[page 825\]](#)

[Viewing Object Change Logs \[page 827\]](#)

[Viewing Metrics \[page 829\]](#)

Related Information

[Viewing a Catalog \[page 825\]](#)

[Viewing Operations \[page 825\]](#)

[Viewing Object Change Logs \[page 827\]](#)

[Viewing Metrics \[page 829\]](#)

2.4.30.1 Viewing a Catalog

The procedure is the same as the one for [opening a pricing catalog \[page 403\]](#).

2.4.30.2 Viewing Operations

From the menu bar in the main window, select  **Window** > **View Operations** . The *Audited Operations* window opens.

The elements of the *Audited Operations* window allows you to search for audited user operations that are based on:

- The rules set in a previously created audit object (*Search From Audit* tab) as a custom filter
- Filter criteria (*Search From Filters* tab)
- Criteria (*Search by Criteria* tab)

Audited Operations (Window)

After you set up either the *Search From Audit* tab, the *Search From Filters* tab, or the *Search From Criteria* tab,

you can start the search by clicking . If there are audited operations that conform to the criteria, they appear in the results area.

Use the following icons to:



: Clear the search results list from the results area.



: Delete all the audited user operations that match the search criteria from the back-end database system. This button deletes the audited operation that are currently displayed and all the other audited operations that match the search criteria.



: Scroll to the next audited user operations that match the criteria.



: Scroll to the previous audited user operations that match the criteria.



Open the *Object Change Log* window to display the object change logs related to the selected audited operation.

Search From Audit (Tab)

Audit: Provides the list of existing audit objects (custom audit filters). Select an audit on which you want to base your search. Before searching for operations, click  to [modify \[page 773\]](#) the original audit if necessary. Make your modifications, [save \[page 775\]](#) them, and then close the audit window.

Period For Search: Choose the option to search for user operations by selecting either *last audited period* or *given dates*. If you select *given dates*, select these dates in the *From* and *To* fields by using the calendar .

Search From Filters (Tab)

You set up this tab in the same way as you [set up \[page 773\]](#) the *Filters* tab of an audit object.

In the *From* and *To* fields, click the calendar  to select the dates between which you want to find all the audited operations.

Search by Criteria (Tab)

To find audited operations, the *Search by Criteria* tab allows you to create a table containing a single or a combination of possible search criteria. To add a row to the table, click the *More* button. To delete a row from the table, click the *Less* button.

Note

- If the criteria table consists of several rows and if you want to delete a row, the *Remove* dialog box opens to display the identifier names. Select the row that you want to delete from the table, and then click *OK*.
- If you choose the *Is Like* comparator when building criteria rows, you can type "*" in the right-hand field to represent a number of characters and "?" to represent a single character.

Each row of the table comprises three fields. To set up a row, do the following:

1. In the first field, select a search criterion in the following list of identifiers:
 - *Reference*: Identifier of the audited operation
 - *Operation*: Type of the audited operation for every object supporting the fine-grained auditing feature
 - *User*: ID of the user who initiated the audited operation
 - *Operand*: Identifier (name, code, another reference) that characterizes the user operation and its action
 - *Error Message*: Error related to the execution of the audited operation

- *Instance ID*: Identifier of the instance that has processed the user operation (for example, updater #1 or rater #1)
2. In the second field, select a search comparator such as *Equals*, *Starts With*, *Ends With*, *Contains*, *Is Like*, for example.
 3. In the third field, select or type the string that you want to find in the database.
 4. In the *From* and *To* fields, click the calendar  to select the dates between which you want to find audited operations.

Related Information

[Viewing Object Change Logs \[page 827\]](#)

2.4.30.3 Viewing Object Change Logs

From the menu bar in the main window, select  *Window*  *View Object Change Logs* . The *Object Change Logs* window opens.

To find object change logs, you perform the operation in two halves of the window:

- The top part of the window is the filter area, which allows you to find object change logs by using filter criteria. The information in the *Basic* and *Advanced* tabs is combined during the search operation.
- The bottom area of the window is the results area, which displays the search results that you perform.

You can find object change logs with or without using search criteria. If you do not use search criteria, click



to start the search. If you use search criteria, set up the *Basic* and *Advanced* tabs, and then click  to start the search. The object change logs are displayed in the results area. To display more columns of information in the results area, click , and then select the types of information you want to display.

Note

- When the system is configured to record object snapshots, you can view and inspect these detailed object changes.
- When the User Operation Auditing feature is enabled in the system, you can audit the SAP CC user and the user operation that are responsible for the data object change.
- Refer to the SAP CC [Application Help](#) for more information and user assistance about the audit concept, features, and functions.

Basic tab

The *Basic* tab allows you to find object change logs depending on the criteria described below:

- *Object Type*: Contains the list of auditable objects.

- [Object ID Part 1](#), [Object ID Part 2](#), and [Object ID Part 3](#): These three fields represent the different parts of the identifier of an object associated to a given change log. In the first field, select a search comparator such as [Equals](#), [Starts With](#), or [Contains](#), for example. In the second field, type the string that you want to find in the database.
- [From](#) and [To](#): Click the calendar  to select the dates between which you want to find change logs.

Advanced tab

To find object change logs, the [Advanced](#) tab allows you to create a table with one or more search criteria such as [Action](#), [Object Reference](#), or [User Operation Reference](#). To add a row to the table, click the [More](#) button. To delete a row from the table, click the [Less](#) button.

Each row of the table consists of three fields. To set up a row, do the following:

- In the first field, select a search criterion in the list of provided criteria.
- In the second field, select a search comparator such as [Lower Than or Equal To](#), [Greater Than](#), [Lower Than](#) or [Equals](#), for example.
- In the third field, type the string that you want to find in the database.

Note

- If the criteria table consists of several rows and if you want to delete a row, the [Remove](#) dialog box opens to display the identifier names. Select the row that you want to delete from the table, and then click [OK](#).
- If you choose the [Is Like](#) comparator when building criteria rows, you can type "*" in the right-hand field to represent a number of characters and "?" to represent a single character.

Results area

Use the following icons:



: Start a new search whether you use search criteria or not.



: Clear the results list.



: Move to the next page. This button is available when the results list is large.



: Move to the previous page. This button is available when the results list is large.



: View the related user operation and the SAP CC user who triggered the operation. This button is available when an object change log is selected and when the system is configured to audit user operations.



: Consult the object snapshot before change. This button is available only when an object snapshot exists.



: Consult the object snapshot after change. This button is available only when an object snapshot exists.

i Note

Clicking the buttons  or :

- Either opens the editor of the object that is related to the snapshot.
- Or asks for saving the object snapshot to a file when it is not possible to open the editor. This occurs when another object snapshot that is required for the display cannot be found in the back-end database system.

You cannot change the object in the editor, and some existing panes may not be available because of the existing dependencies between the related objects.

To compare the object snapshots before and after data object changes, you can save a couple of snapshots to files.

Related Information

[Viewing Operations \[page 825\]](#)

2.4.30.4 Viewing Metrics

From the menu bar in the main window, select  **Window**  **Metrics** . The **Metrics** window opens.

The elements of the **Metrics** window allows you to search for the number of transactions or subscriber accounts processed per day in SAP Convergent Charging. This information measures the usage of the SAP CC product in your system landscape.

Refer to the SAP CC [Application Help](#) for more information and user assistance about the *Product Usage Measurement* features.

Metrics window

To display the search results, you perform the operation in two halves of the window:

- The top part of the window is the filter area, which allows you to define the search rules.
- The bottom area of the window is the results area, which displays the search results.

Filter area

The filter area mainly consists of a table whose each row represents a search rule. You can combine as many rules as you want in the table. For example, you can search all the days during which the number of transactions is greater than 100 and the number of subscriber accounts is lower than 5.



: Click to add a criterion to the table.



: Click to remove the selected criterion

Metric: Select one of the following product sage metrics:

- Transaction
- Postpaid Transaction
- Prepaid Transaction
- Subscriber Account

Comparator: Select one of the following comparators:

- Equals
- Greater than
- Lower than
- Greater or Equals
- Lower or Equals

Value: Type the comparison value.

From and **To:** Click the calendars  to display the dates. These fields allow you to select:

- An undefined period: **From** (empty field) **To** (empty field)
- A defined period: **From** April 8, 2010 12:00:00 AM **To** May 8, 2010 12:00:00 AM
- A period limited by a date in the future: **From** (empty field) **To** April 8, 2010 12:00:00 AM
- A period limited by a date in the past: **From** April 8, 2010 12:00:00 AM **To** (empty field)

Results area

Use the following icons to:



: Clear the search results list from the results area.



: Scroll to the next results matching the criteria.



: Scroll to the previous results matching the criteria.



: Save the results in a CSV file.

2.4.31 Working with Logic Components

Logic Components

⚠ Caution

If you are designing and configuring a price plan for a prepaid environment (session-based charging with credit control and quota reservation), do not forget that the confirmed amount must not be greater than the reserved amount.

For example, if 5 minutes are reserved at the price of \$2.50, the confirmed amount must not be greater than \$12.50.

For more information about session-based charging, refer to the [primary help \[page 348\]](#) of Core Tool.

SAP Convergent Charging consists of the following business scenarios:

- Process of charging: Allows to rate a usage event and debit the price amount from an account or credit it to an account. The SAP CC system performs this process through the execution of a price plan and a charging plan configured in a charge and subscribed in a provider contract.
- Process of refilling: Allows a customer to credit prepaid accounts manually or automatically. This process is performed through the execution of a refill plan activated in a provider contract item.
- Process of creating billable items: Allows to convert charged items and refill records into billable items that are sent to SAP Convergent Invoicing in the SAP ERP/FI-CA or in the SAP S/4HANA system. This process is performed through the execution of the billable item mapping. For more information, see [Help resources \[page 849\]](#).
- Process of creating consumption items: Allows to convert chargeable items into consumption items that are sent to SAP Convergent Invoicing in SAP ERP/FI-CA system for charging or deferred charging purposes, for example. For more information, see [Help resources \[page 849\]](#).
- Process of using allowances: Allows to [create allowances \[page 958\]](#), [send events \[page 943\]](#) to these allowances from the charging or refilling process, [modify \[page 948\]](#) these events, and [redefine \[page 948\]](#) the validity period of allowances. For revenue recognition purposes, SAP CC can inform SAP Convergent Invoicing through billable items when an allowance is created, used, and has expired. The billable items contain information so that SAP ERP/FI-CA can recognize revenues. For more information, see [Help resources \[page 849\]](#). About the share of allowances (shared allowances) between subscriber accounts, refer to the primary help of Core Tool and the [Application Help](#) for more information.

i Note

The processes of creating consumption items and billable items are available in the end-to-end [SAP Solution](#) scenarios that include the SAP ERP/FI-CA component of the SAP Business Suite. Consult the SAP CC [Master Guide](#) for more information.

Process Configuration

You configure the charging process and the refilling process by:

- Designing and specifying the pricing logic.

- Configuring the relevant master data included in the pricing catalog of a service provider.

This logic is configured through the decision trees of a charge, the refill logic, or the allowance logic. These trees consist of logic components¹⁰⁴:

- [Basic Components \[page 894\]](#)
- [Logic Components for a Price Plan \[page 852\]](#)
- [Logic Components for a Charging Plan \[page 863\]](#)
- [Logic Components in the Refill Logic \[page 875\]](#)
- [Logic Components in the Allowance Logic \[page 884\]](#)

Price Plan

A price plan specifies the business logic to calculate an amount linked to a [usage event \[page 854\]](#), a [recurring event \[page 856\]](#), or a [one-shot event \[page 862\]](#). The amount is calculated by using a set of instructions described in a price plan that is contained within a charge. A charge always includes a unique price plan.

→ Remember

About Taxes

Remember that the taxes are defined at the following levels in SAP CC:

- Subscriber account
- Charge in an offer (charging based on subscriptions)

Tax computation only applies to price plan components but does not apply to charging and refill logic components. For more information, consult the [primary help of Core Tool \[page 356\]](#) (see the [Taxes \[page 683\]](#) topic).

Charging Plan

A charging plan specifies which accounts will be charged or refilled with the amount of a service calculated by the related price plan.

To charge or refill an account, the charging plan is linked to a subscriber account through the mapping of charging references included in each subscription. When a customer subscribes to an offer, each charging reference used in a charging plan is connected to one account and optionally to a credit limit balance defined in the related subscriber account.

Refill Logic

Part of a refill plan, the refill logic specifies the logic to compute the different credits (money, units, and so on) of a refill. At runtime, calculations in the refill logic are only performed when the subscribed refill plan is triggered by:

- [A usage event \[page 877\]](#)
- [A periodic event \[page 879\]](#)
- [A one-off event \[page 882\]](#)

To compute a refill event, the refill logic consists of a set of refill logic components.

¹⁰⁴ Except comparators and operators which are [basic components \[page 894\]](#) used both by the price plan, the charging plan, the refill logic, and the allowance logic.

Allowance Logic

Part of an allowance plan, the allowance logic defines the rules and conditions of use of an allowance and can model an algorithm based on several types of triggers: event-based, one-shot, and recurring.

At runtime, calculations in the allowance logic are only performed when the subscribed allowance plan is triggered by:

- [Any event \[page 886\]](#)
- [A periodic event \[page 888\]](#)
- [A one-shot event \[page 892\]](#)

To compute an allowance event, the allowance logic consists of a set of allowance logic components.

Logic Components

To set up the [charge logic \[page 560\]](#) (in price plan and in the charging plan) and the [refill logic](#), SAP CC provides logic components to define the logic of these objects. Components are grouped into families according to their functional usage.

i Note

For more comprehensive detail on using each component, refer to the primary help relating to logic components: [Working with Logic Components \[page 831\]](#)

Family	Description	Price Plan	Charging Plan	Refill Logic
 Rates	Defines the tariff type for pricing (Usage, Recurring or One-Shot)	Yes	-	-
 Charging	Defines the charging type (Usage, One-Shot, Recurring or Default)	-	Yes	-
 Refill	Defines the refill type (Usage, Recurring or One-Shot)	-	-	Yes
 Functions	Calculates the final amount	Yes	-	Yes
 References	Identifies and charges or refills an account Example: Internal Reference	-	Yes	-

Family	Description	Price Plan	Charging Plan	Refill Logic
 Comparators	- Generates two or more branches in order to evaluate properties - Selects one branch according to the result Example: - Mapping Table Comparator - Range Table Comparator - Public Holidays Comparator	Yes	Yes	Yes
 Splitters	- Splits a number or duration - Generates and rates multiple branches Example: Public Holidays Splitter	Yes	-	Yes
 Operators	Adds properties to the calculation context Example: Tier Table Operator	Yes	Yes	Yes

2.4.31.1 What's New?

What's New in SP 6

This version includes the new Increment Counter Operator.

Increment Counter Operator (New)

As of SP 6, a new [Increment Counter Operator \[page 968\]](#) is added in SAP CC Core Tool to enhance shared allowances.

Decrement Counter Operator (Update)

For a matter of consistency, the formerly known Debit Counter Operator is renamed [Decrement Counter Operator \[page 961\]](#).

What's New in SP 4

This version includes the following changes:

- Not Equal Operator (New)
- 4-4-5 Calendar
- Modification of the [Refill components \[page 876\]](#), [Internal Reference](#) and [Switching Comparator \[page 927\]](#) elements in case of an installation scenario integrated with SAP S/4HANA Cloud

Not Equal Operator (New)

As of SP 4, a new comparison operator is added to some logic components available in SAP CC Core Tool to build price plans, allowances... You can now use the *Not Equal* operator to determine difference between two number properties.

This new comparison operator is available for some [logic components \[page 831\]](#):

- [Allowance Event Sender \(Operator\) \[page 943\]](#)
- [Allowance Property Introducer \(Operator\) \[page 949\]](#)
- [Switch Table Operator \[page 983\]](#)

4-4-5 Calendar

As of SP 4, a new calendar called 4-4-5 Calendar is implemented to recurrent events: each quarter is composed of 4, 4, and 5 weeks.

The 4-4-5 calendar is a method of managing accounting periods, and is a common calendar structure for some industries such as retail and manufacturing.

With a 4-4-5 calendar, the standard 52-week year divides into four 13-week quarters, which comprise three periods split into a four-week, four-week, five-week format.

This change impacts the following topics:

- [Recurring Rate \[page 856\]](#)
- [Recurring Refill \[page 879\]](#)
- [Recurring Trigger \[page 888\]](#)
- [Prorata Operator \[page 978\]](#)

What's New in SP 2

This version includes the following change:

- Property Type Convertor Enhancement (Update)

Property Type Convertor Enhancement (Update)

This change enhances the graphical user interface for using number properties in the *Property Type Converter Operator* component and retrieving the length of a string property through the new *Length* attribute in the *Property Introducer Operator* component.

In the *Property Type Converter Operator* component, you can specify the start and end positions of a substring in a string by using number properties.

This change impacts the following topics:

- [Property Type Convertor \(Operator\) \[page 975\]](#)
- [Property Introducer \(Operator\) \[page 973\]](#)

What's New in SP 1

This version includes the following change:

- Input columns in range tables (New)

Input columns in range tables (New)

This change enhances the graphical user interface by allowing you to add input columns to ranges tables.

In SAP CC Core Tool, you can now add input columns to range tables and manage up to five input columns.

This change impacts the following topic:

- [Range Table Introducer \(Comparator\) \[page 919\]](#)

What's New in SP 0

This version includes the following change:

- Shared allowances (Update)

Shared allowances (Update)

This change enhances the graphical user interface of SAP Convergent Charging for sharing allowances between subscriber accounts.

This change impacts the following topics:

- [Working with Logic Components \[page 831\]](#)
- [Matrix of Components \[page 839\]](#)
- [Create Allowance Operator \[page 958\]](#)
- [Update Counter Operator \[page 990\]](#) (*Counter Operator* has been renamed *Update Counter operator*)
- [Allowance Event Sender \(Operator\) \[page 943\]](#)
- [Allowance Property Introducer \(Operator\) \[page 949\]](#)
- [Allowance Validity Period Updater \(Operator\) \[page 952\]](#)

In addition, the new [Decrement Counter Operator \[page 961\]](#) component has been created for implementing shared allowances.

For more information on the sharing of allowances between subscriber accounts, refer to the [primary help of Core Tool \[page 356\]](#) and the [Application Help](#) for more information.

2.4.31.2 Master Data

Master data

Logic components are used to design and set up the pricing logic of customer services of a service provider. These logic components are configured and combined in pricing objects that are stored in the master data related to this service provider.

Data Model	Master Data Related to the Service Provider	Customer Master Data
SAP Convergent Charging provide you with two data models in a mixed environment	SAP Convergent Charging manages master data related to the pricing logic for the business of a service provider. This pricing logic is configured and stored in a pricing catalog dedicated to this service provider.	SAP Convergent Charging manages master data related to the end customers of a service provider. The service provider remains the final owner of this master data.

Data Model	Master Data Related to the Service Provider	Customer Master Data
Data model based on provider contracts	The pricing catalog [page 400] includes mostly: • Reusable charges [page 560] that includes: ◦ A price plan [page 570] and its logic components [page 852] ◦ A charging plan [page 575] and its logic components [page 863] ◦ The Allowance Logic and some components [page 884] ◦ The refille logic and some components [page 875] • Pricing macros [page 411] • Charge plans, refill plans and allowance plans • Business data tables: ◦ Mapping tables [page 469] and classes [page 457] ◦ Range tables [page 503] and classes [page 489] ◦ Translation [page 422] and tier tables [page 437] (rarely) Consult the primary help of Core Tool [page 348], the Application Help, or the Tuning Guide for complete information about the elements of the pricing catalog available for your system landscape.	• Subscriber accounts [page 668] • Business data tables: ◦ Subscriber mapping tables ◦ Subscriber range tables • Provider Contracts

Data Model	Master Data Related to the Service Provider	Customer Master Data
Data model based on subscriptions	The pricing catalog includes mostly: • Reusable charges [page 560] that includes: ◦ A price plan [page 570] and its logic components [page 852] ◦ A charging plan [page 575] and its logic components [page 863] • Pricing macros [page 411] • Offers [page 611] • Business data tables: ◦ Translation tables [page 422] and (rarely) ◦ Tier tables [page 437] ◦ Mapping tables [page 469] and classes [page 457] (rarely) ◦ Range tables [page 503] and classes [page 489] (rarely) Consult the primary help of Core Tool [page 348], the Application Help, or the Tuning Guide for complete information about the elements of the pricing catalog available for your system landscape.	• Subscriber accounts [page 668] • Subscriptions [page 700] • Accesses [page 752]

2.4.31.3 Matrix of Components

The matrix shows you in which master data objects (for example, price plan, charging plan) you can use the logic components. Each cell that contains 'X' means you can use the component in the related master data object. Because the usage of logic components can depend on specific contexts, refer to the following notes for X (1), X (2), X (3), X (4), X (5), X (6), and X (7):

i Note

- X (1): Persistent counters cannot be referenced or used in this context.
- X (2): You can only use a One-Shot Trigger component with a Creation event or an Expiration event (no shift).
- X (3): You can only use a Create Allowance Operator in a One-Shot Trigger component with an Expiration event (no shift). The renewal of shared allowances is not allowed in this context.
- X (4): If the scope is limited to shared allowances in the Allowance Property Introducer Operator, the property that contains the Share Identifier must refer to a property of the rating context.
- X (5): The usage of the Allowance Event Sender Operator depends on its scope:
 - If the scope is limited to shared allowances, you can only use the Allowance Event Sender Operator component in an Event-Based Trigger component of the allowance logic that is not shareable.

- If the scope is limited to the allowances of the contract or the allowances of the contract and its parent, you can only use the Allowance Event Sender Operator component in the price plan and the refill plan (refill logic).
- X (6): Persistent counters can only be referenced and used in a One-Shot Trigger (Creation event).
- X (7): You can only use the Allowance Validity Period Updater Operator in a One-Shot Trigger component with a Creation event.

Rate Components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Usage Rate [page 854]	X					
Recurring Rate [page 856]	X					
One-Shot Rate [page 862]	X					

Charging components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Usage Charging [page 866]		X				
Recurring Charging [page 867]		X				
One-Shot Charging [page 867]		X				
Default Charging [page 868]		X				

References	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Default Reference		X				
Internal Reference		X				
External Reference		X				
Refill		X				

Refill components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Usage Refill [page 877]				X		
Recurring Refill [page 879]				X		
One-Shot Refill [page 882]				X		
Account Event Refill [page 883]				X		
Trigger Com- ponents	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Event-Based Trigger [page 886]	X				X	X
Recurring Trig- ger [page 888]	X				X	
One-Shot Trig- ger [page 892]	X				X	X (2)
Function com- ponents	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Allow Function [page 896]					X	X
Flat Function [page 897]	X		X	X		
Free Function [page 898]	X		X	X		
Generic Func- tion [page 899]	X		X	X		
Linear Function [page 901]	X		X	X		
Macro Function [page 902]	X		X	X		
No Access Function [page 903]					X	X (1)

Function components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Polynomial Function [page 904]	X		X	X		

Comparison components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Date/Time Slot Comparator [page 906]	X	X	X	X	X	X (1)
Dates Comparator [page 908]	X	X	X	X	X	X (1)
Interval Switching Comparator [page 910]	X	X	X	X	X	X (1)
Mapping Table Introducer (Comparator) [page 912]	X	X	X	X	X	X (1)
Numbers Comparator [page 915]	X	X	X	X	X	X (1)
Prefix Switching Comparator [page 916]	X	X	X	X	X	X (1)
Public Holidays Comparator [page 918]	X	X	X	X	X	X (1)
Range Table Introducer (Comparator) [page 919]	X	X	X	X	X	X (1)
Strings Comparator [page 926]	X	X	X	X	X	X (1)
Switching Comparator [page 927]	X	X	X	X	X	X (1)

Splitters components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Amounts Ag- gregator Split- ter [page 929]	X		X	X		
Numbers Split- ter [page 930]	X		X	X		
Public Holidays Splitter [page 932]	X		X	X		
Time Slot Split- ter [page 936]	X		X	X		
Operators components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allow- ance logic (not shareable)	Allowance plan / Allow- ance logic (shareable)
Alert Triggering Operator [page 942]	X	X	X	X	X	X (1)
Allowance Event Sender (Operator) [page 943]	X (5)			X (5)	X (5)	
Allowance Event Updater (Operator) [page 948]					X	X (1)
Allowance Property Intro- ducer (Opera- tor) [page 949]	X (4)			X (4)	X (4)	
Allowance Val- idity Period Up- dater (Opera- tor) [page 952]					X	X (7)
Arithmetic Computation Operator [page 955]	X	X	X	X	X	X (1)
Concatenate Operator [page 957]	X	X	X	X	X	X (1)

Operators components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allowance logic (not shareable)	Allowance plan / Allowance logic (shareable)
Create Allowance Operator [page 958]	X			X	X (3)	
Date Shift Operator [page 959]	X	X	X	X	X	X (1)
Decrement Counter Operator [page 961]	X		X	X	X	X
Duration Operator [page 962]	X	X	X	X	X	X (1)
Duration Adapter Operator [page 963]	X	X	X	X	X	X (1)
Filter Operator [page 965]	X	X	X	X	X	X (1)
Increment Counter Operator [page 968]					X	X
Macro Introducer (Operator) [page 969]	X		X	X	X	X (1)
Multi-Valued Evaluator (Operator) [page 970]	X	X	X	X	X	X (1)
Output Property Update Operator [page 972]	X	X	X	X	X	X (1)
Property Introducer (Operator) [page 973]	X	X	X	X	X	X (1)
Property Type Convertor (Operator) [page 975]	X	X	X	X	X	X (1)
Prorata Operator [page 978]	X	X	X	X	X	X (1)

Operators components	Price plan	Charging plan	Pricing macro	Refill plan / Refill logic	Allowance plan / Allowance logic (not shareable)	Allowance plan / Allowance logic (shareable)
State Schedule Updater (Operator) [page 982]				X		
Switch Table Operator [page 983]	X	X	X	X	X	X (1)
Tier Table Introducer (Operator) [page 986]	X	X	X	X	X	X (1)
Translation Table Introducer (Operator) [page 988]	X	X	X	X	X	X (1)
Update Counter Operator [page 990]	X		X	X	X	X (6)

2.4.31.4 Working with Components

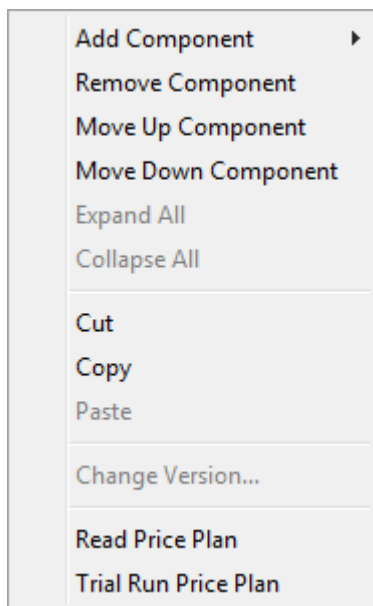
Related Information

[Arranging Components \[page 845\]](#)

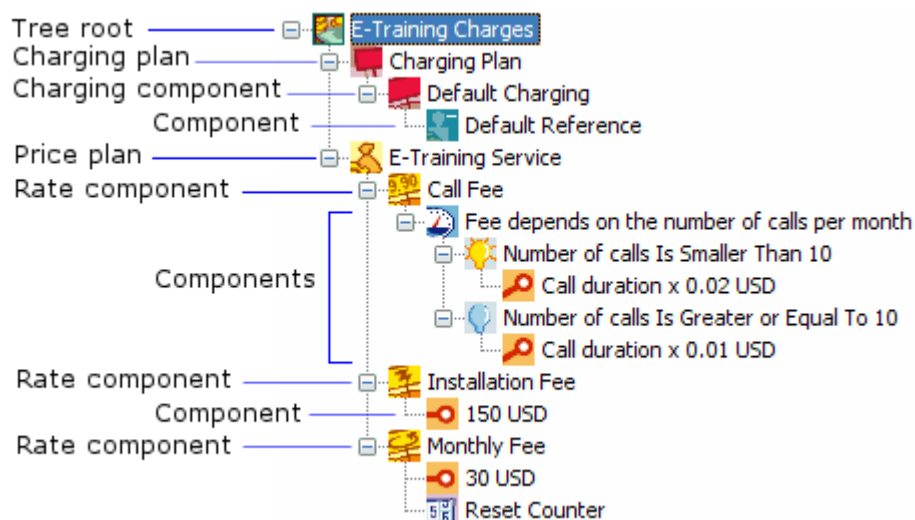
[Setting Up a Component \[page 848\]](#)

2.4.31.4.1 Arranging Components

Commands to arrange the components are grouped on the shortcut menu, which is displayed when you right-click the root of the tree, a rate component, a charging component, a refill component, or an allowance component:



The command features depend on the level at which you use them:



Root level

If you click the root of the tree, you can only carry out the commands [Add](#), [Paste](#), and [Copy](#).

[Add](#): Allows you to add rate, charging, allowance, or refill components, which are automatically arranged in this order:

- Usage Rates (or Usage Charging, Usage Refills, Event-Based Triggers)
- One-Shot Rates (or One-Shot Charging, One-Shot Refills, One-Shot Triggers)
- Recurring Rates (or Recurring Charging, Recurring Refills, Recurring Triggers)

For each component family of a price plan, a charging plan, a refill plan, or an allowance plan, you can add as many components as you want; however, each component is automatically added after the last component of its family. For example, if you add a usage rate, it is added after the last component of the usage rate family.

In a charging plan, you can add one One-Shot Charging and one Recurring at the most.

Copy: Allows you to retrieve the XML version of the tree. Click the root of the tree, right-click to open the shortcut menu, click the **Copy** command, and then open a text editor to paste the XML version of the tree.

Paste: Allows you to paste a part of the tree that you have first cut or copied from the tree. The part of the tree is added after the last component of its family. For example, if you have cut a One-Shot Rate component, this component is added after the last component of the One-Shot Rate family when you paste it. The **Paste** command is available only if you have first cut or copied a component (usage, one-shot, or recurring).

Rate, charging, refill, or allowance component level

If you click a rate, a charging, a refill, or an allowance component, you can carry out all the commands of the shortcut menu; however, the commands are available depending on the context. For example, you cannot move up a rate component if this component is the first component of the tree.

Add: If you click a rate, charging, refill, or an allowance branch, you can add these components:

- Functions¹⁰⁵
- Comparators
- Splitters¹⁰⁶
- Operators
- References¹⁰⁷

Components are available on the shortcut menu depending on the components already in the rate, charging, refill, or allowance branch. For example, if the rate branch contains a function component, you can only add operator components. If the charging branch contains a reference component, you can only add operator components.

Note

You remove, move up or down, cut, copy, or paste a rate, charging, refill, or an allowance component along with its branch.

Remove: Allows you to remove a rate, charging, a refill, or an allowance component from the tree permanently. You cannot paste a rate, charging, refill, or an allowance component that you have removed with this command.

Move Up and **Down:** Allows you to change the order of the rate, charging, refill, or allowance components in their family. For example, if the price plan tree contains several usage rates and recurring rates, you can change the order of usage rates in the usage rate family, but you cannot move a usage rate after the last component of the recurring rate family.

Cut: Allows you to remove a rate, charging, refill, or an allowance component from the tree. To cut a component, click the component, and then click the **Cut** command on the shortcut menu.

¹⁰⁵ Not available in a charging branch

¹⁰⁶ Not available in a charging branch

¹⁰⁷ Not available in a price plan or in the refill logic

Copy: Allows you to copy a rate, charging, refill, or an allowance component. This command also allows you to retrieve the XML version of a rate, charging, or refill branch. Click a rate, charging, refill, or an allowance component, right-click to open the shortcut menu, click the **Copy** command, and then open a text editor to paste the XML version of the rate, charging, or refill branch.

Paste: Allows you to paste a rate, charging, refill, or an allowance component that you have first cut or copied

from the tree. For example, you must click the price plan  or the charging plan  before respectively pasting a rate or a charging component. The component is automatically added after the last component of its family.

Component level

If you click a component, you can carry out all the commands of the shortcut menu; however, the commands are available depending on the context. For example, you cannot move up a component if this component is the first component of the branch.

Add: Allows you to add components in the branches of comparators or splitters only.

i Note

You remove, move up or down, cut, copy, or paste a component along with its branch.

Remove: Allows you to remove a component from a branch permanently. You cannot paste a component that you have removed with this command.

Move Up and **Down:** Allows you to change the order of the components in a branch. This command is available depending on the components already in the branch. For example, if a rate branch contains an operator and a function, you cannot move up or down either of them. In a charging plan, this command is only available for operator components.

Cut: Allows you to remove a component from a branch. You can paste this component at another location in the tree.

Copy: Allows you to copy a component and paste it at another location in the tree. This command also allows you to retrieve the XML version of a component. Click a component, right-click to open the shortcut menu, click the **Copy** command, and then open a text editor to paste the XML version of the component.

Paste: Allows you to paste a component that you have first cut or copied. You can paste a component at rate, charging, refill, or allowance component level or in the branch of comparators or splitters. For example, to paste a component in the branch of a usage charging component, click the usage charging, and then paste the component.

2.4.31.4.2 Setting Up a Component

After you add or insert a component in the decision tree of a [price plan \[page 570\]](#), a [charging plan](#), a [refill plan](#), an [allowance plan](#), or a [pricing macro \[page 411\]](#), you set it up.

To set up a component

1. In the tree display area of the plan window, select the component.
2. On the right side of the plan window, type the *Name* and the *Description* in the *Identification* area.
3. In the *Tabs* area, select or type the appropriate parameters that are needed to set up the component. For more information, refer to the specific component that you need to set up.

2.4.31.5 Getting Help

Related Information

[Help Resources \[page 849\]](#)

[Typographical Conventions \[page 851\]](#)

2.4.31.5.1 Help Resources

To help you get the most out of SAP Convergent Charging, SAP SE provides you with an extensive list of resources you can use for support and guidance.

Integrated SAP Solution Scenarios

SAP Convergent Charging is integrated with different software components of the SAP Business Suite: SAP CRM, SAP ERP/FI-CA, and SAP Convergent Invoicing in the SAP ERP system.

The primary help provides you with specific information and recommendations for configuring data in SAP Convergent Charging for the integrated scenarios.

Consult the SAP Help Portal

On the [SAP Help Portal](#), you find extensive documentation from the SAP Library on SAP products and solutions, along with additional information about the documentation, information design at SAP, educations services, and links to the SAP Community Network (SCN).

i Note

SAP Convergent Charging is part of SAP Billing and Revenue Innovation Management. When your SAP CC system is connected to the SAP CRM system or to SAP Convergent Invoicing in the SAP ERP system, the following SAP libraries are relevant in [SAP Help Portal](#) at:

- [SAP EHP 4 for SAP CRM 7.0](#) > Application Help > SAP Library > SAP CRM for Industries > Telecommunications > Functions for Provider Sales and Order Management
 - Products > Cross Catalog Mapping
 - Business Agreement
 - Provider Order and Provider Contract
 - Sharing Contract

and at:

- [SAP EHP 8 for SAP ERP 6.0](#) > Application Help > SAP Library > Industries in SAP ERP > SAP Telecommunications > Contract Accounts Receivable and Payable > SAP Convergent Invoicing
- - Master Data
 - Rating
 - Billing
 - Discounts and Charges on Billable Items
 - Partner Settlement
 - Invoicing

Access the Reference Guides of SAP Convergent Charging

These guides are available in PDF format and provided on the DVD-ROM with the release of this product. They contain comprehensive information about each functional aspect of SAP Convergent Charging. The guides are also available on [SAP Help Portal](#) for online consultation or download.

- [Master Guide](#)
- [Operations Guide](#)
- [Installation and Upgrade Guide](#)

To find a key word once a guide is open, press CTRL + F (Windows users), type the word in the [Find](#) field, and then click [Find Next](#).

Access the Configuration Guide of SAP Convergent Charging

If you need more information about configuring and maintaining the master data for a service provider, we recommend that you consult the SAP Convergent Charging [Tuning Guide](#) on SAP Help Portal.

Access the Primary help for Subscription-Based Business

In case of a system landscape with customer master data including subscriptions, you can set up the SAP CC Core Tool user interface to work with all kinds of data related to the charging process based either on subscriptions or provider contracts.

Consult the [Primary Help of Core Tool \[page 356\]](#) and the [Logic Component Reference \[page 831\]](#) Reference on the SAP site.

Access the Application Help Documentation

The [Application Help](#) document is provided in the Software Development Kit (SDK) of SAP Convergent Charging. A version is available on SAP Help Portal for online consultation.

Access the Technical Documentation

The Web Services Documentation, the SAP CC Java/XML API References, and the SAP CC Error Code Reference documents are provided in the Software Development Kit (SDK) of SAP Convergent Charging. A version is available on SAP Help Portal for online consultation,

- [Web Services Documentation](#)
- [Core APIs](#)
- [Error Code Reference](#)

→ Tip

You can also download these product documents on [SAP Help Portal](#).

Access the SAP Notes

SAP Notes and SAP Knowledge Base Articles (KBA) help you find answers to questions that arise from your daily work with SAP Convergent Charging:

- [Searching for 'cockpit' in SAP Notes and Knowledge Base Articles \(KBAs\)](#)

2.4.31.5.2 Typographical Conventions

The following typographical conventions are used in the primary help of SAP Convergent Charging 5.0:

- Text or a button that appears on the graphical user interface is written like *this*.

- System commands, names of folders and files, and codes used in APIs are written in Code font.
- Menu choices are shown in this format: ► *menu name* ► *submenu name* ► *menu item name* ►.
- Text to be typed into a field is shown as follows: **userinput**.
- Blue text indicates an active hyperlink to another part of the primary help or a pop-up window that provides you with extra information on a task.
- UI names or features are displayed in purple.

2.4.31.6 Logic Components for a Price Plan

 Caution

Read the [caution about components \[page 831\]](#) carefully.

Each main branch of a price plan in a [charge \[page 570\]](#) begins with a [rate component \[page 853\]](#) (usage, recurring, or one-shot) linked to a rate activation method.

To create a decision tree, you must:

1. Select the *Price Plan* node in the charge to set up.
2. In the left bar, select a [rate component \[page 853\]](#) in the *Rates* pane.
3. Add components from other families according to your price plan requirements.
4. End each branch of the tree with a [function component \[page 895\]](#).

Component Families

In SAP Convergent Charging, logic components are grouped into families according to their functional usage. Each component is represented by a specific icon. In the user interface, these families are represented by a specific color and an icon, and they are visible in the toolbars of the *Charge* and *Pricing Macro* windows. A logic component is of the same color as the one of its family.

The following table presents the component families available in a price plan:

Family icon	Name of the family	Function of the component family	Location of the component family
	Rates [page 853]	Defines the rating type (Usage [page 854] , Recurring [page 856] or One-Shot Rate [page 862])	Always at the root of the decision tree.
 Note Unavailable in a pricing macro.			
	Functions [page 895]	Refer to the basic components [page 894]	Refer to the basic components [page 894]

Family icon	Name of the family	Function of the component family	Location of the component family
	Comparators [page 905]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Splitters [page 928]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Operators [page 939]	Refer to the basic components [page 894]	Refer to the basic components [page 894]

Related Information

[Logic Components for a Charging Plan \[page 863\]](#)

[Logic Components in the Refill Logic \[page 875\]](#)

2.4.31.6.1 Rate Components

Rate components define tariffs (prices) for the chargeable services or products. They are always found at the root of the decision tree of a price plan.

The different types of rate components are available depending on the triggering type that the pricing specialist needs to implement.

The following table shows the different types and the relevant triggering:

Type of Rate Component	Triggering	Examples
Usage	Each consumption of a chargeable service or use of a product to monetize	A telephone call, a video download
Recurring	Periodic	Yearly fees or monthly fees
One-Shot	Once only	One-off fees (subscription, contract resumption) or administrative fees

Rate Components in SAP CC

The following types of rate components are available in SAP Convergent Charging:

Icon	Name	Action/Use
	Usage Rate [page 854]	Calculates the price of a usage event (service consumption or product use). This Rate is activated each time a customer service is used (or consumed).
	Recurring Rate [page 856]	Calculates a price on a periodic basis: Day, week, month, and year. For example, the Recurring Rate can be used in the case of subscriptions or line rental.
	One-Shot Rate [page 862]	Calculates the price of a one-shot event such as the activation, the suspension, or the resumption of a subscription.

Related Information

[Usage Rate \[page 854\]](#)

[Recurring Rate \[page 856\]](#)

[One-Shot Rate \[page 862\]](#)

2.4.31.6.1.1 Usage Rate



The **Usage Rate** component creates in the decision tree a main branch that specifies the tariffs (prices) for the use of a product or for the consumption of a service by end customers. Each product use or service consumption leads to corresponding transactional events. These events are named *chargeable items* in SAP Convergent Charging (SAP CC). Each time an end customer consumes a service or uses a product, some chargeable items are sent to the SAP CC systems for being real-time or batch processed.

The configuration of a Usage Rate component requires the selection of a [chargeable item classes \[page 531\]](#) that specifies the properties of the incoming chargeable items (input data) to be charged by SAP Convergent Charging.

i Note

Only the *Usage Rate* component uses [chargeable item classes \[page 531\]](#). The [Recurring Rate \[page 856\]](#) and [One-Shot Rate \[page 862\]](#) components do not use chargeable item classes.

Rules

The rules are the following:

- A price plan can contain several usage rates.
- You must at least assign a chargeable item class to a usage rate.
- If the [Chargeable Item Class](#) list of the [Definition](#) tab contains many chargeable item classes, you assign each chargeable item class to a different usage rate, or you assign all the chargeable item classes to the same usage rate. You cannot however assign a chargeable item class to several usage rates.
- If a chargeable item class is assigned to a usage rate, the default properties and the user-defined properties of this chargeable item class are available only in the branch using this usage rate.
- The [Charge Effective Date](#) property, which represents the subscription date to an offer, is available in the [Usage Rate](#) branch.
- If all the chargeable item classes are assigned to a usage rate, the default properties and the user properties of these chargeable item classes are not available in the branch using this usage rate. Only the properties related to the charge are available.
For example, the [Charge Effective Date](#), the [Currency Code](#), and the [ISO Currency Code](#) are properties available in the related branch.

Use

You use the [Usage Rate](#) component to trigger and rate chargeable item classes.

❖ Example

The following examples shows how to use the [Usage Rate](#) component:

- Phone call fees that are based on the [Phone Call](#) chargeable item class and charged each time that the customer makes a call
- Online news fees that are based on the [Open Document](#) chargeable item class and charged each time that the customer opens a document

To use a chargeable item class called [Phone Communication](#) a customer is charged a fee for each phone call. The rate is \$0.10 per minute. The following table shows the rating process information:

Data	Name/Content
Chargeable item class	Name: Phone Communication. Type of chargeable item class: Service. User property name: Call duration.
Branch of the price plan	The chargeable item class "Phone Communication" is assigned to the Usage Rate component. The branch contains a linear function component to compute the call price with the numerical property "Call duration".

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Type the business description of the component (optional).

Definition (Tab)

Note

If the chargeable item class belongs to a **chargeable item package coming from a version earlier than SAP CC release 4.0**, the chargeable item class is identified by a two-part name, one of which is in parentheses. For example, the chargeable item class "SMS (E2E_TELCOMOB_CIP)" is part of the chargeable item package "E2E_TELCOMOB_CIP".

Remember that you cannot assign a chargeable item class to several Usage Rates in the same charge. For example, you cannot assign the chargeable item class "SMS" to a Usage Rate and the chargeable item class "SMS (E2E_TELCOMOB_CIP)" to another Usage Rate because SAP CC (from 4.0 onwards) considers the two chargeable item classes as the same one.

For more information about chargeable item packages, consult the [primary help of Core Tool \[page 348\]](#).

Chargeable Item Class: Provides the list of [chargeable item classes \[page 531\]](#) that define the data structure of the incoming chargeable items (input data) to be rated and charged by the system. Select a chargeable item class or select *All Chargeable Item Classes*.

If you select the *All Chargeable Item Classes* option, you assign all the chargeable item classes to a *Usage Rate* component. The *All Chargeable Item Classes* option is available if no chargeable item is already assigned to another *Usage Rate*.

→ Tip



To open and modify the chargeable item class, click . Note that this icon is dimmed if you have selected the *All Chargeable Item Classes* option.

2.4.31.6.1.2 Recurring Rate



The **Recurring Rate** component creates in the decision tree a main branch that is charged on a periodic basis. This logic component is characterized by:

- A **triggering rule** expressed by a:
 - Frequency (day, week, month, year)

- Starting date and time
- **Payment rules** expressed by a:
 - Charging mode at the beginning of the period (prepaid periods)
 - Prorated payment based on the start date/time and end date/time of the subscription

→ Remember

When you insert a *Recurring Rate* in the decision tree of a dependent charge, you cannot set up and use the prorata parameters of the *Advanced* tab. Calculations made on a prorata basis are not allowed in a dependent charge; therefore, if your master charges make calculations on a prorata basis, SAP SE recommends that you use the property *Base Amount* in the related dependent charges to make calculations triggered by the master charges.

For example, if a refund is made on a prorata basis in a master charge, use the property *Base Amount* in the related dependent charges to make calculations relative to the master charge.

Rules

The rules are the following:

- A price plan can contain several recurring rates.
- When you insert a recurring rate in a price plan, some properties are available in the *Recurring Rate* branch:

Property	Description
<i>Charge Effective Date</i>	The subscription date/time to an offer.
<i>Recurring Event Date</i>	The date and time when the recurring rate is triggered by the system.
<i>Prorata Computation</i>	This string property takes one of the two values "prorated" or "not prorated" depending on the result of the prorated calculation. In your logic, you can test this property to check if a transaction has been prorated or not.

Property	Description
<i>Refund Computation</i>	<i>Refund Computation</i>: This string property takes one of the two values "refunded" or "not refunded" depending on changes made to the expiration date/time or cancellation date/time in subscriptions. In your logic, you can test this property to check if a transaction has been refunded or not. In a subscription, if you change the expiration date/time or the cancellation date/time to an earlier date, a refund is automatically generated by the system depending on the periodic basis set up to trigger the recurring rate. For example, a subscription relates to an offer including a recurring rate that triggers a subscription fee of \$5 the 1st of every month. In the subscription, the <i>Expiration Date</i> is the 5th of July. You decide to change this expiration date/time to the 5th of April. Thus, the total refund for May, June, and July will be an amount of \$15. i Note A refund is not possible for the components usage rate [page 854] and one-shot rate [page 862].
<i>Reference Start for Recurring Period</i> (aka <i>Recurring Period Reference Start</i>)	The start date/time of the reference period related to a recurring rate
<i>Reference Stop for Recurring Period</i> (aka <i>Recurring Period Reference Stop</i>)	The stop date/time of the reference period related to a recurring rate
<i>Recurring Period Start</i>	The period start related to a recurring rate. It may be different from the <i>Reference Start for Recurring Period</i> and can be used to compute the prorator factor.
<i>Recurring Period Stop</i>	The period stop related to a recurring rate. It may be different from the <i>Reference Stop for Recurring Period</i> and can be used to compute the prorator factor.

- If you insert a Recurring Rate component in a dependent charge¹⁰⁸, the related master charge always triggers the dependent charge.

Use

You use the *Recurring Rate* component:

- To trigger and calculate a charge that is based on a time period such as monthly subscription or equipment rental costs that are billed on an annual basis

¹⁰⁸ A dependent charge is synchronized with or triggered by another charge. For example, a dependent charge is triggered when an offer is subscribed. A dependent charge can be a commission, a sponsorship, or a discount. Contrary to the dependent charge, the master charge is not triggered by another charge.

- To calculate a commission, a sponsorship, or a discount through a dependent charge that is triggered by a master charge
- To describe specific recurring actions such as resetting a counter to zero

❖ Example

You may use a [Recurring Rate](#) component in a master charge to define recurring charges for a monthly telephone service subscription. If a commission, which is also generated on a monthly basis, is paid to a third party, you need to use a [Recurring Rate](#) component in the dependent charge that includes this commission.

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label for the pricing transactions.

Description: Type the business description of the component (optional).

General (Tab)

This tab defines the frequency and the starting date for triggering the [Recurring Rate](#) component.

→ Remember

Once you have set up a recurring rate, SAP SE recommends not to change the frequency or the starting date/time. A change can cause serious errors.

i Note

In a dependent charge, you cannot configure the settings of the [General](#) Tab.

Reference Date: Provides the list of dates/times for triggering the [Recurring Rate](#) component. Select a date and time that you can combine with the settings chosen in the [This recurring rate is triggered](#) area to trigger the [Recurring Rate](#) component.

i Note

The [Reference Date](#) is used only if you select the following options:

- [The same day as the reference date](#)
- [The same day as the reference date or first day of next month](#)
- [The same time as the reference date](#)

If you select another option, the [Reference Date](#) is ignored.

Calendar: Provides the list of available calendars on which the recurring event is based.

⚠ Caution

Once the calendar is set, SAP SE highly recommends not to change it. A change can cause inconsistencies.

This recurring rate is triggered: Provides the list of recurrences or frequencies:

- For *Gregorian Calendar*, the available periodicities are the following:
 - *Every, Every other, Every 3rd*, and other items associated with the following list: *day, week, month, year*. For example, you can set up the triggering of a recurring rate that is "Every 3rd month on Tuesday". The different options to select the starting date are the following:
 - *The same day as the reference date*: If you click this option, the recurring rate is triggered depending on the date selected in the *Reference Date* list. See the note below.
 - *The same day as the reference date or first day of next month*: If you click this option, the recurring rate is triggered depending on the date selected in the *Reference Date* list or the first day of the month following that of the selected date in the *Reference Date* list. See the note below.
 - *the*: If you have selected the frequency *Every* (3rd, 4th, and so on) *month* or *year*, this option triggers the *Recurring Rate* depending on the day of the month that you select. This option is combined with the list of numbers (from 1 to 31), the list of items such as Last, First, Second, Third and Fourth and the list of weekdays and months. Examples: the *Recurring Rate* is triggered Every 5th month the 11 of the month; the recurring rate is triggered Every year The Second Sunday of January.
 - *on*: If you have selected the frequency *Every* (3rd, 4th, and so on) *week* or *year*, this option triggers the *Recurring Rate* depending on the day of the week or the month that you select. Examples: the recurring rate is triggered Every 4th week on Wednesday; the recurring rate is triggered Every year on the 1st of January
 - *at*: Allows you to select the starting hour if you have selected any of the previous options. This option includes hours and minutes combined with AM (ante meridiem) or PM (post meridiem). For example: the Recurring Rate is triggered Every day at 07:25 PM. You can select the option *The same time as the reference date* that is the date selected in the *Reference Date* list.

i Note

About *The same day as the reference date* and *The same day as the reference date or first day of next month* options.

If you select both of the *Every month* and *The same day as the reference date* options, the *Recurring Rate* will be triggered every month on the *Reference Date*; however, if you select the 31st of the month as the *Reference Date*, the *Recurring Rate* will be triggered the 31st of every odd month but the 30th of every even month (or the 28th of February, for example, if February has 28 days).

If you select both of the *Every month* and *The same day as the reference date or first day of next month* options, the *Recurring Rate* will be triggered every month on the *Reference Date* or the first day of the next month depending on how many days the month has. For example, if you select the 31st of the month as the *Reference Date*, the *Recurring Rate* will be triggered the 31st of every odd month but the 1st of the month following every even month; however, as February can have 28 or 29 days, the *Recurring Rate* will always be triggered the 1st of March if the *Reference Date* is the 31st of the month.

The table below shows you the dates on which the *Recurring Rate* will be triggered if you select the 31st of March as the *Reference Date*:

In the month of	The recurring rate will be triggered
January	The 31st of January
February	The 1st of March
March	The 31st of March
April	The 1st of May
May	The 31st of May
June	The 1st of July
July	The 31st of July
August	The 31st of August
September	The 1st of October
October	The 31st of October
November	The 1st of December
December	The 31st of December

- For *4-4-5 Calendar*, the available periodicities are the following:
 - Every month*, *Every quarter*, *Every semester* and *Every year*.

i Note

The other options, available with the Gregorian Calendar, do not appear any longer. They are useless with the 4-4-5 Calendar.

Advanced (Tab)

This tab defines the charging mode and the settings of the prorated calculation.

i Note

In a dependent charge, you cannot configure these options.

Charged at the beginning of the period: Click to start the charge at the beginning of the period. You must specify the number of the prepaid periods.

- Prepaid Period Number*: The value of 0 means that one period will be prepaid; the value of 1 means that two periods will be prepaid; the value of 2 means that three periods will be prepaid, and so on.
Default option: 0

Proportional during the period: Click to prorate the calculation of the recurring charge according to the subscription date/time and the cancellation date/time of the subscription.

You must specify the calculation parameters in *Prorata Parameters*:

- Refund*: Define how transactions generated at the beginning of the last period are refunded at the end of the contract item.

- **Partial:** Issue a transaction with a negative prorated amount to correct the initial transaction. For example, a monthly recurring rate (triggers at the beginning of periods) generates a transaction with an amount of 30€. The end date/time of the related contract item is set to the 20th of the month. On the end date, a transaction with a -10€ amount is generated (assuming there are 30 days in the month).
- **Complete:** Issue a first transaction with a negative full amount to correct the initial transaction and then a second transaction with the correct prorated amount. For example, a monthly recurring rate (triggers at the beginning of periods) generates a transaction with an amount of 30€. The end date/time of the related contract item is set to the 20th of the month. On the end date, a first transaction with a -30€ amount is generated (assuming there are 30 days in the month) and a second one with a 20€ amount is generated as well.
- **Rounding step:** Adjust the step rule for rounding the duration.

❖ Example

For example, if the rounding step value is 5 seconds and the rounding mode is *To the next greater value*, a duration of 47 seconds is rounded to 50 seconds. In this example, therefore, the rounding step consists of 5-second intervals. The time unit of the rounding step is expressed in *second*, *minute*, *day*, or *year*.

Default option: *seconds*

- **Rounding mode:** Select one of the rounding mode of the calculation result: *To the next greater value*, *To the previous value* or *To the nearest value*. Default option: *To the nearest value*.
- **Use typical period of:** If selected, this option allows you to turn a variable period into a constant period. Once you have selected the *Use typical period of* option, you can either select the value of a property or select *Numerical Value*, and then type a number.

❖ Example

For example, to turn each month into a constant period of 30 days, click *Use typical period of*, select *Numerical Value* in the list, and then type 30. If you clear *Use typical period of*, the reference period is 28 days in February, 31 days in January, and so on.

2.4.31.6.1.3 One-Shot Rate



The *One-Shot Rate* component creates in the decision tree a main branch that is charged only when precise events related to subscriptions occur. These events are the following:

- The activation of a subscription item
- The suspension or the resumption of a subscription item
- The cancellation or the early cancellation of a subscription (The early cancellation of a subscription occurs if the subscription is cancelled before the planned End Obligation Date).

Rules

The rules are the following:

- A price plan can contain several One-Shot Rates: For example, a One-Shot Rate for each type of the event such as Activation, Suspension, Resumption, Cancellation
- When you insert a One-Shot Rate in a price plan, the Charge Effective Date, the Suspension date the Cancellation date¹⁰⁹ and the Resumption date of the subscription item are available in the One-Shot Rate branch depending on the selected type of the event.

Use

You use the One-Shot Rate component to configure one-off fees in SAP Convergent Charging. A One-Shot Rate specifies the triggering dates of fees relating to events linked to subscription items. You can use this component to charge an end customer for the equipment installation fees, the creation fees of a , subscription, the cancellation fees of a subscription, and so on.

❖ Example

For a chargeable item class called **Telephone Service**, every new customer has to pay a one-time installation fee, which is paid when the subscription is signed. This charge can be rated with a One-Shot Rate, which is activated by the *Activation* event.

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Allows you to type the description of the component (optional).

Definition tab

Event Name: Provides the list of events that trigger the One-Shot Rate component. Select one of the following events:

- *Activation*
- *Suspension*
- *Resumption*
- *Cancellation*
- *Early cancellation*

2.4.31.7 Logic Components for a Charging Plan

Charging components are used to create a charging plan in a [charge \[page 560\]](#). Together the components make up a charging tree. You create a charging plan to configure the determination of the [prepaid account](#)

¹⁰⁹ The Cancellation Date is available only if you select "Cancellation" or "Early cancellation" in the Event Name box of the Definition tab. The Cancellation Date only applies to subscriptions.

[page 670] or the [external postpaid account](#) [page 675] to be debited or credited with the calculated amount of the executed [price plan](#) [page 570].

To create a decision tree, you must:

1. Select the [Charging Plan](#) node in the charge to set up.
2. In the left bar, select a [charging component](#) [page 864] in the [Charging](#) pane.
3. Add components from other families to the charging tree according to your charging plan requirements.
4. End each branch of the decision tree with a [Reference](#) component.

Component Families

In SAP Convergent Charging, logic components are grouped into families according to their functional usage. Each logic component is represented by a specific icon. In the user interface, these families are represented by a specific color and icon, and they are visible in the toolbar of the [Charge](#) window. A logic component is of the same color as the family which it belongs to.

The following table presents the component families available in a charging plan:

Family icon	Name of the family	Function of the component family	Location of the component family
	Charging [page 864]	Defines the charging type (Usage, One-Shot, Recurring or Default).	Always at the root of the charging tree.
	Reference Component	Identifies and charges or refills an account.	Always at the end of the branches. References are the leaves of the tree.
	Comparators [page 905]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Operators [page 939]	Refer to the basic components [page 894]	Refer to the basic components [page 894]

Related Information

[Logic Components for a Price Plan](#) [page 852]

[Logic Components in the Refill Logic](#) [page 875]

2.4.31.7.1 Charging Components

Charging components are always found at the root of the charging tree. A charging component is activated by one or more [rate components](#) [page 853].

The following table shows the different types and their relevant activation:

Type of charging component	Activation
Usage	Usage Rate
Recurring	Any Recurring Rate
One-Shot	Any One-Shot Rate
Default	Any rate component

Charging Components

The following types of charging components are available in SAP Convergent Charging:

Icon	Name	Action/Usage
	Usage Charging [page 866]	Creates in the charging tree a main branch that charges to an account each calculated amount of one or more usage rates [page 854] defined in the price plan.
	Recurring Charging [page 867]	Creates in the charging tree a main branch that charges to an account each calculated amount of all recurring rates [page 856] defined in the price plan.
	One-Shot Charging [page 867]	Creates in the charging tree a main branch that charges to an account each calculated amount of all one-shot rates [page 862] defined in the price plan.
	Default Charging [page 868]	Is in the charging tree a main branch that charges to an account each calculated amount of rate components [page 853] when no specified charging is defined.

Related Information

[Logic Components for a Charging Plan \[page 863\]](#)

2.4.31.7.1.1 Usage Charging



The *Usage Charging* component creates in the charging tree a main branch that charges to an account the calculated amount of each *Usage Rate* [page 854] defined in the price plan.

Rules

i Note

If the price plan contains one or more Usage Rates and if the charging plan contains no *Usage Charging*, the *Default Charging* [page 868] is activated by each Usage Rate.

The following rules apply to the *Usage Charging* component:

- You must assign at least a chargeable item class to a Usage Charging.
- If the Chargeable Item Class list of the Definition tab contains many chargeable item classes, you assign each chargeable item class to a different Usage Charging, or you assign all the chargeable item classes to the same Usage Charging. You cannot however assign a chargeable item class to several Usage Charging
- See the rules below relating to the price and charging plans:

If the price plan contains	And if the charging plan contains	Then
n (≥ 1) Usage Rate(s)	One Usage Charging	The Usage Charging is activated: ◦ EITHER by the Usage Rate set up with the same chargeable item class as the Usage Charging¹¹⁰ ◦ OR by all the Usage rates if the Usage Charging is set up with the option <i>All Chargeable Item Classes</i>
n (> 1) Usage Rates	m (> 1) Usage Charging	◦ n $<$ m: Impossible¹¹¹ ◦ n $\geq$ m: Each Usage Charging is activated by a different Usage Rate set up with the same chargeable item class as the related Usage Charging¹¹²

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of charging transactions.

Description: Allows you to type the description of the component (optional).

¹¹⁰ The Usage Rates which are not linked to a Usage Charging activate the Default component

¹¹¹ The number of Usage Rate cannot be less than the number of Usage Charging

¹¹² The Usage Rates which are not linked to a Usage Charging activate the Default component

Definition tab

Chargeable Item Class: Provides the list of chargeable item classes related to chargeable item packages. Select a chargeable item class or select All Chargeable Item Classes. If you select the [All Chargeable Item Classes](#) option, you assign all the chargeable item classes of one or more chargeable item packages to one Usage Charging component; however, user properties or default properties are not available in the Usage Charging branch except the charge effective date property. The [All Chargeable Item Classes](#) option is available if no chargeable item class is already assigned to another Usage Charging. To open and modify the chargeable item

class, click . Note that this icon is dimmed if you selected the [All Chargeable Item Classes](#) option.

2.4.31.7.1.2 Recurring Charging



The [Recurring Charging](#) component creates in the charging tree a main branch that charges to an account the calculated amount of each [Recurring Rate \[page 856\]](#) defined in the price plan.

Rules

The following rules apply to the [Recurring Charging](#) component:

- A charging plan contains one Recurring Charging at the most
- If the price plan contains n (≥ 1) Recurring Rate(s), the Recurring Charging is activated by each Recurring Rate
- If the charging plan contains no Recurring Charging, the [Default Charging \[page 868\]](#) is activated by each Recurring Rate

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of charging transactions.

Description: Allows you to type the description of the component (optional).

2.4.31.7.1.3 One-Shot Charging



The [One-Shot Charging](#) component creates in the charging tree a main branch that charges to an account the calculated amount of each [One-Shot Rate \[page 862\]](#) defined in the price plan.

Rules

The following rules apply to the One-Shot Charging component:

- A charging plan contains one One-Shot Charging at the most
- If the price plan contains n (≥ 1) One-Shot Rate(s), the One-Shot Charging is activated by each One-Shot Rate
- If the charging plan contains no One-Shot Charging, the [Default Charging \[page 868\]](#) is activated by each One-Shot Rate

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of charging transactions.

Description: Allows you to type the description of the component (optional).

2.4.31.7.1.4 Default Charging



The [Default Charging](#) component is in the charging tree a main branch that charges to an account the calculated amount of each [Rate component \[page 853\]](#) when no specific charging is defined. Unlike the other charging components, the [Default Charging](#) component cannot be removed from the charging tree.

i Note

When you create a charge, the [Charge](#) window displays a default charging plan with a [Default Charging](#) and a [Default Reference](#). If necessary, you can remove the [Default Reference](#) that you replace by any other reference.

Rules

The following rules apply to the [Default Charging](#) component:

If the price plan contains	And if the charging plan contains	Then
 n (≥ 1) Usage Rate(s)	No Usage Charging	The Default Charging component is activated by each Usage Rate
 n (≥ 1) Usage Rate(s)	One Usage Charging	The Default Charging component is activated by the Usage Rates which are not linked to a Usage Charging
 n (> 1) Usage Rates	m (> 1) Usage Charging	The Default Charging component is activated by the Usage Rates which are not linked to a Usage Charging
 n (≥ 1) Recurring Rate(s)	No Recurring Charging	The Default Charging component is activated by each Recurring Rate

If the price plan contains	And if the charging plan contains	Then
 n (≥ 1) One-Shot Rate(s)	No One-Shot Charging	The Default Charging component is activated by each One-Shot Rate

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of charging transactions.

Description: Allows you to type the description of the component (optional).

2.4.31.7.2 Reference Components

In the [charging plan \[page 575\]](#) of a charge, a reference defines which account of a subscriber will be charged or refilled with a calculated amount of the price plan. Reference components make up the leaves of the charging tree.

→ Remember

The credit limit balances are not available in the data model based on charge plans/provider contracts. You cannot use them if your environment includes such contracts.

Reference Components

The following reference components are available with SAP Convergent Charging:

Icon	Name	Action/Usage	Availability
	Default Reference [page 870]	Charges one account and up to 3 credit limit balances through the default reference of the Internal Reference Dictionary.	Former data model (DM) based on offers/subscriptions
	Internal Reference [page 871]	Charges one account and up to three credit limit balances through a reference of the Internal Reference Dictionary.	Both data models

Icon	Name	Action/Usage	Availability
	External Reference [page 873]	Charges an external account outside SAP Convergent Charging by specifying the related client/partner and service provider.	Former data model (DM) based on offers/subscriptions
	Refill [page 873]	Refills one account through a reference of the Internal Reference Dictionary.	Former data model (DM) based on offers/subscriptions

Related Information

[Logic Components for a Charging Plan \[page 863\]](#)

2.4.31.7.2.1 Default Reference



The *Default Reference* component charges one account and up to three credit limit balances through the default reference of the Internal Reference Dictionary.

The Default Reference is a unique [Internal Reference \[page 871\]](#) permanently included in the Internal Reference Dictionary.

In a subscription, a charge is defined by the charging mapping made up of several columns¹¹³ that allows you to associate the Default Reference of the charge with any account of a subscriber. When the charging plan is activated, the calculated amount of the price plan is charged to the specified accounts according to the charging mapping.

Note

In the [Default Charging \[page 868\]](#), you can remove the Default Reference, and then replace it by any other reference. Unlike the internal references, the Default Reference is unique; however, you can assign the Default Reference to various charging components in the same charging plan.

You cannot use this component if the convergent charging services are based on provider contracts.

Identification Area

Name: Type the name of the component (mandatory).

¹¹³ The columns are Charging Reference, Charged Account, Credit Limit Balance#1, Credit Limit Balance#2, and Credit Limit Balance#3. Charged Account and Credit Limit Balances are part of the subscriber's accounts and are used to control the subscriber's expenses.

Description: Allows you to type the description of the component (optional).

Definition Tab

Prepaid Account Charging Depending on Account Data State: Allows you to define the conditions for charging the prepaid accounts depending on their state and the component types used in the pricing branch. You are provided with two sliders, one for the Free Function component and one for the other components.

- *Charge Free Component Rates on:* This slider defines the conditions for charging the prepaid accounts when using [Free Function \[page 898\]](#) components in the pricing branch. The calculated amount of the price plan is charged to the prepaid accounts depending on both the slider position and the current state of the prepaid accounts. The table below shows you the expected charging: Yes (the prepaid accounts can be charged) or No (the prepaid accounts cannot be charged). For example, if you set the slider to *Blocked*, the prepaid accounts can be charged only if their state is *Active* or *Blocked*. But if the slider is set to *Closed*, the prepaid accounts can be charged whatever their state. Select one of the slider positions:

Slider position	State of the prepaid accounts			
	Active	Blocked	Locked	Closed
Closed	Yes	Yes	Yes	Yes
Locked	Yes	Yes	No	No
Blocked	Yes	Yes	No	No
Active	Yes	No	No	No

- *Charge Rates Other Than Free on:* This slider defines the conditions for charging the prepaid accounts when using any components other than Free Function components in the pricing branch. Refer to the description above.

Authorize overspending: Click this option to allow the prepaid account and credit limit balances to be overspent. Select one of the two options:

- *Only on Credit Limit Balances:* The prepaid account and credit limit balances are both debited with calculated amounts of the price plan. When the prepaid account is less than its empty limit, charging is rejected.
- *On Prepaid Accounts and Credit Limit Balances:* The prepaid account and credit limit balances are both debited even if the prepaid account is less than its empty limit.

2.4.31.7.2.2 Internal Reference



The *Internal Reference* component charges one account and up to three credit limit balances through a reference of the [Internal Reference Dictionary](#).

In a subscription, a charge is defined by a charging mapping made up of several columns¹¹⁴ that allows you to associate an Internal Reference of the charge with any account of a subscriber. When the charging plan is

activated, the calculated amount of the price plan is charged to the specified accounts according to the charging mapping.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Internal Reference: Provides the list of the references of the Internal Reference Dictionary. Select the Internal Reference to assign to the Internal Reference component.

Prepaid Account Charging Depending on Account State: Allows you to define the conditions for charging the prepaid accounts depending on their state and the component types used in the pricing branch. You are provided with two sliders, one for the Free Function component and one for the other components.

- **Charge Free Component Rates on:** This slider defines the conditions for charging the prepaid accounts when using [Free Function \[page 898\]](#) components in the pricing branch. The calculated amount of the price plan is charged to the prepaid accounts depending on both the slider position and the current state of the prepaid accounts. The table below shows you the expected charging: Yes (the prepaid accounts can be charged) or No (the prepaid accounts cannot be charged). For example, if you set the slider to **Blocked**, the prepaid accounts can be charged only if their state is **Active** or **Blocked**. But if the slider is set to **Closed**, the prepaid accounts can be charged whatever their state. Select one of the slider positions:

Slider position	State of the prepaid accounts			
	Active	Blocked	Locked	Closed
Closed	Yes	Yes	Yes	Yes
Locked	Yes	Yes	Yes	No
Blocked	Yes	Yes	No	No
Active	Yes	No	No	No

- **Charge Rates Other Than Free on:** This slider defines the conditions for charging the prepaid accounts when using any other components other than Free Function components in the pricing branch. Refer to the description above.

Authorize Overspending on Prepaid Account: Click this option to allow the prepaid account and credit limit balances to be overspent. Select one of the two options:

- **Only on Credit Limit Balances:** Credit limit balances can be less than 0, but overspending is not authorized when the prepaid account is less than its empty limit.

¹¹⁴ The columns are Charging Reference, Charged Account, Credit Limit Balance#1, Credit Limit Balance#2, and Credit Limit Balance#3. Charged Account and Credit Limit Balances are part of the subscriber's accounts and are used to control the subscriber's expenses.

- *On Prepaid Accounts and Credit Limit Balances*: The Prepaid account and credit limit balances can both be less than 0. Overspending is always authorized.

2.4.31.7.2.3 External Reference



The *External Reference* component charges an account outside SAP Convergent Charging.

i Note

- The External Reference component must not be used when the rating process is activated
- The External Reference is not included in the Internal Reference Dictionary of a charging plan. You cannot use an External Reference in the charging mapping of a charge included in a subscription.
- Tax is never calculated when using an external reference. Only the third-party billing system can compute the tax by using:
 - The tax information provided by SAP CC and retrieved from the charges in the subscribed offer
 - The tax information which depends on the account defined in the third-party billing system
- You cannot use this component if the convergent charging services are based on provider contracts.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition Tab

The name of the external reference is a character string.

External Reference: Type the name of the external reference, or select a string property or a string parameter.

2.4.31.7.2.4 Refill



The *Refill* component refills one prepaid account through a reference of the Internal Reference Dictionary.

i Note

The Refill component can be used to simulate a transfer by debiting a first account with the calculated amount of the price plan, and then crediting a second account with the same amount. You cannot use this component if the convergent charging services are based on provider contracts.

In a subscription, a charge is defined by a charging mapping made up of several columns¹¹⁵ that allows you to associate an Internal Reference of the charge with any account of a subscriber. When the charging plan is activated, the specified accounts are refilled according to the charging mapping.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition Tab

You define the references that will be associated with the accounts to be credited or debited.

Refilled charging reference: Provides the list of the Internal References of the Dictionary. Select the Internal Reference that will be associated with the account to be credited.

Transfer from account: If clicked, this option provides the list of the available Internal References of the Dictionary. Select the reference that will be associated with the account to be debited. The option *Transfer from account* allows you to debit an account with the same amount used to credit another account.

Expiration schedule postponed: Allows you to postpone the schedule of the states of the prepaid account previously set up in the subscriber account. For more information, click [here \[page 670\]](#).

- *Blocked on*: Select a date property or click the calendar button , and then select a date on which the prepaid account will be blocked.
- *Locked on*: Select a date property or click the calendar button , and then select a date on which the prepaid account will be locked.
- *Closed on*: Select a date property or click the calendar button , and then select a date on which the prepaid account will be closed.

Prepaid balance is: You can impose conditions on the refill of a prepaid account.

- *Clipped*: Click this option to prevent the prepaid balance from being greater than a specified amount. Type the amount expressed in the currency of the price plan. If the sum of the balance amount and the refill amount is greater than the clipping value, the account will only be refilled up to the clipping value.
- *Emptied before balance refill*: Select this option to reset the balance before refill. Furthermore, select *Only if blocked or locked*, if you want to reset a blocked or locked prepaid balance only.

¹¹⁵ The columns are Charging Reference, Charged Account, Credit Limit Balance#1, Credit Limit Balance#2, and Credit Limit Balance#3. Charged Account and Credit Limit Balances are part of the subscriber's accounts.

2.4.31.8 Logic Components in the Refill Logic

Each main branch of the [refill logic](#) begins with a [refill component \[page 876\]](#) ([usage \[page 877\]](#), [recurring \[page 879\]](#), or [one-shot \[page 882\]](#)) linked to a refill activation method.

To create a refill tree, you must:

1. Select a [refill component \[page 876\]](#).
2. Add components from other families according to your refill plan requirements.
3. End each branch of the tree with a [function component \[page 895\]](#).

Component Families for the Refill Logic

In SAP Convergent Charging, logic components are grouped into families according to their functional usage. Each component is represented by a specific icon. In the graphical user interface, these families are represented by a specific color and an icon, and they are visible in the toolbar of the [Refill](#) window. A logic component is of the same color as the family which it belongs to.

The following table presents the component families available in the refill logic:

Family icon	Name of the family	Function of the component family	Location of the component family
	Refills [page 876]	Defines the refill type (Usage [page 877] , Recurring [page 879] , One-Shot [page 882] , or Account Event [page 883])	Always at the root of the refill tree. i Note Unavailable in a pricing macro.
	Functions [page 895]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Comparators [page 905]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Splitters [page 928]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Operators [page 939]	Refer to the basic components [page 894]	Refer to the basic components [page 894]

Related Information

[Logic Components for a Price Plan \[page 852\]](#)

2.4.31.8.1 Refill Components

⚠ Caution

As of SAP CC 5.0 SP 5, these logic components are not available in case of an integrated *SAP Solution* scenario with SAP S/4HANA Cloud.

For further information, refer to SAP Note [2772452](#) .

Refill components are always found at the root of the refill tree in the [refill logic](#). The different types of refill components are available depending on the triggering type that the pricing specialist needs to implement.

The following table shows the different types and the relevant triggering:

Type of Refill Component	Triggering	Examples
Usage	Each usage	Refill through a cash machine
Recurring	Periodic	Refill depending on the threshold of a balance
One-Shot	Once only	Refill at the contract activation
Account Event	Once only	Automatic refill when the prepaid balance goes under a specified threshold

Refill Components

The following types of refill component are available in SAP Convergent Charging:

Icon	Name	Action/Usage
	Usage Refill [page 877]	Computes refill events
	Recurring Refill [page 879]	Computes refills on a periodic basis
	One-Shot Refill [page 882]	Computes refills only when precise events related to provider contracts occur
	Account Event Refill [page 883]	Computes refills only when precise events related to the account occur

Related Information

[Logic Components in the Refill Logic \[page 875\]](#)

2.4.31.8.1.1 Usage Refill



The **Usage Refill** component creates in the refill tree a main branch that computes refill events. When executing the *Usage Refill* component at runtime, the system uses a *refill item class* to compute the refills.

Rules

The rules are the following:

- The refill logic can contain several *Usage Refill* components.
- You must at least assign a refill item class to a usage refill.
- If a refill item class is assigned to a usage refill, the default properties and the user properties of this refill item class are available only in the branch that uses this usage refill.
- You can assign the same refill item class to different usage refills so that they use the properties of the same refill item class. But you must assign a *Usage Identifier* to each usage refill to identify them.
- The *Charge Effective Date* property which represents the subscription date to an offer is also available in the *Usage Refill* branch

Use

As a pricing specialist, you can use the *Usage Refill* component to refill a prepaid account through a card or voucher.

❖ Example

A service provider offers bundled services in one card. End customers use this card as a calling card and also recharge their prepaid account from it. The following table shows the refill process information:

Data	Name/Content
Refill Item Class	Name: Calling Card

Data	Name/Content
Properties	<i>Refill Date</i>: Date of the refill PREPR: Reference number used for the refill GPART: Business partner number BTRW: Refill amount with +/- sign WAERS: Currency key PPRSN: Reason for balance change on prepaid account PINUM: PIN Number
Refill branch of the refill plan	The Refill Item Class Calling Card is assigned to the Usage Refill component. The branch contains a linear function component to compute the recharge.

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of the resulting transactions (refill records) that the system generates.

Description: Type the business description of the component (optional).

Definition (Tab)

i Note

If SAP Convergent Charging is connected to SAP ERP/FI-CA from SAP Business Suite, you must add two Usage Refill components in the refill logic, a component for the refill requests and another one for the reverse refills.

You must respectively set up the *Usage Identifier* option of these components to **_refill_** and to **_reverse_refill_**.

Refill Item Class: Provides the list of refill item classes. Select a refill item class. A refill item class consists of default and user properties that describe a refill event also called a refill item coming from an external system such as SAP CC or a Voucher Management System. The properties of the refill item class are used to perform a refill plan through the refill logic.

Usage Identifier: Type a unique usage identifier to identify each usage refill used in the refill logic. The SAP CC system uses the usage identifier to perform the related branch of the refill logic. To open and modify the refill

item class, click .

2.4.31.8.1.2 Recurring Refill



The **Recurring Refill** component creates in the refill tree a main branch that computes refills on a periodic basis. This component is characterized by an activation rule expressed by a:

- Frequency (day, week, month, year)
- Starting date and hour

Rules

The rules are the following:

- The refill logic can contain several recurring refills.
- When you insert a *Recurring Refill* in the refill logic, some properties are available in the Recurring Refill branch:
 - *Charge Effective Date*: Subscription date of an offer
 - *Recurring Event Date*: Date on which the *Recurring Refill* is activated
 - *Reference Start for Recurring Period*: The start date of the reference period related to a recurring refill
 - *Reference Stop for Recurring Period*: The stop date of the reference period related to a recurring refill
 - *Recurring Period Start*: The period start related to a recurring refill. It may be different from the "Recurring Period Reference Start" and can be used to compute the prorator factor.
 - *Recurring Period Stop*: The period stop related to a recurring refill. It may be different from the "Recurring Period Reference Stop" and can be used to compute the prorator factor.

Use

You use the *Recurring Refill* component to refill a prepaid account depending on periodic usage events.

❖ Example

You may use a *Recurring Refill* component to set up automatic refills so that a service is automatically refilled when the balance of an account reaches a defined threshold or when a recharge from a bank account has been scheduled monthly.

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Allows you to type the description of the component (optional).

General tab

This tab defines the frequency and the starting date for triggering the *Recurring Refill*.

→ Remember

Once you have set up a recurring refill, SAP SE recommends not to change the frequency or the starting date. A change can cause serious errors, especially in subscriptions which are closely linked to the periodicity of recurring refills.

i Note

The *Reference Date* is used only if you select the options *The same day as the reference date*, *The same day as the reference date or first day of next month* or *The same time as the reference date*. If you select another option, the *Reference Date* is ignored.

Reference Date: Provides the list of dates for triggering the *Recurring Refill* component. Select a date that you can combine with the parameters chosen in the *Periodicity* area to trigger the *Recurring Refill* component.

Calendar: Provides the list of available calendars on which the recurring event is based.

⚠ Caution

Once the calendar is set, SAP SE highly recommends not to change it. A change can cause inconsistencies.

Periodicity: Provides the list of frequencies:

- For *Gregorian Calendar*, the available periodicities are the following:
 - *Every*, *Every other*, *Every 3rd*, and other items associated with the following list: *day*, *week*, *month*, *year*. For example, you can trigger the Recurring rate Every 3rd month on Tuesday. The different options to select the starting date are the following:
 - *The same day as the reference date*: If you click this option, the *Recurring Refill* is triggered depending on the date selected in the *Reference Date* list. See the note below.
 - *The same day as the reference date or first day of next month*: If you click this option, the *Recurring Refill* is triggered depending on the date selected in the *Reference Date* list or the first day of the month following that of the selected date in the *Reference Date* list. See the note below.
 - *the*: If you have selected the frequency *Every* (3rd, 4th, and so on) *month* or *year*, this option triggers the *Recurring Refill* depending on the day of the month that you select. This option is combined with the list of numbers (from 1 to 31), the list of items such as Last, First, Second, Third and Fourth and the list of weekdays and months. Examples: the *Recurring Refill* is triggered Every 5th month The 11 of the month; the *Recurring Refill* is triggered Every year The Second Sunday of January.
 - *on*: If you have selected the frequency *Every* (3rd, 4th, and so on) *week* or *year*, this option triggers the *Recurring Refill* depending on the day of the week or the month that you select. Examples: the *Recurring Refill* is triggered Every 4th week on Wednesday; the *Recurring Refill* is triggered Every year on the 1st of January
 - *at*: Allows you to select the starting hour if you have selected any of the previous options. This option includes hours and minutes combined with AM (ante meridiem) or PM (post meridiem). For example: the Recurring Refill is triggered Every day at 07:25 PM. You can select the *same time as the reference date* that is the date selected in the *Reference Date* list.

i Note

About *The same day as the reference date* and *The same day as the reference date or first day of next month* options.

If you select both of the *Every month* and *The same day as the reference date* options, the *Recurring Refill* will be triggered every month on the *Reference Date*; however, if you select the 31st of the month as the *Reference Date*, the *Recurring Refill* will be triggered the 31st of every odd month but the 30th of every even month (or the 28th of February, for example, if February has 28 days).

If you select both of the *Every month* and *The same day as the reference date or first day of next month* options, the *Recurring Refill* will be triggered every month on the *Reference Date* or the first day of the next month depending on how many days the month has. For example, if you select the 31st of the month as the *Reference Date*, the *Recurring Refill* will be triggered the 31st of every odd month but the 1st of the month following every even month; however, as February can have 28 or 29 days, the *Recurring Refill* will always be triggered the 1st of March if the *Reference Date* is the 31st of the month.

The table below shows you the dates on which the *Recurring Refill* will be triggered if you select the 31st of March as the *Reference Date*:

In the month of	The recurring refill will be triggered
January	The 31st of January
February	The 1st of March
March	The 31st of March
April	The 1st of May
May	The 31st of May
June	The 1st of July
July	The 31st of July
August	The 31st of August
September	The 1st of October
October	The 31st of October
November	The 1st of December
December	The 31st of December

- For *4-4-5 Calendar*, the available periodicities are the following:
 - *Every month*, *Every quarter*, *Every semester* and *Every year*.

i Note

The other options, available with the Gregorian Calendar, do not appear any longer. They are useless with the 4-4-5 Calendar.

2.4.31.8.1.3 One-Shot Refill



The **One-Shot Refill** component creates in the decision tree a main branch that computes refills only when precise events related to provider contracts occur. There are three types of events:

- The activation of a contract
- The suspension of a contract
- The resumption of a contract

Rules

The rules are the following:

- The refill logic can contain several One-Shot Refills: For example, a One-Shot Refill for each type of event such as Activation, Suspension, and Resumption.
- When you insert a One-Shot Refill in the refill logic, the charge effective date is available in the One-Shot Refill branch.

Use

You can use the One-Shot Refill component to compute refills (bonuses, free SMS, and so on) linked to the activation of a contract.

❖ Example

In TelcoServ, the customers who have subscribed to a mobile phone service receive bonuses when their contract is activated.

Identification area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Allows you to type the description of the component (optional).

Definition tab

Event Name: Provides the list of events triggering the One-Shot Refill component. Select one of the following events:

- Activation
- Suspension
- Resumption

2.4.31.8.1.4 Account Event Refill



The **Account Event Refill** component creates in the refill tree a main branch that computes refills only when the prepaid balance of a subscriber account goes under a specified threshold.

Contrary to the *Recurring refill* component that is triggered by a scheduler at a later time, the *Account Event Refill* component is triggered immediately after a usage event when the related balance goes under a specified threshold.

Rules

The rules are the following:

- The refill logic can contain several Account Event Refill components. For example, several Account Event Refill components are needed to refill an account automatically with amounts that depend on different thresholds.
- When you insert an Account Event Refill component in the refill logic, you can set the threshold by using a fixed amount or a numeric parameter defined at charge component level.
- Every Account Event Refill component introduces the `Threshold Amount` and `Account Event Date` properties for the Account Event Refill branch.

Use

You use the *Account Event Refill* component to refill a prepaid account automatically when its balance goes under a specified threshold.

❖ Example

You can use the *Account Event Refill* component to execute a 10\$ automatic refill on a prepaid account when its balance goes under a 12\$ threshold.

Identification Area

Name: Type the name of the component (mandatory).

Description: Type the business description of the component (optional).

Definition tab

Balance falls under threshold: Type the amount under which an immediate refill is triggered. The Threshold Amount can be a numerical value or a numeric property inherited from the parent charge component.

2.4.31.9 Logic Components in the Allowance Logic

Each main branch of the allowance logic begins with a [trigger component \[page 885\]](#) (event-based, recurring, or one-shot) linked to an allowance activation method.

To create an allowance tree, you must:

1. Select a [trigger component \[page 885\]](#).
2. Add components from other families according to your allowance plan requirements.
3. End each branch of the tree with a [function component \[page 895\]](#).

Component Families for the Allowance Logic

In SAP Convergent Charging, logic components are grouped into families according to their functional usage. Each component is represented by a specific icon. In the user interface, these families are represented by a specific color and an icon, and they are visible in the toolbar of the *Allowance* window. A logic component is of the same color as the family which it belongs to.

The following table presents the component families available in the allowance logic:

Family icon	Name of the family	Function of the component family	Location of the component family
	Triggers [page 885]	Defines the trigger type (Event-Based, Recurring, or One-Shot)	Always at the root of the allowance tree.
i Note Unavailable in a pricing macro.			
	Functions [page 895]	Refer to the basic components [page 894] (only the <i>No Access</i> and <i>Allow</i> components)	Refer to the basic components [page 894]
	Comparators [page 905]	Refer to the basic components [page 894]	Refer to the basic components [page 894]
	Operators [page 939]	Refer to the basic components [page 894]	Refer to the basic components [page 894]

Related Information

[Logic Components for a Price Plan \[page 852\]](#)

2.4.31.9.1 Trigger Components

Trigger components are always found at the root of the allowance tree of the [allowance logic](#). The different types of trigger component are available depending on the activation type.

The following table shows the different types and the relevant activation:

Type of Trigger Component	Triggering (Activation)	Example
Event-Based	Each event	A new allowance is created for a carry-over, or an allowance is extended for a stacking.
Recurring	Periodic	The allowance counter is reset at the beginning of each month.
One-Shot	Once only	The initial quantity is reported at the allowance activation, or the remaining quantity is reported at the allowance expiration.

Trigger Components

The following types of trigger component are available in SAP Convergent Charging:

Icon	Name	Action/Usage
	Event-Based Trigger [page 886]	Activates a branch when an allowance event triggers the component.
	Recurring Trigger [page 888]	Activates a branch when a periodic event triggers the component.
	One-Shot Trigger [page 892]	Activates a branch when a one-shot event triggers the component.

Related Information

[Logic Components in the Allowance Logic \[page 884\]](#)

2.4.31.9.1.1 Event-Based Trigger



The **Event-Based Trigger** component creates in the decision tree a main branch that is executed at runtime each time an *allowance event* is sent by the SAP system to contract allowances in customer master data through an *Allowance Event Sender (Operator)* [page 943] component.

The configuration of an Event-Based Trigger component requires the selection of an *allowance event class* that specifies the type of the allowance event.

Rules

The rules are the following:

- The *allowance logic* can contain several *Event-Based Trigger* components but only one per allowance event class.
- You must at least assign an allowance event class to an Event-Based Trigger component.
- If an allowance event class is assigned to an Event-Based Trigger component, the user-defined properties of this allowance event class are available only in the branch that uses this Event-Based Trigger component.
- When you insert an Event-Based Trigger component in the allowance logic, some properties (see below) are available in the *Event-Based Trigger* branch.

These properties are the following:

Property	Description
<i>Event Date</i>	The date/time of the allowance event
<i>Validity Start Date</i>	The start date/time of the validity period of the allowance
<i>Validity End Date</i>	The end date/time of the validity period of the allowance
<i>Allowance Unique Identifier</i>	The unique identifier of the allowance
<i>Currency Code</i>	The currency code of the allowance
<i>ISO Currency Code</i>	The currency code of the allowance in the ISO format

Use

As a pricing specialist, you use the Event-Based Trigger component to configure the interactions with allowances created in several decision trees: *Price Plans* [page 570], *Refill Logic*, and *Allowance Logic*.

❖ Example

Example with an event update

As an operator, you create an offer for your end customers so that they can add recharges to a base plan. Each time an end customer buys a recharge, the new recharge (or the new allowance) is created, and the current allowance is extended to the expiration date of the new one.

Furthermore, you want to declare the revenues related to allowances by reporting the exact revenue at the creation, the usage, and the expiration of the allowances.

You can then create in the allowance logic of your allowance plan:

- An [Event-Based Trigger](#) branch to report the revenues related to the usage of allowances
- A One-Shot Trigger branch to report the revenues related to the creation of allowances
- A One-Shot Trigger branch to report the revenues related to the expiration of allowances

Each time the allowance is used with an [Allowance Event Sender \(Operator\)](#) [page 943] component in the price plan of a charge, the Event-Based Trigger component computes the properties to report or updates the allowance event. The Event-Based Trigger branch needs a [Property Introducer \(Operator\)](#) [page 973] component to define the reason of revenue recognition. This Event-Based Trigger branch enables the generation of a charged item.

❖ Example

Example with a validity period

As an operator, you create an offer for your customers so that they can add recharges to a base plan. Each time the customer buys a recharge, the new recharge (or the new allowance) is created, and the current allowance is extended to the expiration date of the new one.

This offer contains an allowance plan, and its allowance logic includes an Event-Based Trigger component whose branch checks whether the validity period of the allowance can be extended or not. This branch contains a [Numbers Comparator](#) [page 915] component and an [Allowance Validity Period Updater \(Operator\)](#) [page 952] component.

The [Numbers Comparator](#) component checks that:

- The allowance start date/time is before the start date/time of the new allowance
- The allowance end date/time is after the start date/time of the new allowance
- The allowance end date/time is before the end date/time of the new allowance

If the previous rules are true, the [Allowance Validity Period Updater Operator](#) component can extend the validity period of the allowance.

i Note

The [Event-Based Trigger](#) component needs an [allowance event class](#) with related properties describing the event.

In this example, the allowance event class can be named **Carryover** and contains the validity period (start date/time and end date/time) of the new allowance.

Important: The name of the allowance event class determines the type of the event.

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Allowance Event Class: Provides the list of allowance event classes. Select an allowance event class. If

necessary, click  to open the selected allowance event class.

Related Information

[Allowance Event Sender \(Operator\) \[page 943\]](#)

2.4.31.9.1.2 Recurring Trigger



The **Recurring Trigger** component creates in the decision tree a main branch that is activated on a periodic basis. This component is characterized by an activation rule expressed by a:

- Frequency (day, week, month, year)
- Starting date and time

Rules

The rules are the following:

- The *Recurring Trigger* component is activated only during the validity period of the allowance.
- The Recurring Trigger component is executed at the beginning of the recurring periods (for example, if the recurring trigger period starts from the first day to the last day of the month, the recurring trigger is executed the first of the month), except for the first recurring period where it is executed at the activation date of the allowance.
- The allowance logic can contain several Recurring Trigger components.
- When you insert a Recurring Trigger component in the refill logic, some properties are available in the [Recurring Trigger](#) branch:

Property	Description
<i>Event Date</i>	The date and time of the recurring event
<i>Validity Start Date</i>	The start date/time of the validity period of the allowance
<i>Validity End Date</i>	The end date/time of the validity period of the allowance
<i>Allowance Unique Identifier</i>	The unique identifier of the allowance
<i>Currency Code</i>	The currency code of the allowance
<i>ISO Currency Code</i>	The currency code of the allowance in the ISO format
<i>Reference Start for Recurring Period</i>	The start date/time of the reference period related to a recurring trigger
<i>Reference Stop for Recurring Period</i>	The stop date/time of the reference period related to a recurring trigger
<i>Recurring Period Start</i>	The period start related to a recurring trigger. It may be different from the <i>Recurring Period Reference Start</i> setting and can be used to compute the prorator factor.
<i>Recurring Period Stop</i>	The period stop related to a recurring trigger. It may be different from the <i>Recurring Period Reference Stop</i> setting and can be used to compute the prorator factor.

Use

As a pricing specialist, you use the Recurring Trigger component to configure the reset of contract [allowances](#) on a periodic basis.

! Restriction

The *Recurring Trigger* component is forbidden within a **shareable allowance logic**.

❖ Example

As an operator, your company proposes a recharge providing 6GB 4G data for a period of 90 days to your new end customers. At the end of the period, the allowances are reset.

As a pricing specialist, you model, design, and configure some allowance logic that contains a *Recurring Trigger* component. It is dedicated to the allowance reset.

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Type the business description of the component (optional).

General (Tab)

This tab defines the frequency and the starting date for triggering the recurring trigger.

Note

The *Reference Date* is used only if you select the options:

- *The same day as the reference date*
- *The same day as the reference date or first day of next month*
- Or *The same time as the reference date*

If you select another option, the *Reference Date* is ignored.

Reference Date: Provides the list of dates/times for triggering the *Recurring Trigger* component at runtime.

Select a date that you can combine with the parameters chosen in the *Periodicity* area to trigger the *Recurring Trigger* component.

Calendar: Provides the list of available calendars which the recurring event is based on.

Caution

Once the calendar is set, SAP SE highly recommends not to change it. A change can cause inconsistencies.

Periodicity: Provides the list of frequencies:

- For *Gregorian Calendar*, the available periodicities are the following:
 - *Every, Every other, Every 3rd*, and other items associated with the following list: *day, week, month, year*. For example, you can trigger the Recurring rate Every 3rd month on Tuesday. The different options to select the starting date are the following:
 - *The same day as the reference date*: If you click this option, the *Recurring Trigger* is triggered depending on the date selected in the *Reference Date* list. See the note below.
 - *The same day as the reference date or first day of next month*: If you click this option, the *Recurring Trigger* is triggered depending on the date selected in the *Reference Date* list or the first day of the month following that of the selected date in the *Reference Date* list. See the note below.
 - *the*: If you have selected the frequency *Every* (3rd, 4th, and so on) *month* or *year*, this option triggers the *Recurring Trigger* depending on the day of the month that you select. This option is combined with the list of numbers (from 1 to 31), the list of items such as Last, First, Second, Third and Fourth and the list of weekdays and months. Examples: the *Recurring Trigger* is triggered Every 5th month The 11 of the month; the *Recurring Trigger* is triggered Every year The Second Sunday of January.
 - *on*: If you have selected the frequency *Every* (3rd, 4th, and so on) *week* or *year*, this option triggers the *Recurring Trigger* depending on the day of the week or the month that you select. Examples: the *Recurring Trigger* is triggered Every 4th week on Wednesday; the *Recurring Trigger* is triggered Every year on the 1st of January
 - *at*: Allows you to select the starting hour if you have selected any of the previous options. This option includes hours and minutes combined with AM (ante meridiem) or PM (post meridiem). For example: the Recurring Trigger is triggered Every day at 07:25 PM. You can select the *same time as the reference date* that is the date selected in the *Reference Date* list.

i Note

About *The same day as the reference date* and *The same day as the reference date or first day of next month* options.

If you select both of the *Every month* and *The same day as the reference date* options, the *Recurring Trigger* will be triggered every month on the *Reference Date*; however, if you select the 31st of the month as the *Reference Date*, the *Recurring Trigger* will be triggered the 31st of every odd month but the 30th of every even month (or the 28th of February, for example, if February has 28 days).

If you select both of the *Every month* and *The same day as the reference date or first day of next month* options, the *Recurring Trigger* will be triggered every month on the *Reference Date* or the first day of the next month depending on how many days the month has. For example, if you select the 31st of the month as the *Reference Date*, the *Recurring Trigger* will be triggered the 31st of every odd month but the 1st of the month following every even month; however, as February can have 28 or 29 days, the *Recurring Trigger* will always be triggered the 1st of March if the *Reference Date* is the 31st of the month.

The table below shows you the dates on which the *Recurring Trigger* will be triggered if you select the 31st of March as the *Reference Date*:

In the month of	The recurring trigger will be triggered
January	The 31st of January
February	The 1st of March
March	The 31st of March
April	The 1st of May
May	The 31st of May
June	The 1st of July
July	The 31st of July
August	The 31st of August
September	The 1st of October
October	The 31st of October
November	The 1st of December
December	The 31st of December

- For *4-4-5 Calendar*, the available periodicities are the following:
 - *Every month*, *Every quarter*, *Every semester* and *Every year*.

i Note

The other options, available with the Gregorian Calendar, do not appear any longer. They are useless with the 4-4-5 Calendar.

2.4.31.9.1.3 One-Shot Trigger



The **One-Shot Trigger component** creates in the decision tree a main branch that is activated when precise events related to the allowance occur:

- The **creation of the allowance** in a provider contract
- The **activation** of the allowance
- The **expiration** of the allowance

In addition, you can activate the One-Shot Trigger component within the allowance validity period (after the activation of the allowance or before the expiration of the allowance).

Rules

The rules are the following:

- The allowance logic can contain several *One-Shot Trigger* components. For example, you can set up a one-shot trigger for each type of event (allowance creation, activation, and expiration).
- When you insert a one-shot trigger in the allowance logic, some properties are available in the *One-Shot Trigger* branch. These properties are the following:

Property	Description
<i>Event Date</i>	The date and time of the one-shot event
<i>Validity Start Date</i>	The start date/time of the validity period of the allowance
<i>Validity End Date</i>	The end date/time of the validity period of the allowance
<i>Allowance Unique Identifier</i>	The unique identifier of the allowance
<i>Currency Code</i>	The currency code of the allowance
<i>ISO Currency Code</i>	The currency code of the allowance in the ISO format

Use

As a pricing specialist, you use the *One-Shot Trigger* component to configure the recognition for the revenues of allowances.

! Restriction

The *One-Shot Trigger* component is forbidden for an allowance activation within a **shareable allowance logic**.

❖ Example

As an operator, you create an offer for your end customers so that they can add recharges to a base plan. Each time the end customer buys a recharge, the new recharge (or the new allowance) is created, and the current allowance is extended to the expiration date of the new one.

Furthermore, you want to declare the revenues related to allowances by reporting the exact revenue at the creation, the activation, or the expiration of the allowances. You can then create in the allowance logic of your allowance plan:

- An *Event-Based Trigger* branch to report the revenues related to the event of allowances.
- Three *One-Shot Trigger* branches to report the revenues related to the creation (first branch), the activation (second branch), and the expiration of allowances (third branch) in contracts.

The *One-Shot Trigger* components can check and report the lost credit of end customers when allowances expire. Each One-Shot Trigger branch needs a *Property Introducer (Operator)* [page 973] component to define the reason of revenue recognition. These *One-Shot Trigger* branches enable the generation of a charged item by the system.

Identification Area

Name: Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

Description: Type the business description of the component (optional).

Definition (Tab)

Event Name: Provides the list of events activating the One-Shot Trigger component. Select one of the following events:

- *Creation*
- *Activation*
- *Expiration*

Shifted By: This option allows activating the One-Shot Trigger component after the activation of the allowance or before the expiration of the allowance. The time shift is defined as a quantity and a unit of time (second, minute, hour, and day). : Type the name of the component (mandatory). Choose an appropriate name because it is reused as the label of pricing transactions.

By default, the time shift is 0.

Select the quantity and the time of unit depending on the selected *Event Name*:

- *Creation*: No shift is possible.
- *Activation*: Only a positive shift is possible.
- *Expiration*: Only a negative shift is possible.

i Note

- The shifted One-Shot Trigger components are always activated before the [Recurring Trigger \[page 888\]](#) components.
- The shifted One-Shot Trigger components are activated only if their computed date is included in the validity period of the allowance.
- A shifted One-Shot Trigger component can be activated several times if the expiration date of the allowance is postponed so that the date activating the One-Shot Trigger component is not only included in the validity period of the allowance but is also greater than the last activation date of the allowance.

2.4.31.10 Basic Components

The basic components are used in the trees and branches of the following:

- [Rate Components \[page 853\]](#)
- [Charging Components \[page 864\]](#)
- [Refill Components \[page 876\]](#)
- [Trigger Components \[page 885\]](#)
- [Pricing Macros \[page 411\]](#)

i Note

The [matrix of components \[page 839\]](#) shows which basic components you can use in the master data objects (price plans, charging plans, pricing macros, refill plans, and allowance plans).

Component Families

In SAP Convergent Charging, logic components are grouped into families according to their functional usage. Each logic component is represented by a specific icon. In the user interface, these families are represented by a specific color and an icon, and they are visible in the toolbar of the [Charge](#), [Pricing Macro](#), [Refill](#), or [Allowance](#) window. A logic component is of the same color as the family which it belongs to. The following table presents these component families:

Family icon	Name of the family	Function of the component family	Location of the component family
	Functions [page 895]	Calculates the final amount.	Always at the end of the branches. Functions are the leaves of the tree.

Family icon	Name of the family	Function of the component family	Location of the component family
	Comparators [page 905]	- Generates two or more branches to evaluate properties. - Selects one branch according to the result.	Middle area of the decision tree: - After rates, charging, refills, triggers - Before functions
	Splitters [page 928]	- Splits a number or duration. - Generates and rates multiple branches.	Middle area of the decision tree: - After rates and refills - Before functions
	Operators [page 939]	Adds properties to the calculation context.	Middle area of the decision tree: - After rates, charging, refills, triggers - Before functions

i Note

The [Update Counter Operator \[page 990\]](#) component is always located after a [Function \[page 895\]](#) component.

2.4.31.10.1 Function Components

A function component calculates an amount from context properties. Function components make up the leaves of the decision tree and are used for calculations.

The *Flat Function* component, which calculates a fixed amount, is one of the simplest. The *Linear Function* component calculates an amount by using a numerical property. For example, the *Linear Function* component calculates the price of a telephone call that is charged 0.34 cents per minute.

Function Components

The following function components are available with SAP Convergent Charging:

Icon	Name	Action/Usage
	Flat [page 897]	Provides a priced amount based on a constant value or a numerical property expressed in the currency of the plan.
	Free [page 898]	Represents a free service in the decision tree.
	Generic [page 899]	Computes an amount P with one of these three formulae: $P = A.X + B$ $P = A.X.Y + B$ $P = A.X + B.Y + C$
	Linear [page 901]	Computes an amount P with the formula $P = A.X + B$
	Macro [page 902]	Allows to use an existing pricing macro to calculate a final amount.
	No Access [page 903]	Indicates an unauthorized use of a service, an invalid access, or an unexpected case when usage events are processed.
	Polynomial [page 904]	Calculates an amount by computing the sum of n number of terms in the form of A.X.Y such as: $A1.X1.Y1 + A2.X2.Y2 + \dots + An.Xn.Yn$

2.4.31.10.1.1 Allow Function



The **Allow Function** component indicates that no additional logic is needed.

Use

As a pricing specialist, you use the *Allow Function* component to terminate each [Trigger \[page 885\]](#) component (event-based, recurring, and one-shot) that you configured in your allowance logic.

❖ Example

You use a [One-Shot Trigger \[page 892\]](#) component triggered by a creation event to calculate the validity period of the allowance through an [Allowance Validity Period Updater \(Operator\) \[page 952\]](#) component. Because you do not need to keep track of this event, you clear the *Generate Charged Item* option.

Identification Area

Name: Type the name of the component (mandatory).

Description: Type the business description of the component (optional).

Definition (Tab)

Generate Charged Item: If selected, a charged item is created by the SAP CC system at runtime.

Related Information

[Trigger Components \[page 885\]](#)

2.4.31.10.1.2 Flat Function



The *Flat Function* component provides a constant amount based on a value or a numerical property expressed in the currency of the plan.

Use

In a price plan, the *Flat Function* component allows you to assign a constant price to a consumed service. This constant price is represented by a value or a numerical property and is expressed in the currency of the plan.

i Note

The usage of the *Flat Function* component with a zero amount generates transactions while the *Free Function* [\[page 898\]](#) component never generates transactions.

❖ Example

You propose an Internet subscription that consists of a monthly connection plan for \$15 per month. Using a Flat component, you can bill this subscription by assigning the value of \$15 to the monthly subscription price.

Instead of indicating a numerical value, you can assign a price by using a numerical property. For example, if the subscription corresponds to several plans whose price varies according to the number of hours, you can create a **fixed price** parameter that takes different values according to the number of hours. Using the Flat component, you assign the `fixed price` to the monthly subscription price.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Fixed Amount: Provides the list of numerical properties or allows you to type a numerical value. Select a numerical property or select *Numerical Value*, and then type a numerical value. On the right, a code is displayed and expresses:

- The currency defined in the charge component (for example, USD for United States Dollar)
- Any currency (symbol “¤”) when the flat function is used in a pricing macro

2.4.31.10.1.3 Free Function



The *Free Function* component represents a free service in the decision tree. It does neither calculate any amount nor create any transactions (charged items) for billing systems. It must be used only if you do not need to produce a transaction. Because no transaction is created, the branch including the *Free Function* component is not rated at runtime.

Use

The *Free Function* component is used only when:

- The consumed service is free.
- It is not necessary to keep a record of the transaction.

⚠ Caution

When the related price plan uses a *Free Function* component, no accounting transactions are created; therefore, you cannot rerate transactions. To create transactions, use the [Flat Function \[page 897\]](#) component with a zero amount instead of the *Free Function* component.

❖ Example

You propose a special offer to try out an Internet connection for one month free of charge. At the end of one month, this offer becomes invalid. If the customer wants to continue the service, you propose a different offer. Because you do not need keep a record of connections during the limited free offer period, you can use a *Free Function* component.

⚠ Caution

SAP SE recommends that you respect the following rules:

- Use the *Free Function* component in a [Recurring Rate \[page 856\]](#), in a [Recurring Refill \[page 879\]](#), in a [One-Shot Rate \[page 862\]](#), or in a [One-Shot Refill \[page 882\]](#).
- Do not use the *Free Function* component in a [Usage Rate \[page 854\]](#) or in a [Usage Refill \[page 877\]](#), but use a [Flat Function \[page 897\]](#) component with a zero amount to set up a free service and create transactions. The service is free, but a transaction is created and can therefore be saved.
- Do not use a *Free Function* component in a [master charge \[page 563\]](#) linked to [dependent charges \[page 564\]](#) because this component stops the rating of dependent charges.

Identification (Area)

Name: Type the name of the logic component (mandatory).

Description: Type the description of the component (optional).

Definition (Tab)

The *Definition* tab is empty because the *Free Function* component need not be set up.

2.4.31.10.1.4 Generic Function



The *Generic Function* component computes an amount P with one of these three formulas:

- $P = A.X + B$
- $P = A.X.Y + B$
- $P = A.X + B.Y + C$

Where:

- A, B and C are numerical values expressed in the currency of the plan
- X and Y are mathematical expressions which combine a numerical property, an operator, and a numerical value. For example, $X = \text{Duration multiplied by } 5$, or $Y = \text{Duration plus } 10$, in which Duration is a numerical property.

You can apply the following operations to the numerical properties:

- Addition
- Subtraction
- Multiplication
- Division

Use

You use a [Generic Function](#) component when you want to calculate a price that uses numerical properties.

❖ Example

In a chargeable item class called **Video Conference**, you charge the customer \$0.10 per videoconference minute. This price is multiplied by the number of members, and then added to a fixed amount of \$15. To compute the price of a **Video Conference**, you use a [Generic Function](#) component according to the formula $AXY + B$, in which A, X, Y, and B have the following values:

A	X	Y	B
\$0.10	Call duration property (in minutes)	Number of members property	\$15

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Type: Click one of the following formulas:

- **$AX + B$:** If this option is selected, the [Set the Y parameters](#) area and the [Money Amount C](#) box are unavailable
- **$AXY + B$:** If this option is selected, the [Money Amount C](#) box is unavailable
- **$AX + BY + C$:** If this option is selected, all is available

Money Amount A: Type the value that represents A in the selected formula. This box is required: Type 1 if A = 1. The displayed currency is the currency of the plan.

Money Amount B: Type the value that represents B in the selected formula. This box is required: Type 0 if B = 0. The displayed currency is the currency of the plan.

Money Amount C: Type the value that represents C in the formula $AX + BY + C$. This box is required: Type 0 if C = 0. The displayed currency is the currency of the plan.

Set the X parameters: Allows you to define the calculation of X in the selected formula. This area is made up of three boxes. From left to right:

- First box: Provides the list of numerical properties. Select a numerical property.
- Second box: Provides the list of operators to be applied to the numerical property that you have selected. Select an operator. Selecting the [-Operator-](#) item in the list allows you to not apply an operation to the numerical property.
- Third box: Once you have selected a property and an operator, type a numerical value. This box is required if you select an operator in the second box.

Set the Y parameters: Allows you to define the calculation of Y in the formulas $AXY + B$ or $AX + BY + C$. Apply the same rules as in the Set the X parameters area.

2.4.31.10.1.5 Linear Function



The *Linear Function* component computes an amount P with the formula $P = A.X + B$ where:

- A and B are numerical values or numerical properties
- X is a numerical property

Use

You can use the *Linear Function* when you want to calculate a price with numerical properties of the plan.

❖ Example

In a chargeable item class called **Telephone Services**, you charge the customer \$0.10 per call minute. To compute the price of a telephone call, you use a *Linear Function* component with the following values:

A	X	B
\$0.10	Call duration property (in minutes)	0

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of numerical properties. Select the numerical property that represents X in the formula $A.X + B$.

Scaled Amount: Type the value that represents A in the formula $A.X + B$. This box is required: Type 1 if A = 1. The displayed currency is the currency of the plan.

Fixed Amount: Type the value that represents B in the formula $A.X + B$. This box is required: Type 0 if B = 0. The displayed currency is the currency of the plan.

2.4.31.10.1.6 Macro Function



The *Macro Function* component allows you to use an existing pricing macro to calculate a final amount. Because a pricing macro cannot be inserted in a decision tree, you must use a *Macro Function*:

- To select a pricing macro
- To provide values to the pricing macro

The *Macro Function* uses the properties of the plan to provide the values to the pricing macro.

Use

You use the *Macro Function* to integrate an existing pricing macro at the end of a decision tree branch. The amount calculated in the pricing macro is the final amount of the branch.

❖ Example

In a chargeable item class called **Communication**, you charge the customer according to the type of communication. The pricing rule is described in a unique Pricing Macro that completely calculates the final price. You can use the Macro Function component to integrate this Pricing Macro into each price plan that relates to the **Communication** chargeable item class.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Pricing Macro: Provides the list of available pricing macros. Select a pricing macro.

Mapping of Rating Context: Displays the rating context properties of the pricing macro and allows you to assign a property of the plan to each rating context property. The pricing macro runs with the values of the plan properties.

- *Name*: Displays the name of the rating context property.
- *Description*: Displays the description of the rating context property.
- *Mapping Property*: Provides the list of plan properties. Select the property that initializes the rating context property of the pricing macro.

2.4.31.10.1.7 No Access Function



The *No Access Function* component indicates an unauthorized use of a service, an invalid access, or an unexpected case when usage events are processed. When it is inserted in a branch, the No Access Function rejects the usage tickets and returns an information message to the process.

Use

The *No Access Function* allows you to control certain access rights such as:

- Exceeding the consumption limit
- Prohibiting international telephone calls

i Note

The *No Access Function*:

- Can be used only in Usage Rate-type branches
- Does not calculate prices and cancels counter updates
- Appears in the decision tree with the default Name “Access Denied”

❖ Example

In a chargeable item class called **Telephone Service**, every consumption is billed according to the dialing codes of the called number. The dialing codes are tested in the price plan which includes a *No Access* component in a branch. When no value corresponds to a dialing code of the called number, the *No Access* component is activated.

⚠ Caution

SAP SE recommends that you respect the following rules:

- Use the *No Access* component only in a Usage Rate-type branch
- Fill in the information message field, and choose properties so that you can easily locate and correct the unexpected incident

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Message: Allows you to type an information message to locate an incident.

Properties: Provides the list of properties. When the incident occurs, the values of the properties are displayed below the message. Select the properties which you want to know the values when the incident occurs. Clear the boxes of the properties that you do not need.

Trigger Best Effort Reservation: Clear this check box if you do not want that the mechanism of best effort reservation computes and reserves the maximum of an available service quota. This option is not available when a No Access Function component is inserted in the refill logic.

2.4.31.10.1.8 Polynomial Function



The **Polynomial Function** component calculates an amount by computing the sum of n numbers of terms in the form of AXY such as: $A_1X_1Y_1 + A_2X_2Y_2 + \dots + A_nX_nY_n$ where:

- A and n are numerical values
- X and Y are numerical properties

You can select different numerical properties for each AXY term or reuse the same properties several times.

Use

The **Polynomial Function** is used when an amount is calculated with two or more numerical properties. It allows you to multiply numerical properties two by two for each term, and then add up the results.

❖ Example

In a chargeable item class called **Video Conference**, you charge the customer \$0.10 per videoconference minute. This price is multiplied by the number of members, and then added to a price that varies according to the distance (\$0.05 cents per kilometer). To compute the price of a **Video Conference**, you use a **Polynomial Function** component with the following values:

Term of the polynomial sum	A	X	Y
1	\$0.10	call duration (in minutes)	number of members
2	\$0.05	distance (in kilometers)	None

The polynomial sum is made up of two terms and equal to:

- $0.10 * \text{call duration} * \text{number of members} + 0.05 * \text{distance}$ (with $*$ as the multiplier sign)

Using the table in the **Definition** tab, you can express this polynomial expression as follows:

	Money Amount	X	Y
	0.10	call duration	number of members
+	0.05	distance	

Definition tab

This tab includes a table that allows you to calculate a polynomial expression in the form of AXY . Each row in the table represents one of the terms AXY of the polynomial expression. For example, if the polynomial expression to calculate is $A1X1Y1 + A2X2Y2 + A3X3Y3$, you must add three rows to the table.

Note

The most left column does not contain entries to be filled in. This column displays the sign "+" so that you can better visualize the polynomial formula.



: Adds a row to the table. Each row in the table allows you to define a term AXY in the polynomial formula.



: Deletes a row from the table and causes the deletion of a term from the polynomial formula.



: Moves a row up in the table to change the order of the terms.



: Moves a row down in the table to changes the order of the terms.

Money Amount: Allows you to type the value that represents A in the term AXY . The currency is that of the plan. This box is required.

X: Provides the list of numerical properties that represent X in the term AXY . This box is optional. If necessary, select a numerical property.

Y: Provides the list of numerical properties that represent Y in the term AXY . This box is optional. If necessary, select a numerical property.

2.4.31.10.2 Comparison Components

A comparator component compares properties of the same type. The comparator component can compare the properties of chargeable item classes, parameters, counters, or properties generated by another logic component. When you insert it in the decision tree, the comparator component creates one or more branches depending on the type of comparison.

Several types of comparator component are available depending on the type of the property used for comparison. For example, you can use:

- A Numerical Comparator component to compare the value of a numerical property with another value
- A Date Comparator component to compare a date property type with time slots

Comparator Components

The following comparator components are available with SAP Convergent Charging:

Icon	Name	Action/Usage
	Date / Time Slot [page 906]	Compares two date/time properties with five comparison operators.
	Dates [page 908]	Compares the value of a date/time property with one or several criteria.
	Interval Switching [page 910]	Compares a numerical property with intervals or values.
	Mapping Table Introducer [page 912]	Allows to look up for data in a mapping table (or subscriber mapping table) in a plan.
	Numbers [page 915]	Compares the value of a numerical property with a value or another numerical property.
	Prefix Switching [page 916]	Compares a string property with prefixes of string type.
	Public Holidays [page 918]	Compares a date property with one or more public holidays.
	Range Table Introducer [page 919]	Allows to look up for data in a range table (or subscriber range table) in a plan.
	Strings [page 926]	Compares the value of a string property with a value or with another string property.
	Switching [page 927]	Compares the state of a prepaid account with one or more predefined values (Active, Blocked, Locked, or Closed).

2.4.31.10.2.1 Date/Time Slot Comparator



The *Date / Time Slot Comparator* compares a date property with one of the following time slots:

- Daily
- Weekly
- Monthly
- Yearly

The comparison is true when the date property is inside the selected time slot.

When you insert it in the decision tree, the *Date / Time Slot Comparator* component creates two separate branches:

- A branch that is activated when the comparison is true

- A branch that is activated when the comparison is false

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices which vary from one time period to another time period, you may need to compare a date with a time slot. To use the [Date / Time Slot Comparator](#) inside your price plan, do the following:

1. After you add the component, choose the date and the time slot.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

Within the context of a promotional offer that contains a calling plan, you want to implement a special price of \$0.02 per minute for telephone calls that start during the weekend. The standard price is \$0.04 per minute. The following table presents the information that you need to set up the Date / Time Slot component inside your price plan:

Data	Settings
Property date	Start date of the phone call
Time slot parameters	Type: Weekly. From Wednesday at 10:00 PM To Monday at 6:00 AM.
Pricing rules	Price that is applied to the "is in the time slot" branch: \$0.02 per minute. Price that is applied to the "is out of the time slot" branch: \$0.04 per minute.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of date properties. Select a date property.

Set the Time Slot parameters: Allows you to compare the date property with a time slot.

- **Time Slot Type:** Provides the list of time slots. Select one of the following time slots:
 - **daily:** Represents a part of the day or a whole day
 - **weekly:** Represents a part of the week or a whole week

- *monthly*: Represents a part of the month or a whole month
- *yearly*: Represents a part of the year or a whole year
- *From*: Allows you to select or type a start date or time (hour and minute) of the time slot.
- *at*: Allows you to select or type a time (hour and minute).
- *To*: Allows you to select or type an end date or time (hour and minute) of the time slot.

i Note

The following examples show different formats of time slots:

- *daily*: *From* 05.00 AM *To* 07.00 AM
- *weekly*: *From* Monday at 05.00 AM *To* Wednesday at 07.00 AM
- *monthly*: *From* 10 *at* 05.00 AM *To* 12 *at* 07.00 AM
- *yearly*: *From* 22 May *at* 05.00 AM *To* 18 June *at* 07.00 AM

2.4.31.10.2.2 Dates Comparator



The *Dates Comparator* component compares two date properties. Six comparison operators are available:

- Has the same
- Is equal to
- Is after
- Is strictly after
- Is before
- Is strictly before

The comparison is true when a date property matches a reference date or defined constraints.

When you insert it in the decision tree, the *Dates Comparator* component creates two separate branches:

- A branch that is activated when the comparison is true
- A branch that is activated when the comparison is false

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches, you may need to compare a date property with a reference date. To use the *Dates Comparator* component in the price plan, do the following:

1. After you add the component, choose a date property, a reference date or define constraints.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

In the context of a special "end of the year" promotional offer, a telephone operator wants to charge a special price (\$0.15 per minute) for all the calls that begin on Sundays during the month of December. All

the other calls are rated at the regular price. The following table presents the information that the telephone operator needs to set up the *Dates Comparator* component inside the price plan:

Data	Settings
Property	Call start date
First constraint	Select <i>Sunday</i> as the <i>Day of week</i>
Second constraint	Select <i>December</i> as the <i>Month</i>
Pricing rules	Price that is applied to the <i>is</i> branch: \$0.15 per minute. Price that is applied to the <i>is not</i> branch: usual price.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of date properties. Select the first date property.

Operator: Provides the list of operators. The operator *Has the same* is used with the option *Set the Constraints to Apply to This Date*. The other operators are used only to compare the first date property with a reference date. Select one of the following operators:

- *has the same*
- *is equal to*
- *is after*
- *is strictly after*
- *is before*
- *is strictly before*

Reference Date: Provides the list of date properties. Select the reference date that you want to compare with the first date property.

→ Remember

The option *Set the Constraints to Apply to This Date* allows you to compare:

- A date property with a reference date: You first select the date property and the reference date. You then use the set of constraints to select which part of the date property you want to compare with the reference date. For example, you select **agreement_creation_date** as the date property and **contract_date** as the reference date. The set of constraints allows you to select the different parts of the **agreement_creation_date** you compare with the **contract_date**: Day of week (contract_date's one), Day of month (contract_date's one), Month (contract_date's one), and so on.

- A date property with a set of defined constraints: You first select the date property, and you select *Choose a property* in the *Reference Date* box. You then define the constraints that you want to compare with the date property. For example, you select Day of week (Monday), Day of month (5), Month (January), and so on.

Set the Constraints to Apply to This Date: Allows you to set up the constraints on the date property. This option is available only if you have selected *Has the same* in the Operator list. You can select one or more criteria:

- *Day of week*: Allows you to compare the day of the date property with any day of the week or with the day of the reference date. Click this option, and then select the day in the list.
- *Day of month*: Allows you to compare the day of the date property with any day of the month or with the day of the month of the reference date. Click this option, and then select the day of month in the list.
- *Month*: Allows you to compare the month of the date property with any month or with the month of the reference date. Click this option, and then select the month in the list.
- *Year*: Allows you to compare the year of the date property with any year or with the year of the reference date. Click this option, and then select the year in the list.

2.4.31.10.2.3 Interval Switching Comparator



The *Interval Switching Comparator* component compares a numerical property with intervals or values of the same type. This component allows you to compare a numerical property with:

- One or several values
- One or several intervals
- One or several values and one or several intervals

When inserted in the decision tree, the *Interval Switching Comparator* component creates:

- A branch for each interval or value, which is activated if the property matches the related interval or value.
- An additional branch that is activated if the property does not match an interval or a value.

i Note

The test stops when a branch matches the comparison; therefore, the order of intervals and values is important.

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches according to the value of a property, you may need to compare a property with a set of intervals. To use the *Interval Switching Comparator* inside your price plan, do the following:

1. After you add the component, choose the property and the limits of the intervals or values.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

A software editor wants to determine the license price of their chargeable item class according to the number of users, which can vary from 10 users to 50 users. An interval represents a group of 10 users. For

more than 50 users, the price is \$700. To determine the license price, the software editor needs to create a numerical property called **number of users** and test if the property matches one of the intervals. The following table presents the information that the software editor needs to set up the *Interval Switching Comparator* component inside the price plan:

Data	Settings
Property	Number of users
Value "0"	0
Interval I1	From 0 to 10 users:]0, 10]
Interval I2	From 10 to 20 users:]10,20]
Interval I3	From 20 to 30 users:]20, 30]
Interval I4	From 30 to 40 users:]30, 40]
Interval I5	From 40 to 50 users:]40,50]
Pricing rules	Branch value 0: error message. Branch I1: \$150. Branch I2: \$280. Branch I3: \$400. Branch I4: \$500. Branch I5: \$600. Branch "outside of interval": \$700.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of numerical properties. Select the first numerical property.



: Adds a row to the table. Click this button to add an interval or a value to the table.



: Deletes a row from the table. To remove an interval, select the corresponding interval row, and then click this button.



: Moves a row up in the table. To move an interval up, select the corresponding interval row, and then click this button.



: Moves a row down in the table. To move an interval down, select the corresponding interval row, and then click this button.



: Opens the Open dialog box to search for a file and import data into the table. Click this button when you want to create intervals with data from a CSV file instead of manually entering the data.



: Deletes all the rows in the table. Click this button to delete the list of intervals.

Parameters: Allows you to set up each row of the table. Each row represents an interval or a value to be compared with the first numerical property. Each interval row also represents a branch in the decision tree.

- **One Bound Interval:** Click this option to compare the first numerical property with a value instead of an interval, and then type the value or select a property in the **Between** box.
- **Between:** If the **One Bound Interval** option is selected, the **Between** option represents a value to compare with the first numerical property; otherwise, the **Between** option is the lowest limit of the interval to be compared with the first numerical property. Type a value or select a property to compare with the first numerical property. In the case of an interval, click the **Included** option to include the limit or clear it to exclude the limit.
- **And:** If the **One Bound Interval** option is not selected, the **And** option is the highest limit of the interval to be compared with the first numerical property. Type a value or select a property to compare with the first numerical property. Click the **Included** option to include the limit or clear it to exclude the limit. This box is not available if you have clicked the **One Bound Interval** option.

2.4.31.10.2.4 Mapping Table Introducer (Comparator)



The **Mapping Table Introducer Comparator** component allows you to use an existing mapping table in a plan and set up the logic that defines the computation of the final values.

At runtime (or during trial run), SAP Convergent Charging proceeds as follows when executing the logic component *Mapping Table Introducer Comparator*:

1. The SAP CC system compares row by row the input columns of a mapping table with the properties of the plan.
2. The comparison stops when the properties match at least one row of the input columns.
3. The output columns related to the input columns are retrieved in generated properties that you can use in the plan.
4. If no property matches the comparison, the mapping table returns a default value for each generated property.

i Note

The number of properties must be equal to the number of input columns of the mapping table.

When it is inserted in the decision tree, the Mapping Table Introducer Comparator component creates two separate branches:

- A branch (*Row found*) that is activated when the comparison is true

- A branch (*Row not found*) that is activated when the comparison is false

When the component is performed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches according to the value of a specific property, you may need to compare a property with a numerical value or another property.

To use the *Mapping Table Introducer* component inside your price plan, do the following:

1. After you add the component, choose a [mapping table class \[page 457\]](#), a [mapping table \[page 469\]](#), a date/time reference, and two properties to compare with the input columns of the mapping table.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

An operator needs a price table to retrieve the prices of offers expressed in many currencies depending on the validity periods of the offers. To do that in a price plan, the operator uses a *Mapping Table Introducer* which contains:

- Mapping table input
 - **OfferCode**: The offer code
 - **Currency**: The currency for the offer code
 - **ValidityPeriod**: The validity period of the offer code
- Mapping table output
 - **OfferPrice**: The price of the offer expressed in the selected currency

Identification Area

Name: Type the name of the component (mandatory).

Description: Describe the scope of the component (optional).

Definition (Tab)

Mapping Table Class: Provides the list of available mapping table classes. Select the mapping table class that you want to use with the *Mapping Table Introducer*. To open and modify the mapping table class, click .

Mapping Table: Provides the list of available mapping tables that relate to the selected class. Select the mapping table that you want to use with the *Mapping Table Introducer* component, or select a parameter or a property that will include the identifier of a mapping table.

Reference Date: Provides the list of date/time properties. Select a date/time property. Each row in the mapping table includes a validity period. Therefore, the **Reference Date** setting enables to select the row whose time period includes the reference date and time. If several rows contain the same reference date/time:

- Rule 1: The SAP CC system selects the row whose start date/time is closest to the reference date/time set in the **Mapping Table Introducer** component.
- Rule 2: And if two time periods have the same start date/time, the shortest time period is first selected.

Column for Longest Prefix Match: Provides the list of input column names of the mapping table. Select an input column name that you define as the input column for containing the prefixes to be compared with the value of the related **Mapping Property**. When comparing the prefixes of this input column with the value of the related Mapping Property, the **Mapping Table Introducer** component finds a row only if the two conditions are true:

- The value of the input column (prefix) that matches the value of the related Mapping Property is the longest prefix match of all rows of the mapping table
- The values of the other input columns of the mapping table match the values of the related Mapping Properties

The Longest Prefix Match (LPM) algorithm is available as of SAP CC 4.1 SP 2.

Mapping of Rating Context: Displays the input columns of the mapping table, and allows you to select the properties that you want to compare with the input columns.

- **Column Name:** Displays the input column name of the mapping table.
- **Column Description:** Displays the description of the input column of the mapping table.
- **Type:** Provides the list of two property types: **String** or **Currency**. Select a property type.
- **Mapping Property:** Provides the list of properties whose type is defined in the **Type** column. Select the property that you want to compare with the input column of the mapping table.

Mapping of Generated Properties: Displays the output columns of the mapping table and allows you to rename the generated properties. When a comparison is true between properties, **Reference Date**, and input columns, the generated properties retrieve the values of the output column entries.

- **Column Name:** Displays the output column name of the mapping table.
- **Column Description:** Displays the description of the output column of the mapping table.
- **Type:** Displays the type of the generated property: **Number** or **String**.
- **Generated Property Name:** Displays the default generated property that retrieves the output column value of the mapping table. To change the name of the default generated property, double-click the entry, and then type a new name. You can use this new generated property in the plan.

Related Information

[Mapping Tables \[page 469\]](#)

2.4.31.10.2.5 Numbers Comparator



The *Numbers Comparator* compares a numerical property with a numerical value or another numerical property. Five comparison operators are available:

- Is equal to
- Is greater than
- Is less than
- Is greater than or equal to
- Is less than or equal to

When inserted in the decision tree, the *Numbers Comparator* component creates two separate branches:

- A branch that is activated when the comparison is true
- A branch that is activated when the comparison is false

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches according to the value of a specific property, you may need to compare a property with a numerical value or another property. To use the *Numbers Comparator* inside your price plan, do the following:

1. After you add the component, choose the first property, the value or the second property to compare with the first one, and then the Comparator operator.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

In a monthly telephone plan, calls are free if the total duration of all the calls per month does not exceed the amount that is specified in the plan. If the total duration exceeds this amount, each call costs \$0.34 per minute. The following table presents information that you need to set up the *Numbers Comparator* component inside the price plan:

Data	Settings
First property	Total duration of all calls per month
Comparator operator	<i>is greater than</i>
Second property	Duration of the monthly plan
Total duration of all calls per month	Price that is applied to the <i>is greater than</i> branch: \$0.34 per minute. Price that is applied to the <i>is less than or equal to</i> branch: \$0.00 per minute (free).

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of numerical properties. Select the first numerical property.

Operator: Provides the list of comparison operators. Select one of the following operators:

- *is equal to*
- *is greater than*
- *is less than*
- *is greater than or equal to*
- *is less than or equal to*

Comparison value: Provides the list of numerical properties or allows you to type a numerical value. Do one of the following:

- Select the second property to compare with the first property
- Type the numerical value to compare with the first property

2.4.31.10.2.6 Prefix Switching Comparator



The *Prefix Switching Comparator* component compares a string property with prefixes of string type.

When you insert it in the decision tree, the *Prefix Switching Comparator* component creates:

- A branch for each prefix, the branch of which is activated if the string property matches the related prefix.
- An additional branch that is activated if the string property does not match a prefix.

i Note

When several prefixes contain identical characters, the *Prefix Switching Comparator* selects the prefix which contains the most characters in common with the string property.

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches, you may need to compare a property with a set of prefixes. To use the *Prefix Switching Comparator* inside your price plan, do the following:

1. After you add the component, choose the property and the prefixes.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

An operator applies different prices to phone calls depending on the called number. The operator wants to determine the price for one minute of call time by analyzing the prefix of the called number. Using the *Prefix Switching Comparator* component, the operator needs to create a numerical property **called number** and compares it with other prefixes. The following table presents the information that the operator needs to set up the *Prefix Switching Comparator* component inside the price plan:

Data	Settings
Property	Called number
Prefix P1	02
Prefix P2	06
Prefix P3	089
Pricing rules	P1 Branch: \$0.17 per minute. P2 Branch: \$0.34 per minute. P3 Branch: \$0.06 per minute. "Other prefix" branch: \$0.25 per minute.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of string properties. Select a string property.

Prefixes: Each row in the table represents a prefix to be compared with the property. Each prefix row also represents a branch in the decision tree. Once you have added a row to the table, double-click the row, and then type a prefix.



: Adds a row to the table. Click the button to add a prefix row to the table.



: Deletes a row from the table. To remove a prefix, select the corresponding prefix row, and then click this button.



: Moves a row up in the table. To move a prefix up, select the corresponding prefix row, and then click this button.



: Moves a row down in the table. To move a prefix down, select the corresponding prefix row, and then click this button.



: Opens the Open dialog box to search for a file and import data into the table. Click this button when you want to create prefixes with data from a CSV file instead of manually entering data.



: Deletes all the rows in the table. Click this button to delete the list of prefixes.

2.4.31.10.2.7 Public Holidays Comparator



The *Public Holidays Comparator* component compares a date property with one or more public holidays.

The comparison is true when the date property matches at least one public holiday.

When you insert it in the decision tree, the *Public Holidays Comparator* creates two separate branches:

- A branch that is activated when the comparison is true
- A branch that is activated when the comparison is false

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches, you may need to compare a property with a set of public holidays. To use the *Public Holidays Comparator* inside your price plan, do the following:

1. After you add the component, choose the date property and the public holidays.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

An operator charges a special price for telephone calls when they begin on a holiday. To do this, the operator compares the **start date of the start of the call** property to the holidays in the United States by using the *Public Holidays Comparator* component. The following table presents the information that is needed to set up the *Public Holidays Comparator* component inside the price plan:

Data	Settings
Date property	Start date of the start of the call
Public holidays	US holidays
Pricing rules	Price applied to the <i>is</i> branch: \$0.15 per minute.
	Price applied to the <i>is not</i> branch: usual price.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of date properties. Select a date property.

Set the Public Holidays: Allows you to select the public holidays that you want to compare with the date property.

- *Group:* Select an item in the list¹¹⁶, and then click  to select the item-related public holidays. Repeat this action for others items if necessary. To clear all the selected public holidays, click .

Note

Do not pay attention to the public holidays that appear dimmed (unavailable) in the list because they are not longer recognized by the SAP CC system and are not longer active in the charges where they are used. For more information, consult the important note in the topic describing how to import public holidays. For more information on the import and export functions, refer to the [dedicated topic \[page 808\]](#) of primary help of Core Tool.

2.4.31.10.2.8 Range Table Introducer (Comparator)



The logic component *Range Table Introducer Comparator* allows you to use an existing range table in a plan and set up the logic that defines the computation of the final values. You can also use a parameter or a property of the rating context to identify the range table. If you use a parameter, its value can be redefined:

- In an [offer \[page 611\]](#) to refer to another [range table \[page 503\]](#) in the [pricing catalog \[page 400\]](#) of the service provider
- In a [provider contract](#) to refer to different [subscriber range tables](#) that are dedicated to each end customer of the service provider

The comparison in the *Range Table Introducer Comparator* component mainly involves two steps:

- The comparison of input column values in the selected range table with properties of the rating context (see [Mapping of Input Properties](#))
- The comparison of a quantity property of the rating context with the ranges (numerical intervals) in the selected range table (see [Range Input Property](#))

¹¹⁶ An item can be a region, a country, or anything else. The list of public holidays is created by your administrator. See your application administrator or consult the [Tuning Guide](#) for more information

The comparison algorithm depends on the characteristics for the selected range table. The processing depends on the options defined for the ranges (numerical intervals):

- Upper bounds are inclusive or not.
- Last upper bound is +Infinity or is a business value.

i Note

The comparison depends on the number of input columns in the selected range table:

- If the range table contains one or more input columns, the [Range Table Introducer Comparator](#) performs the two steps.
- If the range table contains no input columns, the [Range Table Introducer Comparator](#) only performs the second step.

For more information about range table classes and range tables, refer to the [dedicated \[page 489\] topics \[page 503\]](#).

At runtime (or during trial run), SAP Convergent Charging proceeds as follows when executing the logic component [Range Table Introducer Comparator](#):

- The system first compares row by row the set of input column values of the range table with a subset of properties in the rating context. The comparison stops when the subset of properties matches one entire row of input values in the range table. If no set of input values matches the subset of properties in the rating context, the fourth branch is ([Input Values not Found](#)) is executed.
- The system then compares row by row the ranges of the [Range](#) column in the range table with a given property of the rating context. The comparison stops when the property matches one range of the [Range](#) column. The output columns that relate to the selected range are retrieved in generated properties, which you can use in the plan. If no property matches the comparison, an appropriate branch ([Is Below the First Bound](#) or [Is Above the Last Defined Bound](#)) is executed and some default additional values are computed ([Computed Properties](#)).

When you insert the [Range Table Introducer Comparator](#) component in the decision tree for your plan, it creates three or four separate branches:

- A first branch ([Is Below the First Bound](#)) that is processed when the value of the range input property is negative.
- A second branch ([Is in a Range](#)) that is processed when the value of the range input property belongs to a range that is defined in the range table.
- A third branch that depends on the related [range table class \[page 489\]](#) that is specified in the component:

Third branch	Condition (in the range table, if the upper bound for last range is...)
A branch (Is Above the Last Defined Bound) that is processed when the value of the range input property is outside the last bounded range.	Bounded
A branch (Found in Last Unbounded Range) that is processed when the value of the range input property is in the last infinite and unbounded range.	Unbounded (+Infinity)

- A fourth branch ([Input Values not Found](#)) that is processed when no combination of input values has been found in the range table. This branch is available only if at least one input value has been defined in the

related range table class. All the properties that relate to the range table are not available in the context of this branch (for example, output values and computed values).

i Note

When the component is executed by the SAP CC system at runtime, only one branch is executed depending on the comparison result.

When you set up the component, you can use the following generated properties in the logic of a branch:

- All output column values are usable in the rating or refilling context.
- When a column represent a number and the column is marked as cumulative, the cumulated value is generated in a context property.
- Range boundaries are available as context properties: Lower bound of the range and upper bound of the range.
- The size of the range is available: Value of the upper bound of the range minus the value of the lower bound of the range.
- When the value of the range input property is included in a range, the proration within the range is available (the value of the range input property minus the value of the lower bound of the range) / (the value of the upper bound of the range minus the value of the lower bound of the range).
- The difference between the value of the range input property and the lower bound of the range (the upper bound in case of an unbounded range) is also provided.

i Note

If the value of the range input property is equal to 0, the SAP CC system executes different branches according to the configuration of the range table class that is specified in this component. The system takes into account the upper bounds of the intervals that are defined as inclusive or exclusive in the related class:

- If the upper bounds of the intervals are inclusive, the system selects the first branch (*Is Below the First Bound*).
- If the upper bounds of the intervals are exclusive, the system selects the second branch (*Is in a Range*).

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches according to the value of a specific property, you may need to compare a property with a numerical value or another property. To use the [Range Table Introducer](#) inside your price plan, do the following:

1. After you add the component, choose a range table class, a range table, a date/time reference, and a property to compare with the ranges of the range table.
2. Choose input properties and add them to the mapping of input properties if the range table contains input columns.
3. Describe the pricing logic of each decision tree branch by using logic components and end each branch with a [Function \[page 895\]](#) component. In each branch, different new properties are available.

❖ Example

In the telecommunication industry, a company sells voice services and has configured a range table class and a unique range table in its pricing catalog. The table specifies a unit price per minute regarding the call

duration. To use this range table in the pricing logic, you set up a charge with a price plan that includes a [Range Table Introducer Comparator](#) component.

In the [pricing catalog \[page 400\]](#) of this service provider, you must configure:

- [A range table class \[page 489\]](#) (where the last range is unbounded and an output column is a unit price per minute)
- [A range table \[page 503\]](#)

You create a new reusable charge and set up its price plan.

- You insert the [Range Table Introducer Comparator](#).
- You set up the component and its branches by using [Function \[page 895\]](#) components and other logic components¹¹⁷:
 - In the first branch (*Is Below the First Bound*): Add a [No Access \[page 903\]](#) function.
 - In the second branch (*Is in a Range*): Add a [Linear \[page 901\]](#) function where A is the unit price that is set for the selected range, X is the call duration since the beginning of the range (see [Value Beyond Lower Bound](#)), and B is the cumulative price since the beginning of the phone call.
 - In the third branch (*Found in Last Unbounded Range*): Add a [Linear \[page 901\]](#) function.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Range Table Class: Provides the list of available range table classes. Select the range table class that you want to use with the [Range Table Introducer](#). Note that the [Range Table Introducer Comparator](#) only creates the fourth branch (*Input Values not Found*) if the range table class contains input columns. To open and modify the

range table class, click .

Range Table: Provides the list of available range tables that relate to the selected class with the list of parameters and properties of type string. Select the range table that you want to use with the [Range Table Introducer](#), or select a parameter or a property that must include at runtime the identifier of a range table or a subscriber range table (see the note below).

i Note

If you select a parameter, the value of this parameter can be redefined in:

-
- Subscriber range tables are not available in subscriptions
- Refer also to [Customized Use of Range Tables in the Charges and Refill Logic \[page 513\]](#).

¹¹⁷ You can configure more complex pricing logic in these branches.

Reference Date: Provides the list of date/time properties. Select a date property. This reference date/time information enables the SAP CC system to select the appropriate version of the range table.

Range Input Property: Displays the properties of type number from the rating context and allows you to select the property that you want to compare with the ranges (numerical intervals) in the selected range table. Select the property as a quantity that you want to compare with the ranges of positive numbers in the range table.

Mapping of Input Properties: Displays the input columns of type string in the range table. When a range table contains input columns, the mapping of input properties allows you to determine which row of input columns you want to compare with properties of the rating context. The mapping of input properties allows you to map the properties of the rating context onto the input values of the range table:

- **Column Name:** Displays the name of the input column of the range table.
- **Column Description:** Displays the description of the input column of the range table.
- **Input Property Name:** Allows you to assign a property of the rating context to the input value of the range table.

Mapping of Generated Properties: Displays the output columns of the range table and allows you to rename the generated properties. When a comparison is true between properties, the **Reference Date**, and the **Range Input Property**, the generated properties retrieve the values of the output column entries.

- **Column Name:** Displays the output column name of the range table.
- **Column Description:** Displays the description of the output column of the range table.
- **Type:** Displays the type of the output column as configured in the selected range table class. The type are: **String**, **Single Number**, **Cumulative Number**, or **Range Size Cumulative Number**. Depending on this type, the SAP CC system generates one or two new properties for each output column.
- **Generated Property Name:** Displays the name of the generated property that retrieves the value of the cell in the output column and that relates to the row that is selected by the range comparison. The generated property retrieves the value of the cell in the output column that relates to the row that is selected by the range comparison. To change the name of the generated property, double-click the entry, and then type a new name. You can use this new generated property in the branches of this **Range Table Introducer** component. The default name is the name of the output column.
- **Generated Cumulative Property Name:** Displays the name of the generated cumulative property that retrieves the cumulative value or the range size cumulative value that is computed by the system. You can set up this name when the output column is of type **Cumulative Number** or **Range Size Cumulative Number**. To change the name of the generated cumulative property, double-click the entry, and then type a new name. You can use this new generated property in the branches of the component. The generated cumulative property retrieves the value of the cell in the output column that relates to the row that is selected by the range comparison.
 - **Cumulative value:** The generated property is of type number. Its value is computed by adding the output column values of all the rows until the row that is selected by the range comparison in the range table.
 - **Range size cumulative value:** The generated property is of type number. Its value is computed according to a formula (the output column value is multiplied by the range size) that is applied to the row just before the row that is selected by the range comparison in the range table.

The following table shows you the availability of generated properties:

Type of Generated Properties	The range input property is below the first bound	The range input property is in a range	The range input property is in the last unbounded range (+∞)	The range input property is after the last defined bound
String or Single Number	Yes It is the value of the column in the first range.	Yes It is the value of the column in the related range.	Yes It is the value of the column in the related range.	Yes It is the value of the column in the last range.
Cumulative value	Yes It is equal to 0.	Yes It is the sum of the values from the previous ranges excluding the selected range.	Yes It is the sum of the values from the previous ranges but excluding the last range.	Yes It is the sum of the column values from all the ranges.
Range size cumulative value	Yes It is equal to 0.	Yes It is the sum of the values that are computed according to the formula ¹¹⁸ from the previous ranges but excluding the selected range.	It is the sum of the values that are computed according to the formula ¹¹⁹ from the previous ranges but excluding the selected range.	Yes It is the sum of the values that are computed according to the formula ¹²⁰ from all the ranges.

Computed Properties: Displays the computed properties that allows you to rename the generated properties that are visible in the rating contexts of the different branches.

- **Computed Value:** Displays the computed values that are available in the branch of the component. Some values are not available depending on the branch.
- **Computed Property Name:** Displays the names of the computed properties that provide additional information and can be used for the configuration of the pricing logic of the branches. To change the name of the default computed property, double-click the entry, and then type a new name. You can use this new computed property in the branches of the component according to their availability (see the table below).

The following table shows you the availability of computed properties:

Computed Values	The range input property is before the first bound	The range input property is in a range	The range input property is in the last unbounded range (+∞)	The range input property is after the last defined bound
Lower Bound of Range	Yes It is equal to 0.	Yes It is equal to the lower bound of the selected range.	Yes It is equal to the lower bound of the selected range.	Yes It is equal to the last upper bound.

¹¹⁸ The value is multiplied by the range size.

¹¹⁹ The value is multiplied by the range size.

¹²⁰ The value is multiplied by the range size.

Computed Values	The range input property is before the first bound	The range input property is in a range	The range input property is in the last unbounded range ($+\infty$)	The range input property is after the last defined bound
Upper Bound of Range	Yes It is equal to 0.	Yes It is equal to the upper bound of the selected range.	Not available	Yes It is equal to the last upper bound.
Range Size:	Yes	Yes	No (N/A)	Yes
Upper Bound of Range - Lower Bound of Range	It is equal to 0.			It is equal to the last upper bound.
Prorata in Range:	Not available	Yes	No (N/A)	Not available
Value Beyond Lower Bound / Range Size				
Value Beyond Lower Bound:	Not available	Yes	Yes	Not available
Difference between the lower bound of the range and the value of the input property that is used to select the appropriate range				
Value Beyond Upper Bound:	Not available	Not available	Not available	Yes
Difference between the upper bound of the last defined range and the value of the input property				

Related Information

[Range Tables \[page 503\]](#)

2.4.31.10.2.9 Strings Comparator



The *Strings Comparator* component compares a string property with a string value or another string property. Four comparison operators are available:

- Is equal to
- Starts with
- Ends with
- Contains

When you insert it in the decision tree, the *Strings Comparator* component creates two separate branches:

- A branch that is activated when the comparison is true
- A branch that is activated when the comparison is false

When the component is executed, only one branch is activated depending on the test result.

Use

In a [price plan \[page 570\]](#), if you want to apply different prices to branches, you may need to compare a string property with a string value or another string property. To use the *Strings Comparator* inside your price plan, do the following:

1. After you add the component, choose the first property, the second property or the string value to be compared with the first one, and then the Comparator operator.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

A telephone operator decides to apply a special rate (\$0.06 per minute) when the called number begins with "089"; otherwise, the call is billed at the usual price. The following table presents the information that the telephone operator needs to set up the *Strings Comparator* component inside the price plan:

Data	Settings
First property	Number called
Comparator operator	<i>starts with</i>
Value	089
Pricing rules	Price that is applied to the "starts with" branch: \$0.06 per minute. Price that is applied to the <i>does not start with</i> branch: Usual price.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of string properties. Select the first string property.

Operator: Provides the list of comparison operators. Select one of the following operators:

- *is equal to*
- *starts with*
- *ends with*
- *contains*

Comparison Value: Provides the list of string properties or the *String Value* option. Select a second property or select *String Value*, and then type a string.

2.4.31.10.2.10 Switching Comparator

⚠ Caution

As of SAP Convergent Charging 5.0 SP 6, this component not available in case of an installation scenario integrated with SAP S/4HANA Cloud. For further information, refer to SAP Note [2772452](#).



The *Switching Comparator* component compares the state of a prepaid account with one or more predefined values (*Active*, *Blocked*, *Locked*, or *Closed*).

The comparison is true when the state of the prepaid account matches one of the predefined values.

When you insert it in the decision tree, the *Switching Comparator* creates two to five separate branches:

- One to four branches corresponding to a predefined value (*Active*, *Blocked*, *Locked*, or *Closed*), but only one branch is activated if the comparison is true.
- One branch that is activated when the comparison is false.

When the component is executed, only one branch is activated depending on the test result.

Use

In the *refill logic* of a *refill plan*, if you want to make a refill depending on the state of the prepaid account, you may need to compare the state of the prepaid account with one of the predefined states (*Active*, *Blocked*, *Locked*, or *Closed*). To use the *Switching Comparator* inside your *price plan* [page 570], do the following:

1. After you add the component, choose the "*Account State of Prepaid Account*" as the property name.
2. Describe the refill of each decision tree branch by using a *Function* [page 895] component.

Definition tab

Property Name: Provides the list of properties. Because a refill plan is associate to one and only one prepaid account, the list provides only the property *Account State of Prepaid Account*. Select this property.

Values: Provides the list of the states of a prepaid account. Select a state, and then click  to add a value to the table.

- **Active:** Any operation is possible when the prepaid account is active
- **Blocked:** Some operations (refills, overruns, and overspending) are possible when the prepaid account is blocked
- **Locked:** Some operations (refills, overruns, and overspending) are possible when the prepaid account is locked
- **Closed:** No operation is possible when the prepaid account is closed



: Adds a row to the table. Click the button to add a value to the table.



: Deletes a row from the table. To remove a value, select the corresponding row, and then click this button.



: Moves a row up in the table. To move a value up, select the corresponding row, and then click this button.



: Moves a row down in the table. To move a value down, select the corresponding row, and then click this button.



: Opens the Open dialog box to search for a file and import data into the table. Click this button when you want to create values with data from a CSV file instead of manually entering data.



: Deletes all the rows in the table. Click this button to delete the list of values.

2.4.31.10.3 Splitter Components

A splitter component divides a numerical property or a date property into two parts. Each part is represented by a branch in the decision tree. When the component is executed, the two branches are activated and provide two amounts which are added up to compute the final amount.

There are several types of splitter components. For example, the *Number Splitter* component splits an existing property related to a number, and the *Time Slot Splitter* component splits a property related to time slots.

Splitter Components

The following splitter components are available with SAP Convergent Charging:

Icon	Name	Action/Usage
	Amounts Aggregator [page 929]	Creates two or more branches to calculate amounts and performs operations.
	Numbers [page 930]	Compares a numerical property P with a threshold T and divides the numerical property into two parts, p1 and p2, according to some conditions.
	Public Holidays [page 932]	Compares a time slot D with a reference time slot R and divides D into two time slots.
	Time Slot [page 936]	Compares a time slot D with a reference time slot R and divides D into two time slots.

2.4.31.10.3.1 Amounts Aggregator Splitter



The *Amounts Aggregator Splitter* component creates two or more branches in the decision tree to calculate amounts and performs one of the following operations:

- Calculates the sum of the amounts of all the branches
- Compares the amounts of all the branches to activate either the lowest amount or the highest amount
- Calculates the average amount of all the branches

In each branch of the *Amounts Aggregator Splitter*, you can insert components to calculate an amount.

The *Amounts Aggregator Splitter* component allows you to describe independent rules in each branch. You can compare or combine the calculated amounts in the different branches to provide one single amount. The final amount depends on the type of the operation:

With	The final amount is
<i>sum</i>	The sum of all the amounts calculated in each branch
<i>minimum</i>	The minimum of all the amounts calculated in each branch
<i>maximum</i>	The maximum of all the amounts calculated in each branch
<i>mean</i>	The average of all the amounts calculated in each branch

Use

In a [price plan \[page 570\]](#), if you want to bill a chargeable item class according to two distinct criteria and charge the customer the lower price, do the following:

- In the branch of the price plan, insert the *Amounts Aggregator Splitter* component by selecting the operation *Minimum* and the number *2* as the number of amounts or branches.
- Describe the pricing, criterion by criterion, of each branch.

❖ Example

You sell educational documents on the web. The customer is charged an opening fee according to the size and the category of documents. To attract new customers, you decide to charge only the size or the category which represents the lowest fee.

You perform this operation by inserting the *Amounts Aggregator Splitter* component at the suitable level of your price plan. You set up the component by choosing *minimum* as the operation and *2* as the number of operations. The component will calculate:

- The price according to the category in the first branch
- The price according to the size in the second branch

After calculation, the customer is charged the lowest price.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Operation: Provides the list of operations to apply to the tree branches of the *Amounts Aggregator Splitter*. *Sum* is the default value. Select one of the following operations:

- *sum*: Calculates the sum of the amounts of all the branches
- *minimum*: Activates the branch whose amount is the lowest
- *maximum*: Activates the branch whose amount is the highest
- *mean*: Calculates the average of the amounts of all the branches

Number of Amounts: Provides the list of the number of branches that you want to compare or aggregate. The number *2* is the default value. Select a number ranging from *2* to *20*.

2.4.31.10.3.2 Numbers Splitter



The *Numbers Splitter* compares a numerical property *P* with a threshold *T* and divides the numerical property into two parts, *p1* and *p2*, according to the following conditions:

- If *P* is less than or equal to *T*, then $p1 = P$ and $p2 = 0$.
- If *P* is greater than *T*, then $p1 = T$ and $p2 = P - T$.

i Note

In all cases, $P = p1 + p2$.

When you insert it in the decision tree, the *Numbers Splitter* component divides the numerical property P into two parts and creates:

- Two separate branches in the decision tree:
 - A branch *up to* that represents the “p1” value
 - A branch *beyond* that represents the “p2” value
- Two numerical properties to retrieve the “p1” and “p2” values

When the component is executed, if p1 and p2 are not equal to 0, the two branches are activated and provide two amounts which are added up to compute the final amount. If p2 = 0, the branch *beyond* is not activated.

Use

In a [price plan \[page 570\]](#), do the following to use the *Numbers Splitter*:

1. Insert the component in the decision tree to create the two branches *up to* and *beyond*. Choose a numerical property, define a threshold, and choose the name of the generated property.
2. Describe the pricing of each decision tree branch by using a [Function \[page 895\]](#) component.

❖ Example

A client has a telephone service that contains a calling plan of two hours per month at the reduced price of \$0.02 per minute. Beyond these two hours, the calls cost \$0.04 per minute. To calculate the call price, you must compare and divide the call duration according to the time that remains in the monthly calling plan. The remaining time can be a counter that is decreased each time that there is a call and reset to two hours at the beginning of each month.

The following table presents the information that is needed to set up the Numbers component inside the price plan:

Data	Settings
Numerical property	Duration of the phone call (numerical property)
Threshold (Split value)	Monthly remaining duration in the package (counter)
Generated property	Call duration according to the calling plan
Pricing rules	Price that is applied to the <i>up to</i> branch: \$0.02 per minute
	Price that is applied to the <i>beyond</i> branch: \$0.04 per minute

i Note

In a price plan, you may need to apply different prices which vary depending on a numerical threshold. To do this, you can divide a numerical property according to the numerical threshold. A typical use of the *Number Splitter* component is the calculation of a call within the framework of a calling plan. The calculation rule is the following:

- If the call duration is less than the time that remains in the calling plan, you must apply the calling plan price to the entire call duration.
- If the call duration is greater than the time that remains in the calling plan, you must do the following:
 - Apply the non-calling plan price to the part of the call duration that is outside of the calling plan limits

- Apply the calling plan price to the part of the call that is within the calling plan limits
- Add the two resulting amounts

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of numerical properties. Select a numerical property.

Split value: Provides the threshold value list, or allows to type a threshold value. Select or type a split value.

Names of Computed Properties: Allows you to name two new numerical properties:

- *Up to Split Value:* Type the name of the new numerical property that retrieves the result p1. You can reuse this computed property in the branch *Up to* of the decision tree.
- *Beyond Split Value:* Type the name of the new numerical property that retrieves the result p2. You can reuse this computed property only in the branch *Beyond* of the decision tree.

2.4.31.10.3.3 Public Holidays Splitter



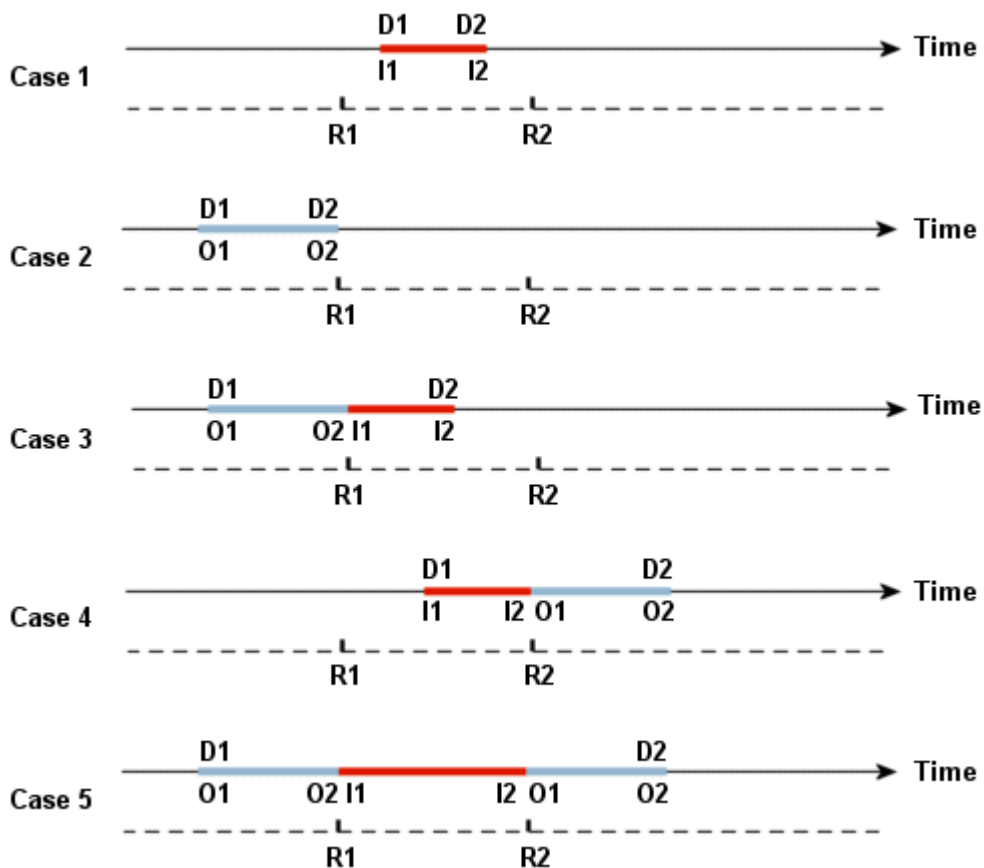
The *Public Holidays Splitter* component compares a time slot D with a reference time slot R and divides D into two time slots:

- Time slot I, which is inside the public holidays R
- Time slot O, which is outside the public holidays R

The reference time slot R is made up of public holidays. You can choose dates by selecting one or more countries or choose one or more dates by selecting individual holidays. The reference time can then be a discontinuous period or just one day.

The illustration below shows different cases you can meet when using a *Public Holidays Splitter*. The time slots are represented as follow:

- Time slot D, represented by [D1-D2]
- Time slot R, represented by [R1-R2]
- Time slot I, represented by [I1-I2]
- Time slot O, represented by [O1-O2]



Note

- If the time slot D is completely inside R, then part O = 0 (Case 1 in the previous illustration).
- If the time slot D is completely outside R, then part I = 0 (Case 2 in the previous illustration).
- In all cases, $D = I + O$ (Refer to the previous illustration).
- If time slot D extends beyond the reference time slot R on either side of R, the time slot results are coherent: $I = R$, and O represents the sum of the two time slots that extend outside of either end of R (Cases 3, 4 and 5 in the previous illustration).

Use

When you insert it in the decision tree, the *Public Holidays Splitter* component divides the time slot D into two time slots and creates:

- Two separate branches in the decision tree:
 - The first branch *During Public Holidays* represents the time slot I
 - The second branch *Not During Public Holidays* represents the time slot O
- Two date properties which are the start date and the end date of the time slots I and O:
 - The start date takes two values I1 and O1 in succession, depending on the branch
 - The end date takes two values I2 and O2 in succession, depending on the branch

When the component is executed, the two branches are activated and provide two amounts which are added up to compute the final amount. If $I = 0$ or $O = 0$, the corresponding branch is not activated.

⚠ Caution

If $D = 0$, (case of $D1 = D2$), no branch is activated and no transaction is generated (like with a [Free Function \[page 898\]](#)).

If the *Public Holidays Splitter* component processes "case 5" in the previous illustration, it does the following in this order:

1. Process of the first time slot $[O1 - O2]$ with Start Date (out of the slot) = $O1$ and End Date (out of the slot) = $O2$.
2. Process of the time slot $[I1 - I2]$ with Start Date (in the slot) = $I1$ and End Date (in the slot) = $I2$.
3. Process of the last time slot $[O1 - O2]$ with Start Date (out of the slot) = $O1$ and End Date (out of the slot) = $O2$.

♣ Example

A customer has a telephone service that includes a reduced price of \$0.02 per minute if the call takes place during a public holiday; otherwise, the call costs \$0.04 per minute. To calculate the cost of a call, you need to do the following:

1. Compare the call time slot with the reference time slot of public holidays.
2. Divide the call time slot into two time slots, **During Public Holidays** and **Not During Public Holidays**.
3. Calculate the duration of the two time slots and apply the corresponding price.

The following table presents the information that is needed to set up the *Public Holidays Splitter* component in the price plan:

Data	Settings
Time slot D	Start date of the phone call ($D1$). Stop date of the phone call ($D2$).
Reference time slot R	All USA public holidays
Generated property	Start Date and End Date (in the slot): $[I1 - I2]$ Start Date and End Date (out of the slot): $[O1 - O2]$
Pricing rules	Duration of each time slot: Difference between the two generated properties Start Date and End Date for each time slot. Price that is applied to the "During Public Holidays" branch: \$0.02 per minute. Price that is applied to the "Not During Public Holidays" branch: \$0.04 per minute.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Start Date Name: Provides the list of date properties. Select the date property that represents the value D1 of the [D1-D2] time slot.

End Date Name: Provides the list of date properties. Select the date property that represents the value D2 of the [D1-D2] time slot.

Public Holidays: Allows you to set up the reference time slot [R1-R2] that represents one or more Public Holidays.

- **Group:** Select an item in the list¹²¹, and then click  to select the item-related public holidays. Repeat this action for others items if necessary. To clear all the selected public holidays, click .

Note

Do not pay attention to the public holidays that appear dimmed (unavailable) in the list because they are not longer recognized by the SAP CC system and are not longer active in the charges where they are used. For more information, consult the important note in the topic describing how to import public holidays. For more information on the import and export functions, refer to the [primary help of Core Tool \[page 808\]](#).

Names of Computed Properties: Allows you to type the names of the new date properties that retrieve the resulting time slots. These properties can be reused in a [Duration Operator \[page 962\]](#) component to calculate a duration.

- **Start Date (in the slot):** Allows you to type the name of the new date property that retrieves the start date of the resulting time slot [I1 - I2]. You can reuse this computed property in the branch *During Public Holidays* of the decision tree.
- **End Date (in the slot):** Allows you to type the name of the new date property that retrieves the end date of the resulting time slot [I1 - I2]. You can reuse this computed property in the branch *During Public Holidays* of the decision tree.
- **Start Date (out of the slot):** Allows you to type the name of the new date property that retrieves the start date of the resulting time slot [O1 - O2]. You can reuse this computed property in the branch *Not During Public Holidays* of the decision tree.
- **End Date (out of the slot):** Allows you to type the name of the new date property that retrieves the end date of the resulting time slot [O1 - O2]. You can reuse this computed property in the branch *Not During Public Holidays* of the decision tree.

¹²¹ An item can be a region, a country or anything else. The list of public holidays is created by your administrator. See your application administrator or consult the [Tuning Guide](#) for more information

2.4.31.10.3.4 Time Slot Splitter

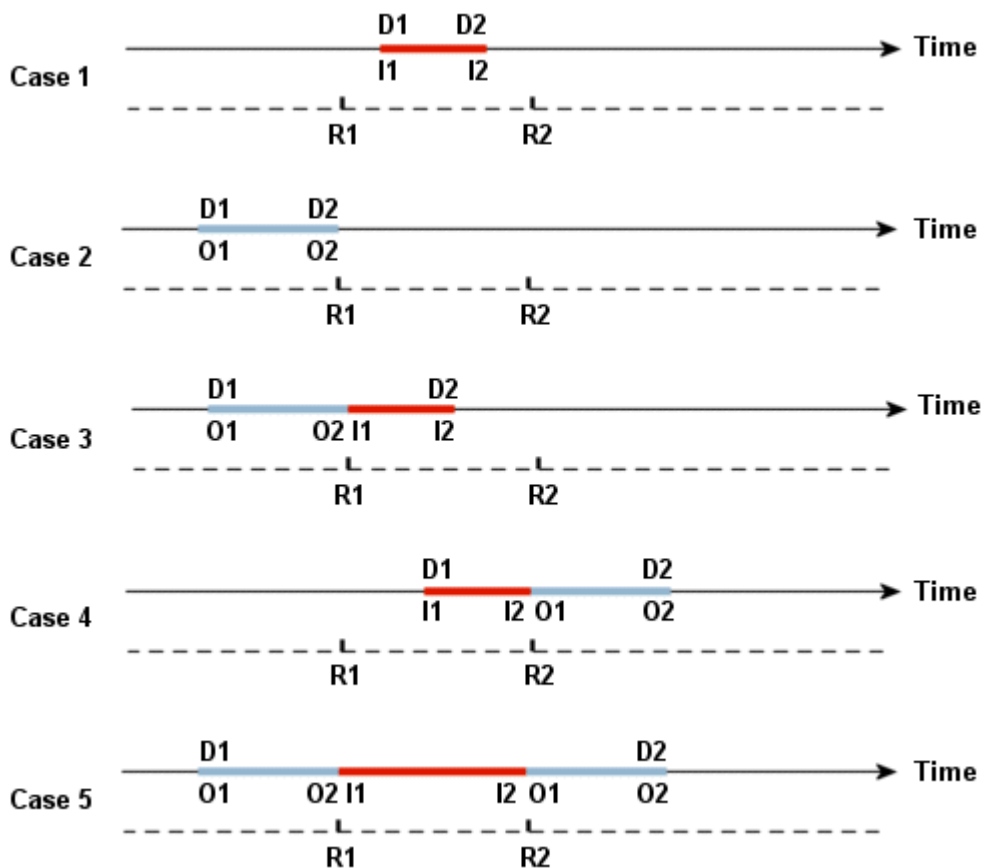


The *Time Slot Splitter* compares a time slot D with a reference time slot R and divides D into two time slots:

- Time slot I, which is inside the reference time slot R
- Time slot O, which is outside the reference time slot R

The illustration below shows different cases you can meet when using a *Time Slot Splitter*. The time slots are represented as follow:

- Time slot D, represented by [D1-D2]
- Time slot R, represented by [R1-R2]
- Time slot I, represented by [I1-I2]
- Time slot O, represented by [O1-O2]



i Note

- If the time slot D is completely inside R, part O = 0 (Case 1 in the previous illustration).
- If the time slot D is completely outside R, part I = 0 (Case 2 in the previous illustration).
- If the time slot D extends beyond the reference time slot R on either side of R, the time slot results are coherent: I = R, and O represents the sum of the two time slots that extend outside of either end of R (Cases 3, 4 and 5 in the previous illustration).

- In all cases, $D = I + O$.

Use

When you insert it in the decision tree, the *Time Slot Splitter* component divides the time slot D into two time slots and creates:

- Two separate branches in the decision tree:
 - The first branch *In the Time Slot*, which represents the time slot I
 - The second branch *Out of the Time Slot*, which represents the time slot O
- Two date properties which are the start date and the end date of the time slots I and O:
 - The start date takes two values I1 and O1 in succession, depending on the branch
 - The end date takes two values I2 and O2 in succession, depending on the branch

When the component is executed, the two branches are activated and provide two amounts which are added up to compute the final amount. If $I = 0$ or $O = 0$, the corresponding branch is not activated.

⚠ Caution

If $D = 0$, (case of $D1 = D2$), no branch is activated and no transaction is generated (like with a *Free Function* [page 898]).

If the *Time Slot Splitter* component processes "case 5" in the previous illustration, it does the following in this order:

1. Process of the first time slot $[O1 - O2]$ with Start Date (out of the slot) = O1 and End Date (out of the slot) = O2.
2. Process of the time slot $[I1 - I2]$ with Start Date (in the slot) = I1 and End Date (in the slot) = I2.
3. Process of the last time slot $[O1 - O2]$ with Start Date (out of the slot) = O1 and End Date (out of the slot) = O2.

🔗 Example

A customer has a telephone service that includes a reduced price of \$0.02 per minute every day during the 10:00 PM to 6:00 AM time slot. Outside this time slot, the call costs \$0.04 per minute. To calculate the cost of a call, you need to do the following:

1. Compare the call time slot with the reference time slot (10:00 PM to 6:00 AM).
2. Divide the call time slot into two time slots: *In the Time Slot* and *Out of the Time Slot*.
3. Calculate the duration of the two time slots and apply the corresponding price. For example, you insert a *Duration Operator* [page 962] component into the two branches to calculate the duration, and then insert a *Linear Function* [page 901] component to calculate the price of each branch.

The following table presents the information that is needed to set up the *Time Slot* component inside the price plan:

Data	Settings
Time Slot D	Start date of the phone call (D1).
	Stop date of the phone call (D2).

Data	Settings
Reference Time Slot R	Type: Daily. From: 10:00 PM To: 06:00 AM.
Generated property	Start Date and End Date (in the slot): [I1 - I2] Start Date and End Date (out of the slot): [O1 - O2]
Pricing rules	Duration of each time slot: Difference between the two generated properties Start Date and End Date for each time slot. Price that is applied to the <i>In The Time Slot</i> branch: \$0.02 per minute. Price that is applied to the <i>Out of The Time Slot</i> branch: \$0.04 per minute.

i Note

In a [price plan \[page 570\]](#), you may need to apply prices which vary according to different time slots. The Time Slot Splitter component is often used to calculate the cost of a telephone call, the price of which varies according to the cases that are shown in the following table:

If the call takes place	You must apply the price to	During
Inside the reference time slot	<i>In the Time Slot</i>	The entire call duration
Outside the reference time slot	<i>Out of the Time Slot</i>	The entire call duration
Partly inside and partly outside the reference time slot	<i>In the Time Slot</i>	The call duration that is inside the time slot
	<i>Out of the Time Slot</i>	The call duration that is outside the time slot

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Start Date Name: Provides the list of date properties. Select the date property that represents the value D1 of the [D1-D2] time slot.

End Date Name: Provides the list of date properties. Select the date property that represents the value D2 of the [D1-D2] time slot.

Time Slot Parameters: Allows you to set up the reference time slot [R1-R2].

- **Time Slot Type:** Provides the list of time slots. Select one of the following time slots:
 - *daily*
 - *weekly*
 - *monthly*
 - *yearly*
- **From:** Allows you to select or type a start date or time (hour and minute) of the time slot.
- **At:** Allows you to select or type a time (hour and minute).
- **To:** Allows you to select or type an end date or time (hour and minute) of the time slot.

i Note

Depending on the selected time slot, the format varies as shown in the following examples:

- *daily:* **From** 05.00 AM **To** 07.00 AM
- *weekly:* **From** Monday **at** 05.00 AM **To** Wednesday **at** 07.00 AM
- *monthly:* **From** 10 **at** 05.00 AM **To** 12 at 07.00 AM
- *yearly:* **From** 22 May **at** 05.00 AM **To** 18 June **at** 07.00 AM

Names of Computed Properties: Allows you to type the names of the new date properties that retrieve the resulting time slots. These properties can be reused in a [Duration Operator \[page 962\]](#) component to calculate a duration.

- **Start Date (in the slot):** Allows you to type the name of the new date property that retrieves the start date of the resulting time slot [I1 - I2]. You can reuse this computed property in the branch *In the Time Slot* of the decision tree.
- **End Date (in the slot):** Allows you to type the name of the new date property that retrieves the end date of the resulting time slot [I1 - I2]. You can reuse this computed property in the branch *In the Time Slot* of the decision tree.
- **Start Date (out of the slot):** Allows you to type the name of the new date property that retrieves the start date of the resulting time slot [O1 - O2]. You can reuse this computed property in the branch *Out of the Time Slot* of the decision tree.
- **End Date (out of the slot):** Allows you to type the name of the new date property that retrieves the end date of the resulting time slot [O1 - O2]. You can reuse this computed property in the branch *Out of the Time Slot* of the decision tree.

2.4.31.10.4 Operator Components

i Note

You can use the Operators components in a [price plan \[page 570\]](#), in a [pricing macro \[page 411\]](#), in a [charging plan](#), in a [refill plan \(refill logic\)](#), or in an [allowance plan \(allowance logic\)](#). But you cannot use:

- The components *Counter Operator* and *Macro Operator* in a charging plan.
- The component *State Schedule Updater Operator* in a price plan, a pricing macro, in a charging plan, and in an allowance plan (allowance logic).

An operator component can do the following in the rating context:

- Modify counter values
- Create allowances
- Use allowances by sending events or introducing allowance properties
- Create new properties resulting from calculation

There are several types of operator component. For example, the *Duration Operator* component calculates the duration between two dates while the Counter component can update counters that are defined in the price plan, the charging plan, or the refill logic.

Operator Components

The following operator components are available with SAP Convergent Charging:

Icon	Name	Action/Usage
	Alert Triggering [page 942]	Configures an alert which is triggered if the branch containing the component is activated.
	Allowance Event Sender [page 943]	Sends an allowance event to allowances under certain conditions.
	Allowance Event Updater [page 948]	Modifies the event handled by the allowance.
	Allowance Property Introducer [page 949]	Retrieves the property values of a set of allowances and saves them in generated properties that are available for the next components of the decision tree.
	Allowance Validity Period Updater [page 952]	Extends the end date or redefines the start date and the end date of the validity period of the allowances.
	Arithmetic Computation [page 955]	Carries out an arithmetical operation between two numerical values or numerical properties.
	Concatenate [page 957]	Concatenates two or more string properties or character strings.
	Create Allowance [page 958]	Creates an allowance for the related provider contract through a refill plan, a charge plan, or an allowance plan.
	Date Shift [page 959]	Calculates a new date by adding a period of time to an existing date property or by subtracting a period of time from an existing date property.

Icon	Name	Action/Usage
	Decrement Counter [page 961]	Debits a counter
	Duration [page 962]	Calculates the period of time between two dates.
	Duration Adapter [page 963]	Converts a period of time into another time unit.
	Filter [page 965]	Compares each value of a multi-valued property of string type with one or more string values.
	Increment Counter [page 961]	Credits a counter
	Macro Introducer [page 969]	Allows to use an existing pricing macro in a plan.
	Multi-Valued Evaluator [page 970]	Counts the number of values which are in a multi-valued property.
	Output Property Update [page 972]	Modifies the generated properties of a pricing macro.
	Property Introducer [page 973]	Creates new properties for a plan.
	Property Type Convertor [page 975]	Creates a new property from an existing property by modifying the type of the existing property.
	Prorata [page 978]	Calculates the product $Y = X * R$, in which: - Y is the numerical result - X is a numerical value - R is a ratio ranging from 0 to 1
	State Schedule Updater [page 982]	Changes the dates on which a prepaid account is blocked, locked, or closed.
	Switch Table [page 983]	Compares the same property with one or more values or properties of the same type.
	Tier Table Introducer [page 986]	Allows to use an existing translation table in a plan.
	Translation Table Introducer [page 988]	Allows to use an existing tier table in a plan.

Icon	Name	Action/Usage
	Update Counter [page 990]	Updates a counter.

2.4.31.10.4.1 Alert Triggering Operator



The **Alert Triggering Operator** component allows configuring an alert which is triggered if the branch containing the component is activated. When an alert is triggered and if the charging operation is successful, a notification is then published by SAP Convergent Charging to a dedicated system.

i Note

- The notification is published only if this function is activated. Refer to your administrator for more information or consult the SAP CC [SAP CC 5.0 Tuning Guide](#).
- The notification handling must be implemented in your external system by the implementation project team. If SAP Convergent Charging is connected to SAP ERP/FI-CA, the default integration does not take into account the notification based on the [Alert Triggering Operator](#) component and a specific implementation project is necessary.

❖ Example

Using Wireless M2M communications, a vending machine can be installed virtually anywhere but should be connected to a support centre to signal when the vending machine is empty, full of change, or out of service. To do that, the price plan can include an Alert Triggering operator component to trigger an alert that notifies a dedicated system.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Code: Allows you to type the code identifying the alert, or select the string property whose value represents the alert code.

Message: Allows you to type an information message describing the alert.

Properties: Provides the list of rating context properties. The properties give additional information about the alert. Select none, one or more string properties. The values of the selected properties are included in the alert published by the dedicated system.

2.4.31.10.4.2 Allowance Event Sender (Operator)

i Note

You cannot use this logic component after an [Account Event Refill \[page 883\]](#) component in the refill logic or after an [Event-Based Trigger \[page 886\]](#) component in the allowance logic.



The **Allowance Event Sender** operator component allows you to configure the sending of an *allowance event* to *allowances* that:

- Belong to the related provider contract or to the related provider contract and its parent.
- Are shared (see [Shared Allowances](#)).
- Are active at the date/time of the allowance event.
- Listen for the *allowance events* of the related [allowance event class](#).
- Can be filtered by using selection criteria based on the values of properties.

i Note

- You can trigger the sending of the event depending on the value of a monitored property.
- The allowance that sends the event through the execution of this *Allowance Event Sender* component, does not receive this event.
- The available scope of allowances depends on the usage of logic components. For more information, refer to the [matrix of components \[page 839\]](#).

Use

You can use the *Allowance Event Sender Operator* for sending events to allowances from the price plan, the refill logic, or the allowance logic.

! Restriction

The *Allowance Event Sender Operator* component is forbidden within a **shareable allowance logic**.

❖ Example

The allowance event is modified

An operator sets up the *Allowance Event Sender Operator* in a price plan to consume the allowances related to the duration of a videoconference. The *Allowance Event Sender Operator* sends an allowance event from the allowance event class `ALLOW_VIDEO_MINUTES` whose property is the duration of the videoconference in minutes.

The operator models the Allowance Logic through the `ALLOW_VIDEO_MINUTES` *Allowance Event Class* (the type of the Event Allowance):

- To authorize part of the duration based on the persistent counters of the allowances
- To update the allowance event based on the authorized part

❖ Example

The allowance event is not modified

An allowance is created through a refill plan. The allowance is valid six months and is part of a group of allowances named `SAMPLE_GROUP`. The allowances of the group have the same parameter value and extend their validity period each time a new allowance is added to the group.

When an allowance is created for the group, the new allowance must inform the allowances of its group with an event of the type `NEW_ALLOWANCE_CREATED` including the following fields:

- The allowance group ID
- The creation date/time
- Its validity period start date/time
- Its validity period end date/time

The other allowances of the group can then perform actions when receiving the events.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Allowance Event Class: Provides the list of [allowance event classes](#). If necessary, click  to open the selected allowance event class. Select an allowance event class, set up the values of the properties of the allowance event class, and then define the new output property if necessary:

- *Property Name*: Displays the property name.
- *Type*: Displays the property type.
- *Value*: Provides the list of available properties or allows you to type a value.
- *Output Property Name*: Type the name of the new property.

Scope: Defines the allowances to which the *Allowance Event Sender Operator* sends an allowance event. Select one of the three options:

- *Only Allowances of the Contract*: Allowance events are only sent to the allowances of the related provider contract.
- *Allowances of the Contract and its Parent*: Allowance events are only sent to the related provider contract and its parent.

- **Only Shared Allowances:** Allowance events are only sent to shared allowances.

Share Identifier: Select a property to identify the group of shared allowances to which the Allowance Event Sender Operator sends an allowance event.

Stop sending when the monitored property is lower than or equal to 0: Select this option if you want to trigger the sending of the event depending on the value of a monitored property.

- **Monitored Property:** Provides the list of numerical properties of the selected allowance event class. Select a numerical property to monitor.
- **Revert allowance changes if condition is not fulfilled:** Click this option to apply the allowance modifications only when the condition is fulfilled.

Note

The definition of output properties and the control of the sending of the event require that the allowance logic modifies the monitored property of the event.

Selection (Tab)

This table defines the conditions for selecting the allowances that will receive the allowance event.



: Adds a row to the table.



: Deletes a row from the table.

Property Name: Select the name of the allowance property, which can be:

- A parameter of the *Allowance Interface*
- A counter of the *Allowance Interface*
- A default allowance property such as:
 - The unique identifier of the allowance
 - The allowance activation date (Validity Start Date)
 - The allowance expiration date (Validity End Date)

Type: Displays the type of the allowance property (Date, Number, or String)

Operator: Provides the list of comparison operators. Select an operator:

- **Date** (Equals, Before, After, Before or Equals, After or Equals)
- **Number** (Equals, Greater Than, Lower Than, Greater Than or Equal To, Less Than or Equal To, Not Equal)
- **String** (Equals, Starts With, Ends With, Contains)

Comparison Value: Type a value or select a rating context property (a parameter or a counter).

Note

- You must verify that the selection criteria are consistent because you can apply different selection criteria to the same allowance property.
- By default, 2 selection criteria are available and correspond to the criteria that are used to select non-expired allowances. These 2 criteria cannot be modified or deleted from the table.

- The counters that are defined in the [Allowance Interface](#) for shared allowances are not available in the table.

Sorting (Tab)

On the [Sorting](#) tab of the [Allowance Event Sender Operator](#) component, you define the two-level rules for sorting the allowances:

- The first level consists in ordering the criteria depending on their position in the table
- The second level consists in defining the ascending or descending order of each criterion

The criteria are the following:

- The parameters defined in the [Allowance Interface](#) (for more information on the Allowance Interface, refer to the [primary help of Core Tool \[page 356\]](#))
- The counters defined in the [Allowance Interface](#)
- The Allowance default properties:
 - The unique identifier of the allowance
 - The allowance activation date/time (Validity Start Date)
 - The allowance expiration date/time (Validity End Date)

Note

- If the values of the properties, parameters, or counters of two or more allowances are equal, the sort system uses the unique identifier of the allowances as the sort criterion. For example, if the values of the properties, parameters, and counters of three allowances A, B, and C are equal, the system sorts allowances A, B, and C according to their unique identifier.
- The criteria cannot be duplicated in the list.
- The counters that are defined in the [Allowance Interface](#) for shared allowances are not available in the table.

❖ Example

On the [Sorting](#) tab of the [Allowance Event Sender Operator](#) component, the table represents a set of rules for sorting allowances. Each row of the table represents a rule, and the first column (#) of the table represents the priority order of the rules.

If we consider a set of allowances a1, a2,..., an, and the following rules for sorting the allowances:

#	Name	Type	Order
1	Property 1	number	Descending
2	Property 2	date	Descending
3	Property 3	number	Descending

The set of allowances is sorted according to the order of the following properties:

1. Property 1: From the greatest number to the smallest number.
2. Property 2: From the earliest date to the oldest date.

3. Property 3: From the greatest number to the smallest number.

For example, if we sort the following set of allowances according to the previous rules:

	Property 1	Property 2	Property 3
Allowance 1	4	26/09/2013	2
Allowance 2	4	26/09/2013	28
Allowance 3	4	26/09/2013	4

The sort result is the following:

	Property 1	Property 2	Property 3
Allowance 2	4	26/09/2013	28
Allowance 3	4	26/09/2013	4
Allowance 1	4	26/09/2013	2

The system first sorts the allowances according to this order: Property 1, Property 2, and Property 3 (position in the table). But if the values of the properties (Property 1 and Property 2) are equal like in this example, the system sorts the allowances according to the different values of Property 3 (in the descending order of the criterion).

If we keep the same rules as in the previous example and if the set of allowances is the following:

	Property 1	Property 2	Property 3
Allowance 1	4	26/09/2013	9
Allowance 2	8	26/09/2013	6
Allowance 3	12	26/09/2013	1

The sort result is the following:

	Property 1	Property 2	Property 3
Allowance 3	12	26/09/2013	1
Allowance 2	8	26/09/2013	6
Allowance 1	4	26/09/2013	9

Because the values of Property 1 are not equal, the system first sorts the allowances according to Property 1 (position in the table) and according to the different values of Property 1 (in the descending order of the criterion). And the system ignores Property 2 and Property 3.

Use of icons



: Adds a row to the table.



: Deletes a row from the table.



: Moves a row up in the table.



: Moves a row down in the table.

#: Displays the sort order of allowances.

Name: Provides the list of properties, parameters, and counters to sort the allowances. Select a property, a parameter, or a counter.

Type: Displays the property, the parameter, or the counter type.

Order: Provides the list of sort orders. Select a sort order: Ascending or Descending.

2.4.31.10.4.3 Allowance Event Updater (Operator)

i Note

You can only use this component after an [Event-Based Trigger \[page 886\]](#) component.



The **Allowance Event Updater** component is an operator component that allows you to modify the *allowance events* handled by the allowances that exist in customer master data. These modifications are visible in the output properties of the charged item mapping, in the "allowance logic" of other allowances, and in the [Allowance Event Sender \[page 943\]](#) component (for more information on the Allowance Logic, refer to the [primary help of Core Tool](#)).

Use

As a pricing specialist, you can use the *Allowance Event Updater* component when you need to change the allowance event properties. **Use the allowance event updater after an event-based trigger.**

❖ Example

An operator rates duration-based voice calls. Before calculating the price of each call, a **Voice Call** allowance event is sent to allowances in provider contracts. As a pricing specialist and in order to model this pricing policy by marketing, you design and configure your settings:

- The allowance event class related to the allowance event contains the **Duration (sec)** property that is a number representing the duration of the call.
- The allowance logic has an *event allowance* for the *allowance event class* called **Voice Call**. To indicate that the current allowance has authorized a part of the duration of the call, you must modify the event by setting up the remaining duration in the *Duration (sec)* field.

The configuration of a Trigger Allowance component requires the selection of an [Allowance Event Class](#) that specifies the type of the allowance event.

Identification Area

Name: Type the name of the component (mandatory).

Description: Type the business description of the component (optional).

Definition (Tab)

This tab includes a configuration table that allows you to fill in the allowance event properties provided by the *allowance event class* defined in the related [Event-Based Trigger \[page 886\]](#) component.

Name: The name of the property.

Type: The type of the property: Date (and Time), Number, String.

Value: Select a property (mandatory) or type a value.

Related Information

[Allowance Event Sender \(Operator\) \[page 943\]](#)

[Event-Based Trigger \[page 886\]](#)

2.4.31.10.4.4 Allowance Property Introducer (Operator)



The **Allowance Property Introducer** component is an operator component that allows you to retrieve the property values of a set of allowances and save them in generated properties that are available for the next logic components of the decision tree.

i Note

- The available scope of allowances depends on the usage of logic components. For more information, refer to the [matrix of components \[page 839\]](#).
- Persistent counters that are used by shared allowances cannot be selected for creating generated properties. About the sharing of allowances between subscriber accounts, refer to the [primary help of Core Tool \[page 356\]](#) and the [SAP CC 5.0 Application Help](#) for more information.

Use

You use the *Allowance Property Introducer* component when:

- The properties of the available allowances of a provider contract are needed for the decision tree of the price plan of a charge, the refill logic, or the allowance logic.
- Some properties of allowances must be reported in charged items.
- The properties of allowances must be used in the [Allowance Event Sender \(Operator\)](#) [page 943] component for sending an event to allowances.

! Restriction

The [Allowance Property Introducer](#) component is forbidden within the **shareable allowance logic**.

❖ Example

You want to retrieve the lowest and greatest credit values from the following set of allowances but only through the "USER" scope:

Allowance ID	Start Date	End Date	Credit (Counter)	Scope (Parameter)
1234	20xx-01-01	20xx-02-01	10	USER
1235	20xx-01-15	20xx-02-15	250	COMPANY
1236	20xx-01-28	20xx-02-28	300	USER
1238	20xx-02-01	20xx-03-01	120	COMPANY
1240	20xx-03-15	20xx-03-15	50	USER

To do that, you configure an [Allowance Property Introducer](#) component to select the allowances whose property named 'Scope' is equal to 'USER', and you create two generated properties named 'LowestValue' and 'GreatestValue' to save the values of the 'Scope' properties.

From the previous set of allowance properties, the [Allowance Property Introducer Operator](#) thus selects the allowances whose ID are 1234, 1236, and 1240:

Allowance ID	Start Date	End Date	Credit (Counter)	Scope (Parameter)
1234	20xx-01-01	20xx-02-01	10	USER
1236	20xx-01-28	20xx-02-28	300	USER
1240	20xx-03-15	20xx-03-15	50	USER

The [Allowance Property Introducer Operator](#) then creates a generated property named 'LowestValue' with the value of 10 (the allowance whose ID is 1234) and a generated property named 'GreatestValue' with the value of 300 (the allowance whose ID is 1236).

Identification Area

Name: Type the name of the component (mandatory).

Description: Type the description of the component (optional).

Definition (Tab)

This tab includes two tables:

- The *Allowance Selection Criteria* table that defines the criteria for selecting allowances according to the values of their properties
- The *Generated Properties* table to define generated properties in which you save the values of the allowance properties

Allowance Selection Criteria

This configuration table defines the conditions for selecting the allowances of a provider contract.



: Adds a row to the table.



: Deletes a row from the table.

Property Name: Select the name of the allowance property, which can be:

- A parameter of the *Allowance Interface*
- A counter of the allowance interface
- A default allowance property such as:
 - The unique identifier of the allowance
 - The allowance activation date (Validity Start Date)
 - The allowance expiration date (Validity End Date)

Type: Displays the type of the allowance property (Date, Number, or String)

Operator: Provides the list of comparison operators. Select an operator:

- *Date* (Equals, Before, After, Before or Equals, After or Equals)
- *Number* (Equals, Greater Than, Lower Than, Greater Than or Equal To, Less Than or Equal To, Not Equal)
- *String* (Equals, Starts With, Ends With, Contains)

Comparison Value: Type a value or select a rating context property (a parameter or a counter).

Note

- Because you can apply different selection criteria to the same allowance property, you must verify that the selection criteria are coherent.
- If you have defined no selection criteria for selecting allowances, this means that all the allowances of the provider contract must be selected.
- Only non-expired allowances can be selected.

Scope

The scope defines the allowances from which you want to retrieve the property values. Select one of the three options:

- *Only Allowances of the Contract*: Retrieves the property values that only belong to the allowances of the related provider contract
- *Allowances of the Contract and its Parent*: Retrieves the property values that only belong to the allowances of the related provider contract and its parent

- **Only Shared Allowances:** Retrieves the property values that only belong to the shared allowances

Share Identifier: Select a property to identify the group of shared allowances from which you want to retrieve the property values.

Generated Properties

This table allows you to create generated properties which are initialized with the result of operators. You need to select an operator that is applied to the selected allowance properties. The generated properties are then available as computed properties in the rating context.

Allowance Count Property Name: Type the name of the generated property that represents the count of selected allowances.



: Adds a row to the table.



: Deletes a row from the table.

Property name: Select the name of the allowance property.

Type: Displays the type of the allowance property: Date or Number

Operator: Select one of the following operators to initialize the generated properties:

- **Greatest:** Returns the greatest value of a given allowance property. If no allowance has been selected, the default value defined in the allowance interface is returned.
- **Lowest:** Returns the lowest value of a given allowance property. If no allowance has been selected, the default value defined in the allowance interface is returned.
- **Sum:** Returns the sum of the allowance property if exists. If no allowance has been selected this operator returns '0'.

Generated Property name: Type the name of the generated property.

Note

You can give the name of an allowance property to any generated property.

2.4.31.10.4.5 Allowance Validity Period Updater (Operator)

→ Remember

In the case of automatic allowance renewal and at runtime, if an *Allowance Validity Period Updater*¹²² tries to set up the validity start date/time of an allowance to a date/time that is earlier than its current validity start date/time, the validity period of the allowance is automatically shifted to the current validity start date/time. See also the *Create Allowance Operator* [page 958] component about the allowance renewal.

¹²² This rule is only true if the *Allowance Validity Period Updater* is used in a one-shot trigger (creation event) of the allowance logic and if the allowance was created by a one-shot trigger at expiration time.



The **Allowance Validity Period Updater** operator component enables to redefine the end date/time or redefine the start date/time and the end date/time of the validity period of the allowances.

This component is available in the [Allowance Logic](#) and can be inserted in the decision tree after an [Event-Based Trigger \[page 886\]](#), a [Recurring Trigger \[page 888\]](#), or a [One-Shot Trigger \[page 892\]](#) component.

Use

Use the *Allowance Validity Period Updater Operator* component when you need to change the validity period of an allowance.

! Restriction

The *Allowance Validity Period Updater Operator* component is forbidden within a **shareable allowance logic**.

♣ Example

As a service provider, you create an allowance valid for six months for a customer. The allowance extends its validity period when a new allowance is created (carry-over).

At creation time, the new allowance generates an allowance event of the **ALLOWANCE_CREATED** type including the following fields:

- Its validity period start date
- Its validity period end date

The old allowance that receives the allowance event first checks that its end date is before the end date of the new allowance. If it is the case, the old allowance extends its own validity end date.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

An allowance has a validity period, which is the period of time during which the allowance can be debited by the charging process. The validity period is specified according to two dates, the start date and the end date. Note that the start date is included in the validity period and the end date is excluded from the validity period: [start date, end date[.

Update the validity period according to the allowance status

i Note

When selecting a date property, keep in mind the following:

- **Keep**: Does not change the date
- **Creation Date**: Is the date when the allowance is created (only available in a Creation One-Shot Trigger)
- **Event Date**: Is the date of the current event (Event, Recurring or One-Shot)
- **Validity Start Date**: Is the current start date of the validity period of the allowance
- **Validity End Date**: Is the current end date of the validity period of the allowance
- You can select your own date properties created in the allowance logic (context properties)

i Note

The values of the **Validity Start Date** and **Validity End Date** properties are updated according to the modifications performed by the **Allowance Validity Period Updater Operator** and are then available for the next logic components that can use these dates.

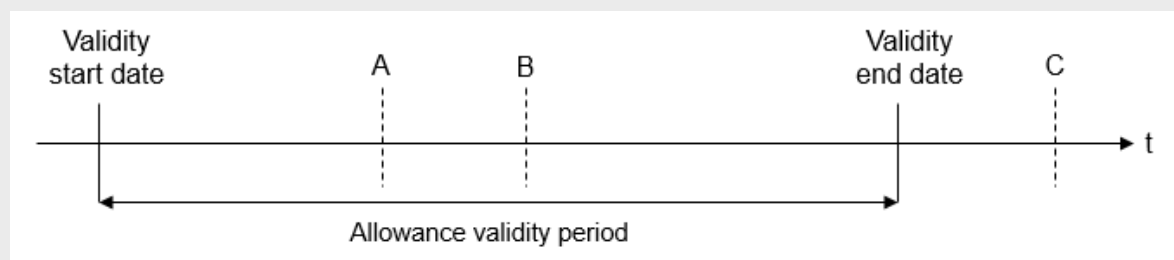
Inactive: The allowance has not been yet activated by SAP CC (activation process). You can then redefine the start and end dates of the validity period of the allowance:

- **Validity End Date**: Select a date property.
- **Allow to shorten the validity period**: If you select this option, the validity period of the allowance can be either shortened or extended; otherwise, the validity period of the allowance can only be extended.

i Note

- If the **Allow to shorten the validity period** option is selected, make sure that the validity end date is greater than the following dates:
 - The date of the current event, which corresponds to the value of the **Event Date** property
 - The date when the last recurring or one-shot was triggered
 - The date of the latest reservation which may have accessed the allowance (so that such reservation is not impacted by the modification of the validity end date)
- If the specified validity end date is not greater than these dates, the validity end date is automatically set to the greatest of these dates, plus 1 second (because the end date is excluded from the validity period).
- If the **Allow to shorten the validity period** option is not selected, make sure that the new value of the validity end date is greater than its current value. Otherwise, the validity end date is not modified.

❖ Example



- If the end date of the validity period of the allowance is modified to the date C, the modification is performed as configured whether the **Allow to shorten the validity period** option is selected or not.

- If the end date of the validity period is modified to the date A:
 - If the *Allow to shorten the validity period* option is not selected, the end date of the validity period of the allowance is not modified.
 - If the *Allow to shorten the validity period* is selected and there is no reservation in progress, the end date of the validity period of the allowance is modified to the date A as configured.
 - If the *Allow to shorten the validity period* option is selected and there is a pending reservation at the date B, the end date of the validity period of the allowance is modified to the date B plus 1 second instead of the date A.

Expired: The allowance is expired. You cannot update the validity period of the allowance.

2.4.31.10.4.6 Arithmetic Computation Operator



The **Arithmetic Computation Operator** component carries out an arithmetical operation between two numerical values or properties. The calculation result is saved in a new property. The Arithmetic Computation Operator component can carry out the following operations:

- Addition
- Subtraction
- Multiplication
- Division
- Modulo
- Power

i Note

In the case of division, you can specify the rounding mode and decimal places.

Use

To calculate a price in a [price plan \[page 570\]](#), you can combine one of the [Function \[page 895\]](#) components with the *Arithmetic Computation Operator*. The *Arithmetic Computation Operator* allows you to calculate numerous intermediate results that are saved in new properties; therefore, you can reuse these properties to calculate the final price by using a function component.

Example

In a price plan, the price of a telephone call is calculated by using the following basic formula:

Call price = Constant x Base price x Call Duration

Base price is a parameter in the offer and represents a price per minute. *Call Duration* is a numerical property. The generic function component, which is a "AXY + B" type formula, allows you to calculate **call price**. However, for certain customers, a percentage-type discount that is saved as a parameter is applied

to **Base price**. To calculate the discount, you can insert an *Arithmetic Computation Operator* component before the generic function component as shown in the following table:

Step	Component	Calculation
1	<i>Arithmetic Computation Operator</i>	Discounted Price = Base price x Customer discount
2	<i>Generic Function [page 899]</i>	Call price = Constant x Discounted Price x Call Duration

Identification Area

Name: Type the name of the component (mandatory).

Description: Type the description of the component (optional).

Definition (Tab)

First Operand: Type a constant value or select a numerical property that contains the value.

Operator: Provides the list of arithmetical operators. Select one of the following operators:

- *Plus*
- *Minus*
- *Multiplied By*
- *Divided By*
- *Modulo*
- *Power*

Second Operand: Type a constant value or select a numerical property.

Computed Property: Type the name of the new computed property that contains the result of the operation.

Rounding Mode: Provides the list of modes for rounding the decimal portion of the result. This list is available only if you select *Divided By* in the *Operator* list. The default option is *To the next greater value*. Select one of the following rounding modes:

- *To the next greater value*
- *To the previous value*
- *To the nearest value*

Scale: Provides the list of decimal places of the result. This list is available only if you select *Divided By* in the *Operator* list.

2.4.31.10.4.7 Concatenate Operator



The *Concatenate Operator* component allows you to concatenate two or more string properties or character strings.

❖ Example

For reporting purpose, an operator needs to create a CSV file which must contain some information such as customer name, service, consumption date, and duration. In a [price plan \[page 570\]](#), the operator uses a *Concatenate Operator* component to generate a computed property from the properties of the price plan. For example, the operator can build sentences like this one: "John Smith consumed the Internet service QuickAccess on Monday the 03 of October 2011 at 11:55:26 during 15 seconds".

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Computed Property Name: Type the name of the new string property that retrieves the concatenation result.

Fields Separator: Provides the set of separators that is used to separate the concatenated properties. Select a separator (*Semicolon*, *Tabulation*, and so on), or click *Other*, and then type a character that you want as a separator.

- *No Separator*: Select this option if you do not want to separate the concatenated properties
- *Semicolon*: Select this option if you want a semicolon as a separator
- *Tabulation*: Select this option if you want a tabulation as a separator
- *Comma*: Select this option if you want a comma as a separator
- *Space*: Select this option if you want a space as a separator
- *Slash*: Select this option if you want a slash as a separator
- *Other*: Type a character that you want as a separator

Elements to Concatenate: Allows you to choose the string properties or type the character strings that you want to concatenate. The Concatenate Operator concatenates the values of properties or character strings in

the order of the table from the top to the bottom of the table. To add a property to the table, click , and then select a property or type a new property.



: Adds a row to the table.



: Deletes a row from the table.



Moves a row up in the table to change the order of properties or character strings.



Moves a row down in the table to changes the order of properties or character strings.

2.4.31.10.4.8 Create Allowance Operator

→ Remember

- The *Create Allowance Operator* is executed at the end of the decision tree if there is one master charge or at the end of all the decision trees if there is one or more dependent charges. For more information on [charge plans](#), [charges \[page 560\]](#), and dependencies between [master \[page 563\]](#) and [dependent charges, \[page 564\]](#) refer to the dedicated topics in the primary help of Core Tool.
- The configuration of a *Create Allowance Operator* component requires the selection of an [Allowance Plan](#) that specifies the type of the allowance. If you want to create a shared allowance, you must select a shareable allowance plan. For more information on the Allowance Plan, refer to the dedicated topic in the primary help of Core Tool.
- In the [Allowance Logic](#), you cannot use the *Create Allowance Operator* in the [Event-Based Trigger \[page 886\]](#) and [Recurring Trigger \[page 888\]](#) branches, but you can use the *Create Allowance Operator* in a [One-Shot Trigger \[page 892\]](#) branch if you configure the *One-Shot Trigger* with an expiration event and no time shift.
- In the case of automatic allowance renewal and at runtime, if a one-shot trigger (creation event) that contains a *Create Allowance Operator* is executed in the allowance logic, the duration between the validity start date of the current allowance and the validity start dates of the newly created allowances cannot be less than one day (calendar). If this duration is greater than one day, the validity period is automatically shifted. The new validity start dates are automatically set to the effective date of the current allowance plus one day while the validity period of the allowances do not change. See also the [Allowance Validity Period Updater \(Operator\) \[page 952\]](#) about the allowance renewal.



The *Create Allowance Operator* creates an allowance for the related [provider contract](#) through a [refill plan](#), a [charge plan](#), or in an [allowance plan](#).

! Restriction

Rating Trial Runs do not consider allowance creation.

Use

You use the *Create Allowance Operator* component to create allowances for your provider contracts.

! Restriction

The *Create Allowance Operator* component is forbidden within a **shareable allowance logic**.

❖ Example

An operator sells data plans to its customers. They can buy recharges including data buckets that are valid for a limited period of time and can be modeled as allowances. The *Create Allowance Operator* can be used

to create such allowances. In this context, the initial value of the bucket can be represented as an allowance parameter.

Identification area

Name: Type the name of the component (mandatory).

Description: Type the description of the component (optional).

Definition tab

Allowance Plan: Provides the list of *Allowance Plans*. The *Create Allowance Operator* component must reference an Allowance Plan whose status is set to `Released`. Select an *Allowance Plan* (mandatory). If necessary, click



to open the selected allowance plan. On the right side of the field, a text displays if the *Allowance Plan* is shareable or not.

i Note

You cannot create a shared allowance in the allowance logic because the renewal of allowances is not allowed in this context. You can only create a shared allowance in a charge or the refill logic. For more information, refer to the dedicated section in the primary help of Core Tool.

Create a Shared Allowance: Select this box if you want to create a shared allowance. The *Allowance Plan* must be shareable.

- *Share Identifier*: Type or select an identifier that identifies a group of shared allowances.

Validity Start Date: Provides the list of date properties. Select a start date property for the Allowance validity period (mandatory).

Validity End Date: Provides the list of date properties. Select an end date property for the Allowance validity period (mandatory).

Allowance Parameters: Displays the table of Allowance parameters provided by the related *Allowance Plan*. Fill in the values of the allowance parameters:

- *Name*: Displays the name of the parameter.
- *Type*: Display the type of the parameter (*Date*, *Number*, *String*, *Counter*, *Mapping Table Key*, *Mapping Table Identifier*, or *Range Table Identifier*).
- *Value*: Select a property, or type a value.

2.4.31.10.4.9 Date Shift Operator



The *Date Shift Operator* component calculates a new date by adding a period of time to an existing date property or by subtracting a period of time from an existing date property. The new date is saved in a new date

property. The time unit is expressed in seconds, minutes, hours, or days. You use this component to change an existing date into an earlier or a later date.

❖ Example

In a chargeable item class called **Telephone Service**, you want to give a customer a time-credit of six seconds for each call. To define the payable period, you use the *Date Shift* component to recalculate the start date of the customer's call.

i Note

You can easily calculate the local time based on GMT time if you know the GMT offset. You enter the consumption date as the original date to which you add the numerical property `GMT Offset` representing the period of time in hours. The calculation result determines the local time that is saved in the computed property. You can also use the local time in the subbranch of the price plan.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Date Property Name: Provides the list of date properties. Select a date property.

Computed Property Name: Type the name of the new date property that retrieves the calculation result.

Operation: Provides the list of operations. The default option is *Subtraction*. Select one of the following operations:

- *Subtraction*: The period of time is subtracted from the date property
- *Addition*: The period of time is added to the date property

Duration: Allows you to type the period of time that is added to or subtracted from a numerical property, or allows you to select a numerical property that represents the period of time.

i Note

Whether you type the period of time or select a numerical property, if the period of time is a decimal number, the fractional part of the decimal number is truncated. Only the integer part is added to or subtracted from the date property. For example, adding 1.5 hours to August 28, 2007 2:13:48 PM gives the result August 28, 2007 3:13:48 PM, or subtracting 2.10 hours to August 28, 2007 2:13:48 PM gives the result August 28, 2007 0:13:48 PM.

Duration Unit: Provides the list of time units. The default option is *seconds*. Select one of the following time units:

- *seconds*
- *minutes*
- *hours*
- *days*
- *months*
- *years*

2.4.31.10.4.10 Decrement Counter Operator



The **Decrement Counter Operator** component debits a counter (transient or persistent) without exceeding the current value of the counter.

Use

The *Decrement Counter Operator* is used to decrement counters defined in shared allowances.

❖ Example

As a service provider, you create a bucket of 100,000 SMS for a company. This bucket is shared by the employees of this company and implemented as a shared allowance that includes a persistent counter.

Based on the previous example, a bucket of 100,000 SMS is debited through a *Debit Counter Operator* each time an employee uses a SMS. When the value of the bucket is equal to 0, employees cannot send SMS anymore.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Counter Name: Provides the list of counters. Select a counter.

Decrement: Type or select the positive value to be withdrawn from the counter.

⚠ Caution

If you type or select a negative value, an exception is raised during the rating process.

Generated Properties: Allows you to name two new numerical properties.

- *Non Decrementated:* Type the name of the new property that contains the value that could not be withdrawn from the counter. For example, the counter is equal to 15. If the decrement is equal to 16, the counter is debited of 15, and its new value is equal to 0 because the counter cannot be less than 0. The non decrementated (decrement minus value of the counter) is equal to 1 and is the value that could not be debited from the counter
- *Decrementated:* Type the name of the new property that contains the value that is withdrawn from the counter. For example, the counter is equal to 20. If the decrement is equal to 18, the decrementated is equal to 18. But if the decrement is equal to 24, the decrementated is equal to 20 because the counter cannot be less than 0

2.4.31.10.4.11 Duration Operator



The *Duration Operator* component calculates the period of time between two dates. The period of time is expressed in seconds, minutes, hours, or days and saved in a new numerical property. You can specify the precision unit, the rounding mode, the rounding step, and the threshold of the period of time.

Use

In a [price plan \[page 570\]](#), you may need to calculate a price that is dependent of time. To compute the period of time, you use the *Duration Operator* that calculates the period of time between a start date and an end date.

❖ Example

In a chargeable item class called **Video Conference**, you charge the customer \$0.10 per video conference minute. After the start and stop date of the video conference, a *Duration* component calculates the duration of the video conference in the price plan.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

The *Duration Operator* calculates the period of time between two dates: The start date property and the end date property. The result is saved in a generated property.

Start Date Property Name: Provides the list of date properties. Select a start date property.

End Date Property Name: Provides the list of date properties. Select an end date property.

Name of the Generated Property: Type the name of the new numerical property that retrieves the calculation result.

Time Unit: Provides the list of time units. Select one of the following units:

- *seconds*
- *minutes*
- *hours*
- *days*

Advanced tab

You set up the parameters to make calculation.

Rounding Mode: Provides the list of modes for rounding the decimal portion of the period of time. The default option is *To the next greater value*. Select one of the following rounding modes:

- *To the next greater value*
- *To the previous value*
- *To the nearest value*

Precision Unit: Provides the list of time units. The default option is *seconds*. Select one of the following time units:

- *seconds*
- *minutes*
- *hours*
- *days*

Rounding Step: Allows you to type a step rule to round the period of time, or allows you to select a numerical property that represents the step rule. The default option is *1*. Example: If the rounding step value is 5 seconds and the rounding mode is *To the next greater value*, the period of 47 seconds is rounded to 50 seconds. In this example, the rounding step then consists of 5-second intervals.

Threshold: Allows you to type the minimum value of the period of time, or allows you to select a numerical property that represents the minimum value. The default option is *0*. Example: If the threshold is 30 seconds, a period less than 30 seconds is rounded to 30 seconds.

2.4.31.10.4.12 Duration Adapter Operator



The *Duration Adapter* operator component converts a period (of time) into another time unit. The calculation result is saved in a new numerical property. You can convert into days a numerical property expressed in seconds or in hours. You can specify the time unit of the source and the target, the rounding mode, the rounding step, and the threshold of the target.

Use

In a [price plan \[page 570\]](#), you may need to make calculations dependent of time and that you want to convert into a different time unit. To do that, you use the *Duration Adapter* component to convert a period (of time). The conversion result is saved in a new numerical property.

❖ Example

In a chargeable item class called **Telephone Service**, a phone call duration is expressed in seconds. You need to convert the call duration into minutes because your price is defined in minutes. You use the *Duration Adapter Operator* to convert the call duration into minutes.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

You define the names and the time unit of the source, the new numerical property that retrieves the conversion result, and the time unit for converting the source.

Source Duration Name: Provides the list of numerical properties. Select a numerical property.

Source Time Unit: Provides the list of time units of the source. Select one of the following time units:

- *seconds*
- *minutes*
- *hours*
- *days*

Target Duration Name: Allows you to type the name of the new property that retrieves the conversion result.

Target Time Unit: Provides the list of time units for converting the source. Select one of the following time units:

- *seconds*
- *minutes*
- *hours*
- *days*

Calculation Parameters (Tab)

You set up the calculation parameters to convert the conversion result.

Rounding Unit: Provides the list of time units for rounding the conversion result. The default option is *seconds*. Select one of the following time units:

- *seconds*
- *minutes*
- *hours*
- *days*

Rounding Mode: Provides the list of modes for rounding the decimal portion of the period of time. The default option is *To the next greater value*. Select one of the following rounding modes:

- *To the next greater value*
- *To the previous value*
- *To the nearest value*

Rounding Step: Allows you to type a step rule to round the period of time, or allows you to select a numerical property that represents the step rule. The default option is *1*.

Example: If the rounding step value is 5 seconds and the rounding mode is *To the next greater value*, the period of 47 seconds is rounded to 50 seconds. In this example, the rounding step then consists of 5-second intervals.

Threshold: Allows you to type the minimum value of the period of time, or allows you to select a numerical property that represents the minimum value. The default option is *0*.

Example: If the threshold is 30 seconds, a period less than 30 seconds is rounded to 30 seconds.

2.4.31.10.4.13 Filter Operator



The **Filter Operator** compares each value of a multi-valued property of string type with one or more string values. Each time that the result of a comparison is true, the value of the multi-valued property is stored in a specified multi-valued property associated with the comparison. Each time that the result of a comparison is false, the value of the multi-valued property is rejected and stored in a specified multi-valued property.

i Note

If a value of the multi-valued property matches several string values, the value is stored in the specified multi-valued properties associated with the comparisons for which the result is true.

♣ Example

You want to filter a multi-valued property that contains the following values:

- image/jpeg:2500
- image/jpeg:4000
- image/jpeg:5000
- image/gif:4000
- image/gif:10000
- text/plain:100

- audio/mp3:20000
- Message:20

Each value of this multi-valued property is compared with the comparison values that are shown in the next table. When the result of a comparison is true, the value is stored in the property associated to the comparison (ImageFolder, TextFolder, and so on). If a value of the multi-valued property does not match any string values, the value is stored in the property RejectedValues.

Property Name	Comparator	Comparison Value
ImageFolder	<i>starts with</i>	image
TextFolder	<i>starts with</i>	text
AudioFolder	<i>starts with</i>	audio
JpegImageFolder	<i>contains</i>	jpeg
GifImageFolder	<i>contains</i>	gif

Once the *Filter Operator* have completed the comparisons, each property contains the following list:

ImageFolder	TextFolder	AudioFolder	JpegImageFolder	GifImageFolder
image/jpeg:2500	text/plain:100	audio/mp3:20000	image/jpeg:2500	image/gif:4000
image/jpeg:4000			image/jpeg:4000	image/gif:10000
image/jpeg:5000			image/jpeg:5000	
image/gif:4000				
image/gif:10000				

The value "Message:20" does not match any string values. This value is thus stored in the multi-valued property RejectedValues.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Source: Allows you to select a multi-valued property that you want to filter.

- *Property Name*: Provides the list of multi-valued properties. Select a multi-valued property.

Target: Allows you to create the table of comparisons that filters the selected multi-valued property.

- **Unmatched Values Property:** Allows you to name the property that retrieves all the values of the multi-valued source property that do not match the table of comparisons.
- : Adds a row to the table. Click this button to add a comparison.
- : Deletes a row from the table. To remove a comparison, select the corresponding comparison row, and then click this button.
- **Property Name:** Allows you to type the multi-valued source property name that retrieves all the values of the multi-valued source property that match the comparison.
- **Operator:** Provides the list of comparators. Select an operator. The comparators are the following:
 - **is equal to:** All the values that are equal to the value of Comparison Value are saved in the Property Name column entry
 - **starts with:** All the values that start with the value of Comparison Value are saved in the Property Name column entry
 - **ends with:** All the values that end with the value of Comparison Value are saved in the Property Name column entry
 - **contains:** All the values that contain at least the value of Comparison Value are saved in the Property Name column entry
 - **matches(*):** All the values that match the regular expression of Comparison Value are saved in the Property Name column entry
 - **matches (capturing group):** All the values that match the regular expression containing parenthesis in Comparison Value are saved in the Property Name column entry. For example, in the following multi-valued source property containing the string "text/html;12000;text/html;06000;text/html;03000", you can retrieve the values "text/html;12000", "text/html;06000" and "text/html;03000" with a regular expression such as "text/.+;([0-9]+)".
- **Comparison Value:** Allows you to type a value or select a property that is compared with each value of the source property. You cannot type a regex or a capturing group.

(*) The last two comparisons use regular expressions that you should know. These regular expressions are compliant with the POSIX standard. For more information about regular expressions, consult the relevant J2SE websites.

The following table shows the regular expressions (Regex) that are equivalent to the most used wildcards:

Wildcard	Regex	Comment
*	*	Represents a number of characters (including zero or more characters). If you type "cd*" or "cd.*", you can retrieve "cda", "cdrom", "cdrecord" and anything that starts with "cd", "cd" itself included.
?	.	Represents a single character. If you type something like "hd?" or "hd.", you can retrieve hda, hdb, hdc and every other letter/number between a-z, 0-9.

Wildcard	Regex	Comment
[]	[]	Specifies a range. If you type m[aou]m, this expression can become: mam, mum, mom. If you type m[a-d]m, this expression can become anything that starts and ends with m and has a character a to d in-between. For example: mam, mbm, mcm, mdm. This kind of wildcard specifies an "or" relationship.
\	\	Represents an "escape" character, which role is to protect a subsequent special character. Thus, "\\" searches for a backslash.

2.4.31.10.4.14 Increment Counter Operator



The **Increment Counter Operator** component credits a distributed counter.

Use

The *Increment Counter Operator* is used to increment counters defined in shared allowances.

❖ Example

A company wants to be notified when the number of SMS sent by its employees exceeds 50,000.

As a pricing specialist for the service provider of this company, you define a specific counter which is incremented through an *Increment Counter Operator* component each time an employee sends an SMS. Once this counter reaches 50,000, the company receives a notification reporting that the threshold is reached.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Counter Name: Provides the list of counters. Select a counter.

Increment: Type or select the positive value to be added to the counter.

i Note

If you type or select a negative value, an exception is raised during the rating process.

Generated Property: Displays the counter value after the increment operation.

2.4.31.10.4.15 Macro Introducer (Operator)



The *Macro Introducer* operator component allows you to use an existing pricing macro in a plan. This component allows you:

- To select a [pricing macro \[page 411\]](#)
- To provide the values to the rating context properties that the pricing macro needs to make calculations
- To retrieve the calculation results from the generated properties of the pricing macro

The *Macro Introducer* component uses the price plan properties:

- To provide the values to the pricing macro
- To retrieve the calculation results from the pricing macro

❖ Example

An operator bills telephone calls according to:

- The duration of calls
- The location of called numbers
- The type of telephone such a fixed line or a mobile

A pricing macro called **MacroTel** computes the cost of calls that is based on:

- The prefix of the called number (**Prefix_Called**)
- The type of telephone (**Phone_Type**)
- The duration of the call (**Call_Duration**)

The *Macro Introducer* provides this information to the pricing macro through price plan properties. To calculate the price of each call, the pricing macro needs the price code provided by a translation table. The pricing macro returns the total amount of calls and the price code, both of which are retrieved by the *Macro Introducer* through price plan properties. In the price plan, the *Macro Introducer* component shows the following information:

- The Pricing Macro **MacroTel**
- The Price Plan properties (**Prefix_Called**, **Phone_Type** and **Phone_Type**) that contain the values to initialize the rating context properties of the pricing macro
- The price plan property **Total_Amount** that retrieves the computed amount of the Pricing Macro
- The price plan property **Code_Price** that retrieves the price code of the generated property of the pricing macro

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Pricing Macro: Provides the list of available pricing macros. Select a pricing macro.

Mapping of Rating Context: Displays the rating context properties of the pricing macro, and allows you to assign a property of the plan to each rating context property. The pricing macro runs with the values of the plan properties.

- *Name*: Displays the name of the rating context property.
- *Description*: Displays the description of the rating context property.
- *Mapping Property*: Provides the list of the plan properties. Select the property that initializes the rating context property of the pricing macro.

Mapping of Generated Properties: Displays the generated properties of the pricing macro, and allows you to assign a new property to each generated property that retrieves the calculation results from the pricing macro.

- *Computed Amount Property Name*: Allows you to type the name of the new property that retrieves the computed amount of the Pricing Macro.
- *Name*: Displays the name of the generated property.
- *Description*: Displays the description of the generated property.
- *Generated Property Name*: Allows you to type the name of the new property that retrieves the value of the generated property of the pricing macro. The default property is the generated property that is displayed in the *Name* column. Double-click the entry to modify it. You can use this new property in the plan.

2.4.31.10.4.16 Multi-Valued Evaluator (Operator)



The *Multi-valued Evaluator Operator* counts the number of values which are in a multi-valued property. If the multi-valued property is of numerical type, the *Multi-valued Evaluator Operator* calculates the sum and the average of all the numerical values which are in the multi-valued property and determines the smallest and the greatest of these numerical values.

i Note

Use the [Property Type Converter \(Operator\) \[page 975\]](#) to convert an existing property into a multi-valued property.

❖ Example

To calculate a price that depends on a number of recipients, the rating branch of a [price plan \[page 570\]](#) needs two components:

- A *Filter Operator* that tests the recipient addresses
- A Multi-valued Evaluator that counts the number of values which are in the multi-valued property **RecipientsAddresses**

To identify the recipients of the service providers, a *Filter Operator* [page 965] tests their address. The *Filter Operator* is configured to create one multi-valued property per service provider: **MeteoRecipients**, **NewsRecipients**, **ExchangeRecipients**, **SpotsRecipients**, **TrafficRecipients** and **TaxiRecipients**. All the addresses that do not match a comparison are added to the property **RejectedAddresses**.

The configuration of the *Filter Operator* relating to the service provider Meteo is the following:

Property Name	Comparator	Comparison Value
MeteoRecipients	<i>ends with</i>	@meteo.com

In this example, it is supposed that once the *Filter Operator* have completed the comparisons:

- The multi-valued string **MeteoRecipients** contains two values: "greatbritain.country@meteo.com" and "london.city@meteo.com". The multi-valued property **RejectedAddresses** contains "ysmith.messagestore@blue.uk".
- The multi-valued properties of the other recipients are empty.

Once the *Filter Operator* have completed its tasks, the *Multi-Valued Evaluator Operator* counts:

- The number of recipients per service provider, the number of which is six.
- The number of addresses that are retrieved in the multi-valued property of each recipient, which is two for MeteoRecipients and zero for the other recipients.

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Property Name: Provides the list of multi-valued properties of the plan. Select the multi-valued property that you want to evaluate.

Count Property Name: Allows you to name the property that retrieves the number of all the string values which are in a multi-valued property of string type.

Sum: This area is only available if you want to evaluate a multi-valued property of numerical type.

- *Property Name*: Allows you to name the property that retrieves the sum of all the numerical values which are in a multi-valued property.
- *Default Value*: Allows you to type a default value that is assigned to the previous property if the multi-valued property is empty. The default value is mandatory if the *Property Name* box is not empty.

Minimum: This area is only available if you want to evaluate a multi-valued property of numerical type.

- **Property Name:** Allows you to name the property that retrieves the smallest value of all the numerical values which are in a multi-valued property.
- **Default Value:** Allows you to type a default value that is assigned to the previous property if the multi-valued property is empty. The default value is mandatory if the **Property Name** box is not empty.

Maximum: This area is only available if you want to evaluate a multi-valued property of numerical type.

- **Property Name:** Allows you to name the property that retrieves the greatest value of all the numerical values which are in a multi-valued property.
- **Default Value:** Allows you to type a default value that is assigned to the previous property if the multi-valued property is empty. The default value is mandatory if the **Property Name** box is not empty.

Average: This area is only available if you want to evaluate a multi-valued property of numerical type.

- **Property Name:** Allows you to name the property that retrieves the average of all the numerical values which are in a multi-valued property.
- **Default Value:** Allows you to type a default value that is assigned to the previous property if the multi-valued property is empty. The default value is mandatory if the **Property Name** box is not empty.

2.4.31.10.4.17 Output Property Update Operator



The *Output Property Update Operator* component allows you to modify the generated properties of a pricing macro.

Use

In a [pricing macro \[page 411\]](#), you can create generated properties to which you assign default values. Before retrieving these default values in the price or charging plan through a [Macro Operator \[page 969\]](#) component, you can modify them by using the *Output Property Update Operator*.

❖ Example

An operator bills telephone calls according to the duration and the geographical zone of called numbers. The price plan contains a pricing macro **TelNumber** that analyzes the telephone number and returns a generated property **ZoneCode**. This property is retrieved in the price plan to calculate the price of the call. In the pricing macro, an *Output Property Update Operator* is used to assign a specified value to **ZoneCode**". This value depends on the prefix of the telephone number. In the price plan, a *Macro Operator* is used to retrieve the calculation results from the pricing macro. The *Macro Operator* component shows the following information:

- The **TelNumber** pricing macro
- The **NumberCalled** price plan property that provides the telephone number to the pricing macro
- The **GeographicZone** price plan property that retrieves the value of the generated property **ZoneCode**

Identification area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition tab

Output Property Name: Provides the list of generated properties of the pricing macro. Select the generated property to which you want to assign a new value.

Value To Set: Provides the list of rating context properties of the pricing macro or allows you to type a value. Select a rating context property or select *Numerical Value*, and then type a numerical value to set the generated property. Values or properties must be the same type as the generated property.

i Note

You cannot type a value for a multi-valued string or a multi-valued number. You must select *Empty* or a property.

2.4.31.10.4.18 Property Introducer (Operator)



The **Property Introducer** operator component allows you to create new properties for a plan or to modify the properties that are created with an above Property Introducer component. This component can also be used to access properties that are not available for other components (for example, the contract identifier).

Use

In a pricing plan, you can insert a first *Property Introducer* operator component to create new properties available for the branch of a rate component. If you need to modify the values of these properties in the branch of a component, you can insert a second Property Introducer component in this branch to assign new values to the properties that are created with the first Property Introducer component.

❖ Example

In a [price plan \[page 570\]](#), you need an intermediate property to save a result. You then insert a Property Introducer component into your price plan to create the property **Intermediate result**.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

This tab includes a table that allows you to create new properties.



: Adds a row to the table



: Deletes a row from the table

Property Name: Type the name of the new property.

Type: Select the type of the new property: *Date*, *Number*, or *String*.

Value: Type a value, or select a property, a parameter, or a counter.

Attribute: You can assign one of the following attributes to the selected value:

- *Not Applicable*: No attribute is assigned to the selected value.
- *Current Value*: The selected value includes the modifications that result from ongoing reservations. This attribute only applies to properties of number type and values that are persistent counters.
- *Reservation-free Value*: The selected value does not include the modifications resulting from ongoing reservations. This attribute only applies to properties of number type and values that are persistent counters.
- *Length*: The property includes the length of the selected value. This attribute only applies to properties of number type and values of string type.

Note

- The reservation-free value is not compatible with the cancellation of the previous transaction in the session-based charging. In case of cancellation, the reservation-free value will be the current value at the time of the canceled reservation.
- The reservation-free value of the persistent counter is provided for information and reporting and must be carefully used in the decision tree.

❖ Example

In the offer of a telephone operator, an **SMS count** persistent counter represents the number of SMS that the consumer can use. The reservation-free value is 3, which means that the consumer can use 3 SMS. And the current value of **free SMS** is 1 because there are 2 ongoing reservations for this counter.

You must not authorize the consumer to use more than 1 free SMS even if the reservation-free value is 3 because you cannot predict if the reservations will be confirmed or canceled.

2.4.31.10.4.19 Property Type Convertor (Operator)



The **Property Type Convertor** operator component creates a new property from an existing property by modifying the type of the existing property.

Use

In a plan, some calculations use numerical data which are included in string properties. The Property Type Convertor operator component allows you to convert a string property into a number property.

The table below shows the authorized and unauthorized conversions:

Source property type	Target property type	Comment
String	String	Authorized
String	Date	Authorized
String	Number	Authorized
String	Multi-valued string	Authorized
String	Multi-valued number	Authorized
Date	String	Authorized
Date	Number	Authorized
Date	Date	Not authorized
Number	String	Authorized
Number	Date	Not authorized
Number	Number	Not authorized
Multi-valued string	Multi-valued string	Authorized
Multi-valued string	String	Authorized
Multi-valued string	Multi-valued number	Authorized
Multi-valued number	String	Authorized
Multi-valued number	Multi-valued string	Authorized
Multi-valued number	Multi-valued number	Not authorized

❖ Example

An operator uses a translation table providing a discount percentage from the number of units that are consumed by customers. The **number of units consumed** property is numerical.

Using the Property Type Convertor operator component, you can convert this property into string before putting it into the translation table.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Source

- *Property Name*: Provides the list of the properties. Select a property that you want to convert.
- *Property Type*: Displays the type of the selected property. "Undefined" is the default value.

Target

- *Property Name*: Allows you to type the property name that retrieves the result of the conversion.
- *Property Type*: Provides the list of conversion types. The available types vary according to the source property type. Select one of the following conversion types:
 - *String*: Represents a character string. For example, "image", "text" and "price" are strings.
 - *Number*: Represents a decimal or an integer number. For example, 25.60, 6523 and 4.55 are numbers.
 - *Date*: Represents a combination of the day, the month, the year and the time. For example, August 12, 2008 12:00:00 AM is a date.
 - *Multi-valued String*: Represents a list of string values. For example, the multi-valued string **ImageType** contains the following list: image/jpeg:5000, image/gif:10000, image/eps:25000 and image/pic:8000.
 - *Multi-valued Number*: Represents a list of numerical values. For example, the multi-valued number **ImageSize** contains the following list: 5000, 10000, 15000, 20000.

Advanced (Tab)

This tab is separated in four areas. Each area corresponds to a type of property, but only one or two areas are available according to the conversion type that you select on the *Definition* tab.

For example, if you want to convert a string into a string, only the *String Parameters* area is available.

i Note

About string parameters:

- The values of *Start Offset* and *Stop Offset* can range from 1 to the size of the string. The value of *Stop Offset* must be equal to or greater than the value of *Start Offset*.

Particular values:

- If *Stop Offset* is set to -1, this value represents the size of the string.
- If *Start Offset* is set to 1 and if *Stop Offset* is set to 0, the combination of these values represents an empty string.
- If *Start Offset* is set to a value greater than 1 and if *Stop Offset* is set to 0, the system generates an error.

String Parameters: Specifies the positions of start and end of a character substring in an input character string or in each string of a multi-valued string.

- **Start Offset:** Specifies a start position in the string or the multi-valued string by typing a number value or selecting *Start of String*, a counter, a property of number type, or a parameter of number type.
- **Stop Offset:** Specifies an end position in the string or the multi-valued string by typing a number value or selecting *End of String*, a counter, a property of number type, or a parameter of number type.

Date Parameters: Specifies the date format that allows you to convert a string into a date, or specifies the date field that allows you to convert a date either into a number or into a string.

- **Date Format:** Allows you to type or select a date format.

The date format conventions are the following:

- The character 'm' stands for month, 'd' for day and 'y' for year. For example, the date format 'm d y' represents dates such as 03 16 2021 or 05 26 2021.
- A lower-case letter represents numbers, and an upper-case letter represents letters. For example, the date format 'D d M y' represents the date Tuesday 05 June 2001, in which 'D' represents Tuesday and 'M' represents June.
- The '/' character is used to separate each part of the date. For example, the date format 'm/d' represents dates such as 03/16 or 05/26. The date format 'y-m-d' represents dates such as 2021-03-16 or 2021-05-26. Any other characters can be used as a separator.
- **Field to use:** Converts the part of a date into a number. The date format is 'D d M y'. For example, if you select the *Month* option, you can convert the date Tuesday 05 June 2001 into the number 6 because June is the 6th month of the year. To convert a part of a date into a number, select one of the following parts of the date:
 - **Year:** Converts the date into a number of years. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 2001.
 - **Month:** Converts the date into a number between 1 and 12. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 6 because June is the 6th month of the year.
 - **Day of Year:** Converts the date into a number between 1 and 366. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 156 because 05 June is the 156th day of the year.
 - **Day of Month:** Converts the date into a number between 1 and 31. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 5 because 05 June is the 5th day of the month.
 - **Hour:** Converts the date into a number between 0 and 12. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 2 because the number of hours in 02:12:46 PM is 2. The particular values are the following: The time 12:00:00 AM is turned into 0, the time 12:00:00 PM is turned into 12.
 - **Minute:** Converts the date into a number between 0 and 59. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 12 because the number of minutes in 02:12:46 PM is 12.
 - **Second:** Converts the date into a number between 0 and 59. Example: The date Tuesday 05 June 2001 02:12:46 PM is converted into 46 because the number of seconds in 02:12:46 PM is 46.
 - **Milliseconds since 1970:** Converts the source date/time into a timestamp that is equal to the number of elapsed milliseconds since the UNIX epoch time (1/1/1970 at midnight GMT). Source dates/times prior to this epoch time are converted into negative timestamps.

Number Parameters: Specifies the target number format that converts:

- A string into a number or multi-valued number
- A multi-valued number into a string or multi-valued string
- A multi-valued string into a multi-valued number

You must specify the decimal and hundreds separators.

- **Decimal Separator:** Select one of the following decimal separators:
 - **Point:** For example, 1234567.89
 - **Comma:** For example, 1234567,89
- **Thousand Separator:** Select one of the following thousand separators:
 - **No Separator:** For example, 1234567,89
 - **Space:** For example, 1 234 567,89
 - **Comma:** For example, 1,234,567,89
 - **Quote:** For example, 1'234'567,89

Multi-Valued Parameters: Specifies the field separator that converts:

- A string into a multi-valued string or multi-valued number
- A multi-valued string into a string
- A multi-valued number into a string

Click one of the available separators (**Semicolon**, **Tabulation**, **Comma**, **Space**, or **Slash**), or click **Other**, and then type a separator.

The default value is **Semicolon**.

For example, to convert the string

`MeteoRecipients;NewsRecipients;ExchangeRecipients;SpotsRecipients;TrafficRecipients;TaxiRecipients` into a multi-valued string, you must click **Semicolon** so that the Property Type Converter operator component removes all the semicolons for converting the string into a list of a multi-valued string.

If you want to convert the multi-valued number (2000 5000 10000 20000) into a string, you must select a field separator to separate the elements of the list in the string. If you select **Slash** as the field separator, the resulting string is 2000/5000/10000/20000.

2.4.31.10.4.20 Prorata Operator

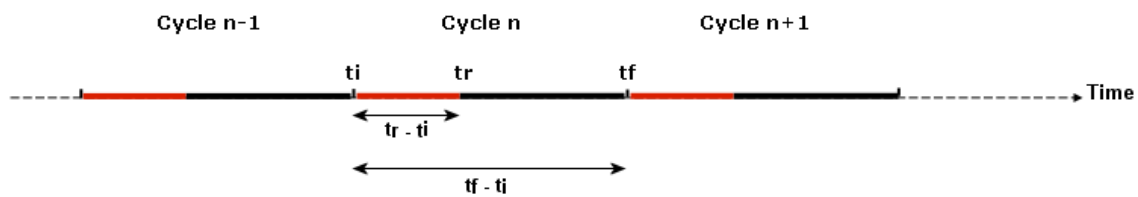


The **Prorata Operator** calculates the product $Y = X * R$, in which:

- Y is the numerical result
- X is a numerical value
- R is a ratio ranging from 0 to 1 (R is a decimal number; for example, 0.45)

As shown in the next illustration, the **Prorata Operator** calculates $R = (tr - ti) / (tf - ti)$ as the ratio of two time periods:

- $tf - ti$: Time period that is delimited by the initial time ti and the final time tf . The condition $ti < tf$ is always true.
- $tr - ti$: Part of the time period $tf - ti$ that is delimited by the initial time ti and the reference time tr . The condition $ti \leq tr \leq tf$ is always true.



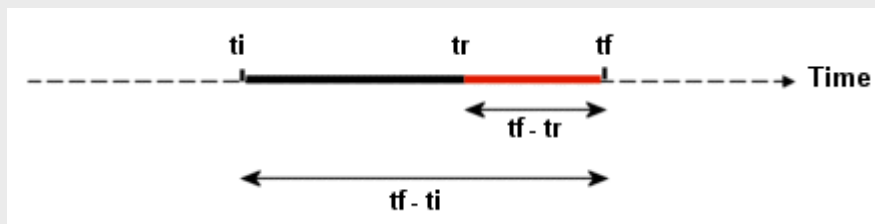
→ Remember

Keep in mind that $tf - ti$ is a cycle defined by one of the following frequencies:

- A day or 24 hours
- A week
- A month
- A year

i Note

Instead of calculating $R = (tr - ti) / (tf - ti)$, the *Prorata Operator* can calculate the ratio $R = (tf - tr) / (tf - ti)$ as shown in the next illustration.



❖ Example

If you propose some services that include a monthly calling plan, you may want to adjust a new client's plan for the first month according to the subscription date of the contract. Likewise, you may want to adjust the plan for the last month when the plan is based on the cancellation date of the contract. In both cases, you use the *Prorata* component to calculate the calling plan.

A customer signs a contract on the 10th of the month for a service that includes two free hours per month. Because the customer signed on the 10th of the month, you want to prorate two free hours from the 10th to the end of the month. The following table presents the information that you need to set up the *Prorata* component:

Data	Name of properties/Settings	Comment
Property to prorate	Number of free hours	In the product $Y = X * R$, the numerical value X is Number of free hours (two hours).
Generated Property	Number of free hours during the first month	The generated property contains the resulting amount $Y = X * R$.
Prorata Date	Charge effective date	In the product $Y = X * (tf - tr) / (tf - ti)$, the reference time tr is the Charge effective date (the 10th of the month).

Data	Name of properties/Settings	Comment
Time period	Every month	In the product $Y = X * (tf - tr) / (tf - ti)$, the initial time ti is the first of the month at 12:00 AM and the final time tf is the last day of the month.
Type of ratio	Calculation according to the <i>Fraction from prorata date</i> option	The <i>Fraction from prorata date</i> option calculates $R = (tf - tr) / (tf - ti)$.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Property to prorata: Provides the list of numerical properties. Select the property that represents the numerical value X of the product $Y = X * R$.

Generated Property Name: Allows you to type the name of the new property that retrieves the numerical result of $Y = X * R$.

Calendar: Provides the list of available calendars on which the recurring event is based.

Reference period: Allows you to set up the time period $tf - ti$ and the initial time ti . To set up the time period $tf - ti$, this area provides you with a list of frequencies:

- For *Gregorian Calendar*, the available periodicities are the following:
 - Every*, *Every other*, *Every 3rd*, and other items associated with the following list: *day*, *week*, *month*, and *year*. For example, you can choose a time period of two months by selecting *Every other month*, or you can choose a time period of one day by selecting *Every day*.

i Note

The *Reference Date* is used ONLY if you select either or both of the options *The same day as the reference date* and *The same time as the reference date*. Instead of the *Reference Date*, you can use the other options.

- Once you have selected a frequency or time period, you can select the initial time ti :
 - Reference Date*: Provides the list of date properties. Select the property that represents the initial time ti .
 - The same day as the reference date*: If you click this option, the initial time ti is the date selected in the *Reference Date* field. Example: you have selected the Charge Effective Date. If you select Every month, the time period $tf - ti$ is one month and the initial time ti starts at the *Charge Effective Date*.
 - The same day as the reference date or first day of next month*: If you click this option, the *Recurring Rate* is triggered depending on the date selected in the *Reference Date* list or the first day of the month following that of the selected date in the *Reference Date* list. See the note below.

- *the*: If you have selected the frequency *Every* (3rd, 4th, and so on) *month* or *year*, this option allows you to select the initial time t_i as a day of the month. This option is combined with a list of numbers (from 1 to 31), a list of items such as Last day, First, Second, Third and Fourth and the list of weekdays and months. Example: selecting Every 5th month The 11 of the month at 04:00 PM means that the time period $t_f - t_i$ is five months and that the initial time t_i starts the 11 of the month at 04:00 PM.
- *on*: If you have selected the frequency *Every* (3rd, 4th, and so on) *week* or *year*, this option allows you to select the initial time t_i as a day of the week or the month. This option is combined with a list of numbers (from 1 to 31) and months and a list of weekdays. Example: selecting Every 4th week on Wednesday at 02:00 AM means that the time period $t_f - t_i$ is four weeks and that the initial time t_i starts on Wednesday at 02:00 PM.
- *at*: Allows you to select the starting hour of the initial time t_i if you have selected any of the previous options. This option includes hours and minutes combined with AM (ante meridiem) or PM (post meridiem). Example: selecting Every day at 07:25 PM means that the time period $t_f - t_i$ is one day and that the initial time t_i starts at 07:25 PM. You can select *The same time as the reference date* that is the date selected in the *Reference Date* field. Example: if you select the *Charge Effective Date*, the initial time of the time period $t_f - t_i$ is that of the *Charge Effective Date*.
- For *4-4-5 Calendar*, the available periodicities are the following:
 - *Every month*, *Every quarter*, *Every semester* and *Every year*.

i Note

The other options, available with the Gregorian Calendar, do not appear any longer. They are useless with the 4-4-5 Calendar.

Fraction of the reference period to prorate: Allows you to select the reference time t_r and the type of ratio to calculate: $R = (t_r - t_i) / (t_f - t_i)$ or $R = (t_f - t_r) / (t_f - t_i)$.

- *Prorata date*: Provides the list of numerical properties. Select the reference time t_r .
 - *Fraction up to prorata date*: Calculates the ratio $R = (t_r - t_i) / (t_f - t_i)$
 - *Fraction from prorata date*: Calculates the ratio $R = (t_f - t_r) / (t_f - t_i)$

Calculation Parameters

You set up the parameters for making the calculation.

Time Unit: Provides the list of time units to calculate the total part of the ratio R . The default option is seconds. Select one of the following units:

- *seconds*
- *minutes*
- *hours*
- *days*

Rounding Mode: Provides the list of modes for rounding the decimal portion of the ratio R . The default option is *To the next greater value*. Select one of the following rounding modes:

- *To the next greater value*
- *To the previous value*

- [To the nearest value](#)

Rounding Step: Allows you to type a step rule for rounding the ratio R, or allows you to select a numerical property that represents this step rule. The default option is [1](#).

❖ Example

If the rounding step value is 5 seconds and the rounding mode is [To the next greater value](#), a period of time of 47 seconds is rounded to 50 seconds. In this example, the rounding step consists of 5-second intervals.

Use typical period of: If selected, this option allows you to turn a variable period into a constant period. Once you have selected the [Use typical period of](#) option, you can either select the value of a property or select [Numerical Value](#), and then type a number.

❖ Example

For example, to turn each month into a constant period of 30 days, click [Use typical period of](#), select [Numerical Value](#) in the list, and then type 30. If you clear [Use typical period of](#), the reference period is 28 days in February, 31 days in January, and so on.

2.4.31.10.4.21 State Schedule Updater (Operator)



The **State Schedule Updater** operator component allows to change the dates/times on which a prepaid account is blocked, locked, or closed.

Remember that a prepaid account can be active, blocked, locked, or closed and these states are initially scheduled in the subscriber account including the prepaid account. For more information, refer to the [primary help of Core Tool \[page 670\]](#).

You can insert several *State Schedule Updater* components in a refill tree because each component is independent. Therefore, the dates scheduled in each component are effective when each component is performed.

❖ Example

An operator can use the [State Schedule Updater Operator](#) component in a price plan:

- To block the prepaid accounts if the end customers or subscribers have not refilled their prepaid account
- To close the prepaid accounts if the end customers or subscribers have terminated their contract

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Blocking Date Change

- **Operation:** Provides the list of operations. Select an operation.
 - **None:** Does not change the date on which the prepaid account is blocked
 - **Clear:** Clears the date on which the prepaid account is blocked
 - **Set:** Sets or changes the date on which the prepaid account is blocked
 - **Add Duration:** Adds a duration value to the date on which the prepaid account is blocked
 - **Subtract Duration:** Subtracts a duration value from the date on which the prepaid account is blocked
- **Date:** Provides the list of date properties and date parameters. Select a date.
- **Duration:** Provides the list of numerical properties and counters and parameters. Select a date.
- **Duration Unit:** Provides the list of duration units (*Seconds*, *Minutes*, *Hours*, *Days*, *Months*, and *Years*). Select a duration unit.

Locking Date Change

- **Operation:** Provides the list of operations. Select an operation.
 - **None:** Does not change the date on which the prepaid account is locked
 - **Clear:** Clears the date on which the prepaid account is locked
 - **Set:** Sets or changes the date on which the prepaid account is locked
 - **Add Duration:** Adds a duration value to the date on which the prepaid account is locked
 - **Subtract Duration:** Subtracts a duration value from the date on which the prepaid account is locked
- **Date:** Provides the list of date properties and date parameters. Select a date.
- **Duration:** Provides the list of numerical properties and counters and parameters. Select a date.
- **Duration Unit:** Provides the list of duration units (*Seconds*, *Minutes*, *Hours*, *Days*, *Months*, and *Years*). Select a duration unit.

Closing Date Change

- **Operation:** Provides the list of operations. Select an operation.
 - **None:** Does not change the date on which the prepaid account is closed
 - **Clear:** Clears the date on which the prepaid account is closed
 - **Set:** Sets or changes the date on which the prepaid account is closed
 - **Add Duration:** Adds a duration value to the date on which the prepaid account is closed
 - **Subtract Duration:** Subtracts a duration value from the date on which the prepaid account is closed
- **Date:** Provides the list of date properties and date parameters. Select a date.
- **Duration:** Provides the list of numerical properties and counters and parameters. Select a date.
- **Duration Unit:** Provides the list of duration units (*Seconds*, *Minutes*, *Hours*, *Days*, *Months*, and *Years*). Select a duration unit.

2.4.31.10.4.22 Switch Table Operator



The **Switch Table Operator** compares the same property with one or more values or properties of the same type. When a comparison is true, the test stops and a numerical or string value is assigned to a computed property.

If no comparison is true, a default value is assigned to the computed property.

Use

In a price plan, you may need to apply different prices that depend on the value of a property. To use the [Switch Table Operator](#) inside your price plan, do the following:

1. Choose the first property, a comparison operator, and the values or properties to compare to the first property.
2. Type the value of the computed property for each comparison.
3. Describe the pricing of each value of the computed property.

Note

The [Switch Table Operator](#) stops the test when a comparison is true; therefore, the order of the comparisons in the table is important.

Example

An operator bills telephone calls that depend on the duration and the type of call (local, international and information). In the price plan, the property "CallType" is assigned one of these three values: "Loc", "Int" or "Inf". In the Switch Table Operator component, the computed property "Price" is expressed in cents/minute and is assigned three values as described in the following table:

Property	Comparator	Value	Price
CallType	equal to	Loc	\$0.10
CallType	equal to	Int	\$0.60
CallType	equal to	Int	\$0.20

The table rows mean that:

- If [CallType](#) is equal to "loc", then [Price](#)=0.10
- If [CallType](#) is equal to "int", then [Price](#)=0.60
- If [CallType](#) is equal to "inf", then [Price](#)=0.20

The string property [CallType](#) is compared with the values "loc", "int" and "inf". [Price](#) is a new numerical property that is assigned a numerical value for each comparison. The [Switch Table Operator](#) stops the test when a comparison is true, and then [Price](#) is assigned the value relating to the comparison.

For example, if [CallType](#) is equal to "inf", the value of [Price](#) is 0.20. If no comparison is true, a default value is assigned to [Price](#).

Identification Area

[Name](#): Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Property Name: Provides the list of properties. Select a property. The selected property is compared with the values or properties that are set up in the table. The property name appears in the heading of the first column *If ? ...* of the table. Example: If you select a property called Duration, the first column heading displays *If Duration ...*.

Parameters of the computed property: Allows to name and set up the computed property, which is assigned a value depending on the comparisons of the table.

- *Name:* Allows you to type the name of the computed property. This property is assigned a value depending on the comparisons that are set up in the table. The property name appears in the heading of the third column *... ?=* of the table. Example: If you type Price, the third column heading in the table displays *...Price=*.
- *Type:* Select *String* or *Number* as the type of the computed property.
- *Default Value:* Allows you to type the default value of the computed property, or allows you to select a numerical property that represents the default value. The computed property is assigned the default value if no comparison is true.

Table area

Each row added to the table allows you to make a comparison such as: If (condition) then (result). Example: If Duration... is equal to ... the value ...25...Price=100, where Duration is the property that you select in the Property Name list and Price is the computed property name.



: Adds a row to the table. Click this button to add a comparison.



: Deletes a row from the table. To remove a comparison, select the corresponding comparison row, and then click this button.



: Moves a row up in the table. To move a comparison up, select the corresponding comparison row, and then click this button.



: Moves a row down in the table. To move a comparison, select the corresponding comparison row, and then click this button.



: Opens the *Open* dialog box to search for a file and import data into the table. Click this button when you want to create comparisons with data from a CSV file instead of manually entering the data.



: Deletes all the rows in the table. Click this button to delete the list of comparisons.

- Case of a *String* type:
 - *If ? ...*: The "?" symbol is replaced by the property that you select in the *Property Name* list. Each row that you add to the table allows you to select one of the following operators:
 - *is equal to*: For example, if a property that contains "06526179" is compared with the second column entry that contains "06526179", the comparison is true; otherwise, the comparison is false.

- **starts with**: For example, if a property that contains "06526179" is compared with the second column entry that contains "06", the comparison is true; otherwise, the comparison is false.
 - **ends with**: For example, if a property that contains "06526179" is compared with the second column entry that contains "79", the comparison is true; otherwise, the comparison is false.
 - **contains**: For example, if a property that contains "06526179" is compared with the second column entry that contains "261", the comparison is true; otherwise, the comparison is false.
 - **...the value...:** Each row added to the table allows you to type a value or select a property to compare with the first column.
 - **... ? =:** The "?" symbol is replaced by the computed property name. Each row added the table allows you to type a value or select a property, either of them is assigned to the computed property when the comparison is true.
- Case of a **Number** type:
 - **If ? ...:** The "?" symbol is replaced by the property that you select in the **Property Name** list. Each row that you add to the table allows you to select one of the following operators:
 - **Is Equal To**: For example, if a property that contains "12" is compared with the second column entry that contains "12", the comparison is true; otherwise, the comparison is false.
 - **Is Greater Than**: For example, if a property that contains "12" is compared with the second column entry that contains "10", the comparison is true; otherwise, the comparison is false.
 - **Is Smaller Than**: For example, if a property that contains "12" is compared with the second column entry that contains "30", the comparison is true; otherwise, the comparison is false.
 - **Is Greater Than or Equal To**: For example, if a property that contains "12" is compared with the second column entry that contains "10", the comparison is true; otherwise, the comparison is false.
 - **Is Smaller Than or Equal To**: For example, if a property that contains "12" is compared with the second column entry that contains "30", the comparison is true; otherwise, the comparison is false.
 - **Is Not Equal To**: For example, if a property that contains "12" is compared with the second column entry that contains "10", the comparison is true; otherwise, the comparison is false.
 - **...the value...:** Each row added to the table allows you to type a value or select a property to compare with the first column.
 - **... ? =:** The "?" symbol is replaced by the computed property name. Each row added the table allows you to type a value or select a property, either of them is assigned to the computed property when the comparison is true.

2.4.31.10.4.23 Tier Table Introducer (Operator)



The **Tier Table Introducer Operator** component allows you to use an existing **tier table** [page 437] in a plan.

In a tier table, each group consists of one or more numerical intervals. The output columns of the tier table are number or string values assigned to each numerical interval. The **Tier Table Introducer** component compares row by row each numerical interval of a group with a property value of the plan. The comparison stops when the property value matches a numerical interval of the group. The output columns related to the numerical interval are retrieved in generated properties that you can use in the plan.

With the **Tier Table Introducer Operator** component, you can:

- Select a tier table.
- Select one of the groups of the tier table.
- Select the property value to compare with the numerical intervals of the group.

❖ Example

A service provider bills Internet services to its end-customers according to their contract length. To calculate the service price, a tier table provides the contract lengths with their price. The contract type (Gold prices or Silver prices) determines the service price. To use the tier table, a [Tier Table Introducer](#) must be inserted in the decision tree of the price plan. The tier table **TieredTariff** consists of:

- Numerical intervals representing the contract length in months ($]-\infty, 6]$, $]6, 12]$, $]12, 24]$, $]24, +\infty[$)
- Output columns representing the related prices (Gold prices and silver prices) in USD

In the [price plan \[page 570\]](#), the [Tier Table Introducer](#) component shows the following information:

- The **TieredTariff** tier table
- The **ContractLength** price plan property that is compared to the numerical intervals (contract lengths) of the group
- The **GoldenPrice** price plan property that retrieves the value of the "Golden price" output column
- The **SilverPrice** price plan property that retrieves the value of the "Silver price" output column

In this example, the tier table **TieredTariff** uses the default group. Therefore, the [Group Name Property](#) is [Default Group](#). If the tier table uses another group, the list of [Group Name Properties](#) must contain the property whose value is the group name.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Tier Table: Provides the list of available tier tables. Select the tier table that you want to use with the [Tier Table](#)

Introducer. To open and modify the tier table, click .

Mapping Property: Provides the list of properties. Choose the property to compare with the numerical intervals of the selected group.

Group Name Property: Provides the list of properties. Choose the property whose value is the group name, or choose the default group.

Mapping of Generated Properties: Displays the output columns of the tier table and allows you to rename the generated properties. When a comparison is true between a numerical interval and the property, the generated properties retrieve the output column values of the tier table.

- **Column Name:** Displays the output column name of the tier table.

- **Column Description:** Displays the description of the output column of the tier table.
- **Type:** Displays the type of the generated property.
- **Generated Property Name:** Displays the default generated property that retrieves the output column value of the tier table. To change the name of the default generated property, double-click the entry, and then type a new name. You can use the generated property in the plan.

Related Information

[Tier Tables \[page 437\]](#)

2.4.31.10.4.24 Translation Table Introducer (Operator)



The *Translation Table Introducer Operator* component allows you to use an existing translation table in a plan.

The *Translation Table Introducer Operator* component compares row by row the input columns of a [translation table \[page 422\]](#) with properties of the plan. The comparison stops when the properties match at least one row of the input columns. The order of the rows in the translation table is therefore important. The output columns related to the input columns are retrieved in generated properties that you can use in the plan. If no property matches the comparison, the translation table returns a default value for each generated property.

Note

The number of properties must be equal to the number of input columns of the translation table.

With the *Translation Table Introducer Operator* component, you can:

- Select a translation table
- Select the properties to compare with the input columns of the translation table
- Select the type of comparison

❖ Example

An operator bills telephone calls according to the geographic zone of the called numbers. To calculate the price of each call, a translation table provides the price plan with the geographic zone code that is assigned to each telephone number prefix. To use the translation table, a *Translation Table Introducer* must be inserted in the rating tree of the price plan. The translation table **TableZone** is made up of the input column **Prefix** and the output column **ZoneCode**. The input column contains the telephone number prefixes, and the output column contains the geographic zone codes.

In the [price plan \[page 570\]](#), the *Translation Table Introducer* component shows the following information:

- The **TableZone** translation table
- The **NumberCalled** price plan property that provides the telephone number to the translation table
- The **GeographicZone** price plan property that retrieves the value of the **ZoneCode** output column

- The comparison test *starts with* that is used to compare the price plan properties with the input columns of the translation table

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Translation Table: Provides the list of available translation tables. Select the translation table that you want to use with the *Translation Table Introducer*. To open and modify the translation table, click .

Comparison Operator: Provides the list of comparison operators. To compare the properties with the input columns of the translation table, select one of the following operators:

- *Is equal to*: The comparison is true when the property matches the value of the input column. For example, if the property that contains "06526179" is compared with an input column entry that contains "06526179", the comparison is true; otherwise, the comparison is false.
- *Starts with*: The comparison is true when the property starts with the value of the input column. For example, if the property that contains "06526179" is compared with an input column entry that contains "06", the comparison is true; otherwise, the comparison is false.
- *Contains*: The comparison is true when the property contains the value of the input column. For example, if the property that contains "06526179" is compared with an input column entry that contains "261", the comparison is true; otherwise, the comparison is false.
- *Ends with*: The comparison is true when the property ends with the value of the input column. For example, if the property that contains "06526179" is compared with an input column entry that contains "79", the comparison is true; otherwise, the comparison is false.

Reference Date: Is an additional criterion to compare a date with the *Start Date* and *End Date* columns of the translation table¹²³. If you do not select a *Reference Date*, this option is ignored. If selected, the comparison result depends on the following rules:

- If a row includes a non-null *Start Date* and a non-null *End Date*, the comparison is true if the *Reference Date* is equal or greater than the *Start Date* and strictly less than the *End Date*; otherwise, the comparison is false.
- If a row includes a non-null *Start Date* and no *End Date*, the comparison is true if the *Reference Date* is greater than or equal the *Start Date*; otherwise, the comparison is false.
- If a row includes no *Start Date* and a non-null *End Date*, the comparison is true if the *Reference Date* is strictly less than the *End Date*; otherwise, the comparison is false.
- If a row includes no *Start Date* and no *End Date*, the comparison is always true.

Mapping of Rating Context: Displays the input columns of the translation table, and allows you to select the properties that you want to compare with the input columns.

¹²³ *Reference Date* is used in combination with the *Start and end dates can be specified for each row* option of translation tables.

i Note

In the *Type* column, you are allowed to select only one multi-valued string as a property type.

- *Column Name*: Displays the input column name of the translation table.
- *Column Description*: Displays the description of the input column of the translation table.
- *Type*: Provides the list of two property types: *String* or *Multi-Valued String*. Select a property type.
- *Mapping Property*: Provides the list of properties relating to the selected type of the Type column. Select the property that you want to compare with the input column.

Mapping of Generated Properties: Displays the output columns of the translation table, and allows you to rename the generated properties. When a comparison is true between properties, *Reference Date* (if selected), and input columns, the generated properties retrieve the values of the output column entries.

- *Column Name*: Displays the output column name of the translation table.
- *Column Description*: Displays the description of the output column of the translation table.
- *Type*: Displays the type of the generated property.
- *Generated Property Name*: Displays the default generated property that retrieves the output column value of the translation table. To change the name of the default generated property, double-click the entry, and then type a new name. You can use this new generated property in the plan.

2.4.31.10.4.25 Update Counter Operator

i Note

If your configuration is part of session-based charging services, be careful when using the Update Counter component and read the note at the end of this topic.



The **Update Counter Operator** component updates a counter of a plan. To update a counter, you can:

- Reset the counter
- Assign a value such as a constant or numerical property to the counter
- Add a value such as a constant or numerical property to the counter
- Subtract a value such as a constant or numerical property from the counter

→ Remember

This component is not compatible with counters defined in shared allowances (distributed counters). To update such counters, you have to use the [Decrement Counter Operator \[page 961\]](#) or the [Increment Counter Operator \[page 968\]](#) component.

Use

In a periodic-type telephone calling plan, the *Update Counter* operator component can allow you to upgrade the **number of hours in the calling plan** counter and reset this counter at the beginning of the period.

❖ Example

A monthly calling plan includes two hours of free call time for end customers.

This plan is billed using a recurring rate component (for monthly subscriptions) and a usage rate component (for calls).

The [price plan \[page 570\]](#) contains a counter **number of hours in the calling plan**.

- In the recurring rate branch, this counter is reset to the original value of two hours at the beginning of the month by using an [Update Counter Operator](#) component.
- In the usage rate branch, an [Update Counter Operator](#) component subtracts the duration of each call from the counter **number of hours in the calling plan**.

Identification Area

Name: Type the name of the component (mandatory).

Description: Allows you to type the description of the component (optional).

Definition (Tab)

Counter Name: Allows you to type the name of the counter that you want to update.

Counter operation: Provides the list of counter updates. Select one of the following counter updates:

- [Reset to the initial value](#)¹²⁴: The counter is set to its initial value.
- [Set to the value defined below](#): The counter is set to the [Operation Value](#)
- [Add the value defined below](#): The [Operation Value](#) is added to the counter value.
- [Subtract the value defined below](#): The [Operation Value](#) is subtracted from the counter value.

Operation value: Allows you to type the value that updates the counter, or allows you to select a numerical property that represents the value.

Update During the Reservation for a Session: This option is available only when you select a transient counter. If selected, this option means that the transient counter is updated at reservation time within a session. This option does not change the behavior of a persistent counter.

¹²⁴ Do not set or reset counters when working with session-based charging operations. Refer to the [SAP CC 5.0 Application Help](#) documentation for more information about the process constraints and limitations relating to the charging process.

2.4.32 Troubleshooting

As part of the technical operations, you may have to troubleshoot some problems when using the Core Tool user interface to configure or maintain the data or the system. Find afterwards a list of possible symptoms and related solutions that you can try to implement.

Related Information

[Enabling the Traces for Troubleshooting \[page 992\]](#)

[Troubleshooting Connection Issues to Core Server \[page 992\]](#)

[Error Messages in Core Tool \[page 993\]](#)

2.4.32.1 Enabling the Traces for Troubleshooting

For troubleshooting purposes, SAP SE recommends that you temporarily enable the logging and tracing functions in the graphical user interface.

For more information, refer to the related procedure in the SAP CC [Operations Guide](#).

i Note

In addition, you can consult the messages exchanged between your Core Tool user interface and the SAP CC system (XML verbose mode). See the [Preferences \[page 787\]](#) menu.

2.4.32.2 Troubleshooting Connection Issues to Core Server

i Note

For more information about this connection issue, refer to your administrator and the related SAP Note [1846673](#) .

Symptom

An issue occurs when the Core Tool user interface tries to connect to the distant multi-instance Core Server system.

The user interface displays the following error message: *An error occurred during communication with the server*

Several reasons are possible. The user interface must sequentially connect to several instances.

Details	The dispatcher and the updater instances should be accessible through the firewall. For more information, refer to the Tuning Guide (chapter System Settings for Communication) about the communication interfaces that must be accessible through a firewall.
Possible Solutions	1. Verify with the system administrator that the SAP system is up and running. The dispatcher and updater instances must be started and ready. 2. Verify that the HCI URLs of the updater and dispatcher instances are directly accessible from the Core Tool host. For example, ping these instances to check the connections. Core Tool uses the dispatcher instance address to retrieve the address of the running updater. Once connected to the updater instance, Core Tool only communicates with it. Refer to Launching Core Tool [page 379] topic if necessary. 3. Make sure that you provide Core Tool with the IPv4 or IPv6 address of the dispatcher instance, and not the updater instance's. Once connected to the updater instance, Core Tool only communicates with it. 4. In addition, you should also check that the entered Server URL included the relevant protocol (HTTP vs HTTPS) in your SAP system landscape.

2.4.32.3 Error Messages in Core Tool

Core Tool provides you with some user guidance when an error occurs. To improve your user experience, the user interface interprets all the issues and displays an error message that must help you.

Find here some error messages, possible symptoms, and related solutions that you can try to implement.

 Error message: "This database does not support to store strings which end with a space character (<ERRE-
OUS_TEXT>)."

This error message means that the Core Tool user interface requested the SAP Convergent Charging system (Core Server) to save data into the back-end database system (Core Database). The operation request failed. This situation may be due to:

- The database technology for the back-end database does not support any values that end with a space character. Verify with your system administrator. For example, SAP ASE does not store string values ending with trailing spaces.
In Core Tool, do not enter any string values that include trailing spaces when such a database is in your SAP system landscape.
- You may encounter this problem when trying to import some data to a target SAP CC system. The data was previously exported from another system. The back-end database for the target system does not support any values ending with a space character.
- This problem may relate to a database migration project. Contact your implementation and integration project team.

See also:

- [Log message com.sap.SCC.infra.000003](#)
- [Error code SQL-59](#)



Error message: "An error occurred during communication with the server"

This error message means that the Core Tool user interface cannot communicate with the target SAP CC system.

Several reasons are possible.

See: [Troubleshooting Connection Issues to Core Server \[page 992\]](#)

2.4.33 Administering the SAP CC System

SAP Convergent Charging 5.0 [Admin+ \[page 1002\]](#) is a user interface of SAP Convergent Charging 5.0. It is a console program that allows you to manage local or remote instances of the SAP CC Core Server system and change their configuration parameters. The console program runs in interactive mode to get commands/arguments and to give you results or prompts for new options. It provides an IT administrator with some troubleshooting tools to resolve problems about SAP CC systems, data refreshing, and SAP CC users.

Related Information

[Admin+ \[page 1002\]](#)

2.5 SL Common GUI

SL Common GUI is a web application and a central tool that allows the SAP CC system administrators and IT consultants to install and deploy initially, maintain, and upgrade a multihost and multiinstance SAP Convergent Charging 5.0 system.

[What's New? \[page 995\]](#)

[Getting Started \[page 995\]](#)

[Important Concepts \[page 997\]](#)

[Tasks \[page 997\]](#)

[FAQs and Tips \[page 999\]](#)

[Troubleshooting \[page 1000\]](#)

2.5.1 What's New?

What's New in SP 5

As of SP 5 for release 5.0, the SAP installer is based on a newer toolset. The user interface is named [SL Common GUI](#). It replaces SAPINSTGUI.

2.5.2 Getting Started

Target Audience

The primary target audiences are:

- IT Administrator
- Operations Team Expert

The documentation also addresses to the following secondary audiences:

- IT Consultant

Getting Started with the User Interface

If this is your first time using the SAP installer, get started by working through this topic to familiarize yourself.

SL Common GUI is the graphical user interface and **central tool** of SAP Convergent Charging 5.0 that is dedicated to the installation and deployment activities for your SAP CC systems. SL Common GUI (front-end) is associated with SAPinst Framework 749 (back-end) to compose the SAP installer for SAP CC 5.0.

Only a web browser is required. You control the processing in the browser running on any device. The SL Common GUI tool connects the web browser on a client with the `sapinst` executable running on the installation host using the standard protocol HTTPS.

With this unique tool, you manage all the deployment phases and operations:

- The **initial installation** of an SAP CC 5.0 system
- The **system maintenance** (software maintenance update, system instance redeployment)
- The **upgrade from a replaced release** of SAP Convergent Charging to this release 5.0

SAP Convergent Charging provides you with a customized and extended version of the standard installation tool that is delivered by SAP. It replaces `SAPINSTGUI` as of SP 5 for release 5.0.

Operations	Description	Typical Tasks
Initial Installation	With the SAP installer, you perform the initial installation and deployment of your SAP system landscape. Depending on the decided architecture and sizing, you deploy the necessary SAP Convergent Charging systems on multiple hosts. Refer to the Installation and Upgrade Guide for more information and user assistance.	As a system administrator, you perform the following tasks: • Install a complete server system • Install an instance in an SAP CC system As an IT consultant, you install and deploy a development system (DEV).
Maintenance	The SAP installer allows you to <i>maintain</i> your systems and software with support packages and patches to implement. Refer to the Operations Guide.	Software Maintenance • Implement a Support Package (SP) • Implement a patch level System Maintenance and Operations • Replace or deploy a new instance in an SAP CC system • Add or replace a host
Upgrade Project	When a new main release for SAP CC is generally available, SAP installer allows you to upgrade your SAP system landscape from a former main release to this newest release. You plan and setup a complete upgrade project to change your system landscape and implement the latest support package and its latest patch level. Refer to the Installation and Upgrade Guide.	You perform the upgrade process.

First Activities and Tasks

You can now perform your technical operations for the first time:

- Running the installer. See [Launching the SAP installer](#).
 - Locally
 - Remotely

2.5.3 Important Concepts

As an IT administrator or an IT consultant who must install, maintain (update), or upgrade a production, preproduction, quality assurance, test, development, or training SAP CC system, you are aware of the installation and deployment concepts:

- [SAP Global Host](#)
- [SAP Central Repository](#)
- SAP Licensing
- Operating Systems (OSs)
- Host and hardware
- Network and storage
- Security and communications
- Database technology

2.5.4 Tasks

Activities and Tasks

- [Installing SAP Convergent Charging](#)
 - [Installing a Core Server on a Mono-Host Landscape](#)
 - [Installing a Core Server on a Multi-Hosts Landscape](#)
 - [Adding Core Server Instances in a Multi-Hosts Landscape](#)
 - [Installing a BART Server in an Existing Landscape](#)
- [Updating and Maintaining SAP Convergent Charging](#)
 - [Implementing a Support Package \(SP\)](#)
 - [Implementing a Patch Level](#)
- [Upgrading SAP Convergent Charging](#)
- [Troubleshooting \[page 1000\]](#)

Administration

Depending on your scenario (initial installation, maintenance update, upgrade project), you perform the following administrative procedures:

-
-

2.5.4.1 Running SL Common GUI

Prerequisites

Launching the SAP installer

Linux and UNIX operating systems

1. Open the `/DATA_UNITS/CC50_IM_<OS>` folder of the installation materials of SAP Convergent Charging 5.0, where `<OS>` corresponds to the version of your Linux or UNIX operating system.
2. Execute the following command to update the access rights of the SAP installer launch script and make it executable:

```
chmod +x sapinst
```

3. Open `./sapinst` to start the SAP installer and wait for incoming connections from the SL Common GUI.

Microsoft Windows operating system

1. Open the `/DATA_UNITS/CC50_IM_WINDOWS_X86_64` folder of the installation materials of SAP Convergent Charging 5.0.
2. Open `sapinst.exe` to start the SAP installer and wait for incoming connections from the SL Common GUI.
3. If a *User Account Control* dialog window opens, click the **Yes** button to grant the SAP installer the required administrator access right.

i Note

Once started, the SAP installer listens to the following defaults ports:

- **4237**, used for HTTPS¹²⁵ connections with the SL Common GUI. If this port cannot be used, you can assign a free port number by launching the SAP installer with the following command line parameter: `SAPINST_HTTPS_PORT=<FREE_PORT_NUMBER>`
- **4239**, used for managing the feedback evaluation form displayed at the end of the installation process. If this port cannot be used, you can assign a free port number by executing the SAP installer with the following command line parameter: `SAPINST_HTTP_PORT=<FREE_PORT_NUMBER>`

¹²⁵ HyperText Transfer Protocol Secured

→ Remember

See the other important prerequisites [Launching the SAP installer](#).

Using the SL Common GUI

To use the SL Common GUI, make sure that you use the latest version of one of the following supported browsers:

- Google Chrome (recommended)
 - Mozilla Firefox
 - Microsoft Edge
 - Microsoft Internet Explorer 11 or higher
1. If you have a supported browser installed on the host where you run the `sapinst` executable, the SL Common GUI application starts automatically a browser.
 2. Alternatively you can open a supported web browser on any device and run the URL from there. Then, open the URL¹²⁶ of the SL Common GUI, that is available at the bottom of the shell from which you launched the SAP installer, in the following information section:

```
...
*****
Open your browser and paste the following URL address to access the GUI
https://[<hostname>]:4237/sapinst/docs/index.html
Logon users: [<users>]
*****
...
```

i Note

If you copy the URL of the SL Common GUI application manually in the browser window, make sure that you open a new Web browser window in private browsing mode (Internet Explorer), incognito mode (Chrome) or private browsing mode (Firefox). This is to prevent Web browser plugins and settings from interfering with the SL Common GUI.

2.5.5 FAQs and Tips

Based on SAP user feedbacks, we deliver *Frequently Asked Questions (FAQs)* about all aspects of working with the application efficiently. We complete these solutions with our best time-saving or task-completion *tips and tricks*.

¹²⁶ Uniform Resource Locator



How to have some general information about SAP installer

On SAP Support Portal, review the published FAQs about "**SL Common GUI**". See the SAP knowledge base article (KBA) [2480194](#).

Search for FAQs about the back-end application: "**SAPinst Framework 749**".

Consult our SAP communities of experts. See [SAP Questions and Answers \(answers.sap.com\)](#) for **SAP Convergent Charging**.

Consult also your local communities, power users, experts, knowledge bases, other self services, and support teams.

→ Remember

Please **share your SAP user experience** to enrich this section about the installation and deployment tools for the SAP Convergent Charging software product.

2.5.6 Troubleshooting

If you run into any problems, your personalized version of the SAP installer for SAP Convergent Charging (SAP CC) handles the error and manages log files to facilitate the troubleshooting investigations.

→ Remember

Your SAP installer generates the `sapinst_dev.log` file that contains both traces and logs.

The log messages contain important information about successful and failed single operations.

To determine a possible root cause:

1. Get the `sapinst_dev.log` file in the following directory:

Linux and UNIX operating systems	<code>/tmp/sapinst_instdir/CC2020/INSTALL/STANDARD/UPDATE/</code>
Microsoft Windows operating systems	<code><DRIVE>:\Program Files\sapinst_instdir\CC2020\INSTALL\STANDARD\UPDATE\</code>

This file contains both trace messages and log messages that are essential for analyzing problems.

2. View and inspect the recorded log messages. See SAP Note [2142461](#).
3. Consult your local communities, power users, experts, knowledge bases, self services, and support teams.
4. For some user guidance, contact the SAP communities of experts:
 - [Searching for 'sapinst' in SAP Questions and Answers](#)
 - [SAP Questions and Answers \(answers.sap.com\) for SAP Convergent Charging](#)
5. Search for a solution in SAP self services based on our *SAP Notes and Knowledge Base Articles (KBAs)*:
 - [Search for "sl common gui" or sapinst in SAP Notes and Knowledge Base Articles \(KBAs\)](#)

6. Contact your SAP Support Team from your SAP Local Support Center by phone, e-mail, or chat.

3 Console User Interfaces

SAP Convergent Charging 5.0 provides you with several user interfaces to configure the SAP CC systems with master data, business data, or system level settings. You can use these user interfaces to configure, administer, monitor, and operate all the SAP CC systems available in your system landscape.

SAP Convergent Charging 5.0 provides some console programs to administer the SAP CC systems. These user interfaces run in interactive mode to get commands and to give you results or prompts for new information.

UI NAME	SUMMARY
Admin+ [page 1002]	<i>Admin+</i> is a console program that allows you to manage local or remote instances of the SAP CC Core Server system and change their configuration parameters.
BART+ [page 1003]	<i>BART+</i> is a console program that allows you to manage the SAP CC BART Server system by changing its configuration parameters.
Message Client [page 1003]	<i>Message Client</i> is a console program that allows you to use the global charging services of SAP CC via the Message TCP technical interface (for test, demo, or training purposes only).

Related Links

- SAP Convergent Charging 5.0 [Operations Guide](#)
- SAP Convergent Charging 5.0 [Tuning Guide](#)
- SAP Convergent Charging 5.0 [Installation and Upgrade Guide](#)

3.1 Admin+

[Working with Admin+](#)

Related Information

[Cockpit \[page 157\]](#)

3.2 BART+

[Working with BART+](#)

[BART+ \[page 1003\]](#) is a user interface of SAP Convergent Charging. It is a console program that allows you to manage the connected instance of the SAP CC BART Server system by changing its configuration parameters. The console program runs in interactive mode to get values and to give you results or prompts for new values.

Related Information

[Admin+ \[page 1002\]](#)

3.3 Message Client

[Testing with Message Client](#)

4 Command-Line User Interfaces

SAP Convergent Charging 5.0 provides you with several user interfaces to configure the SAP CC systems with master data, business data, or system level settings. You can use these user interfaces to configure, administer, monitor, and operate all the SAP CC systems available in your system landscape.

SAP Convergent Charging 5.0 provides some command line programs to configure the SAP CC systems. These user interfaces can be included in the command scripts of your operating systems.

UI NAME	SUMMARY
BART Setup Tool [page 1004]	<i>BART Setup Tool</i> is a command line program that allows you to configure some business or technical functions of the SAP CC Core Server system when it is offline. It can configure business data available in the SAP CC system: EU VAT taxation policies, EZTax transaction/service types.
Config Tool [page 1005]	<i>Config Tool</i> is a command line program that allows you to configure or transport a large subset of system parameters of an SAP CC Core Server system quickly. A system restart is necessary to take the changes into account.
HTTP Client [page 1005]	<i>HTTP Client</i> is a command line program that allows you to send operation requests from a file to the SAP CC system via the HCI technical interface (for test, demo, or training purposes only).
Setup Tool [page 1005]	<i>Setup Tool</i> is a command line program that allows you to manage some functions of the SAP CC BART Server system when it is offline.

Related Links

- SAP Convergent Charging 5.0 [Operations Guide](#)
- SAP Convergent Charging 5.0 [Tuning Guide](#)
- SAP Convergent Charging 5.0 [Installation and Upgrade Guide](#)

4.1 BART Setup Tool

[Working with BART Setup Tool](#)

4.2 Config Tool

[Working with Config Tool](#)

Related Information

[Manage SAP CC System Parameters \[page 316\]](#)

4.3 HTTP Client

[Testing with HTTP Client](#)

4.4 Setup Tool

[Working with Setup Tool](#)

5 Index of User Interfaces

View a short A-Z index for the user interface of SAP Convergent Charging 5.0.

The alphabetical list of user interfaces is:

- [Admin+ \[page 1002\]](#)
- [BART+ \[page 1003\]](#)
- [BART Setup Tool \[page 1004\]](#)
- [BART Tool \[page 6\]](#)
- [CAT Tool - IEC Application \[page 55\]](#)
- [Cockpit \[page 157\]](#)
- [Config Tool \[page 1005\]](#)
- [Core Tool \[page 348\]](#)
- [HTTP Client \[page 1005\]](#)
- [Message Client \[page 1003\]](#)
- [Setup Tool \[page 1005\]](#)
- [SL Common GUI \[page 995\]](#)

See also the Fiori apps in the Convergent Charging Cockpit launchpad.

Related Information

[Cockpit Apps \[page 176\]](#)

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