



Configuration Guide

SAP Convergent Charging (SAP CC 5.0)

Target Audience

- Technology Consultants
- System Administrators
- Solution Consultants
- Application Administrators
- Support Specialists

CUSTOMER

Document version: 1.0 – May 2017

Document History



CAUTION

Before you start the implementation project or the production operations, make sure you have the latest version of this *SAP product document* in the user assistance of SAP Convergent Charging release 5.0.

You can find the latest version in SAP Help Portal at the following location: ►
<https://help.sap.com/cc50> → *Configuration Information* ◀.



Configuration

Use the quick link: help.sap.com/cc50.

The following table provides an overview of the most important document changes:

Version	Date	Description
1.0	May 2017	Initial version (SAP CC 5.0 SP 0)

Table of Contents

DOCUMENT HISTORY	2
TABLE OF CONTENTS	3
1 INTRODUCTION	13
Target Audience	14
About This Document	15
What's New in This Document	17
<i>What's New in SP 0</i>	17
Document Abbreviations	18
2 BEFORE YOU START	20
Fundamental User Assistance and Guides	21
<i>Product Documentation Set</i>	22
Master Guides	24
Configuration Guides (Integrated Solution Scenario)	25
Global Definitions	26
Business Scenario	27
<i>Convergent Charging</i>	27
<i>Variants</i>	28
Business Processes	30
<i>Processing Refilling</i>	30
<i>Processing Charging</i>	32
<i>Creating Billable Items</i>	35
<i>Creating Consumption Items</i>	36
<i>Reverting with BART Server</i>	37
<i>Reverting with SAP CI</i>	38
Key Functions of SAP CC 5.0	39
Technical System Landscape	41
Starting and Stopping the Server Systems	43
<i>MS Windows</i>	43
<i>UNIX Operating Systems</i>	43
Configuration and Administration Tools	45
<i>Admin+</i>	45
<i>Setup Tool</i>	46
<i>Cockpit</i>	46
<i>Config Tool</i>	46
<i>Core Tool</i>	47
<i>BART+</i>	47
<i>BART Setup Tool</i>	48
<i>BART Tool</i>	48
<i>CAT Tool</i>	48
Important SAP Notes	50
Related Documentation	51
Additional Information	52
3 CONFIGURATION OVERVIEW	53

Typical Configuration Activities.....	54
Key Implementation Activities	56
<i>Standard Deployment.....</i>	56
<i>Solution Deployment with SAP CRM and SAP ERP</i>	57
Transport Management	58
Activities of the Implementation Project.....	59
<i>Implementation of the Online or Offline Charging Services</i>	59
<i>Implement the Multiservice Session-Based Charging.....</i>	60
<i>Implementing the Session-Based Charging with SAP CM by DigitalRoute</i>	60
<i>Implementing the Session-Based Charging with Diameter Server</i>	60
<i>Implementing the Event-Based Charging with Credit Control.....</i>	61
<i>Implementing the Event-Based Charging without Credit Control (Immediate Charging)</i>	61
<i>Implementing the Event-Based Batch Charging (Offline Charging Services)</i>	61
<i>Advanced: Implementing the Spending Status Monitoring.....</i>	61
<i>List of Implementation Activities</i>	62
Data Customization Activities	64
4 CORE SERVER CONFIGURATION OF THE TECHNICAL FEATURES	65
Startup Configuration File	66
<i>Working with the Startup Configuration Files</i>	66
<i>Setting Up the JVM Options in a Startup Configuration File</i>	67
Boot Configuration File	68
System Settings for the License Management.....	69
<i>Applying for the Permanent License.....</i>	69
<i>Installing the Permanent License.....</i>	69
System Settings for the Java Virtual Machine.....	71
<i>JVM Options</i>	71
<i>Determining the JVM Options for an SAP CC Core Server System</i>	77
<i>Setting up the Logging for the Java Garbage Collection (GC) in the SAP CC Instances</i>	79
System Settings for the Database Communication	81
<i>Changing the Login and Password for the Database (Advanced Procedure)</i>	81
System Settings for Communications	84
<i>Specifying a list of protocols and cipher suites for communications using SSL/TLS</i>	84
<i>Setting up the HTTP/HTTPS Connections.....</i>	84
<i>Enabling the Secured HTTP Connections</i>	86
<i>Installing the Private Keys and Certificates</i>	86
<i>Setting up the Communications via the Web Services</i>	88
<i>Enabling the UDP Discovery Function (Postinstallation)</i>	88
<i>Advanced Settings for Message Queues</i>	90
Settings for the User Management.....	92
<i>Enabling or Disabling the Security Policy for the User Passwords.....</i>	92
<i>Setting Up the Security Policy for the User Passwords</i>	92
<i>Setting up the SAP Users</i>	94
<i>Changing the Client Application Credentials for the Message TCP Technical Interface.....</i>	95
<i>Enabling or Disabling the User Isolation</i>	95
<i>Setting up the Number of SHA-256 Steps for Hashing User Passwords</i>	96
<i>Advanced: Resetting the Emergency User (Normal Procedure)</i>	97
<i>Advanced: Resetting the Emergency User (System Down).....</i>	98
<i>Enabling or Disabling the User Session Management and the Concurrent Edition Management</i>	100
<i>Setting Up the User Session Management in Core Tool and BART Tool.....</i>	101
System Settings for Logging and Tracing	102

Changing the Settings of the Logging and Tracing Functions	102
Changing the Version of the Error Files for Bulkloading	104
Enabling the Sequencing of File Names for Error Files Generated by Bulkloader Instances	104
System Settings for the System and Data Auditing	106
System Settings for the Product Usage Measurement	106
Setting up the Product Usage Metric Recording Feature	106
Setting up the Customer Usage Measurement in SAP Solution Manager	107
System Settings for the Data and Operation Auditing	109
Implementing the Data Object Auditing Feature	110
Customizing the Object Snapshot Recording Feature	111
Customizing the User Operation Auditing Feature	113
Settings for Time Zones and Dates	116
System Customization: Setting up the Time Zone and Date Management (Implementation)	116
System Settings for the System Landscape Directory	117
Enabling the SLD Data Supplier Function	117
Setting Up the SLD Data Supplier Function	118
System Settings for CA APM Introscope (IS)	120
Configuring the Introscope Agent	120
System Settings for Publishing Public Notifications	122
Overview of the Function	122
Notifications	123
Setting up the Notification Policy Function	126
Defining a Concept for the Notification Policy	127
Creating a Notification Policy Configuration File	127
Enabling the Notification Policy Function	129
System Settings for the Management of Provider Contracts	131
Enabling the Optimization of Provider Contracts	131
System Settings for Data Cache Management	132
Setting up the Cache Sizes	132
System Settings for Data Cache Management	133
Setting up the Cache Sizes	133
Advanced: Enabling the Cache Warm-Up Function	133
System Settings for Catalog Transport	135
Importing Transport Destinations	135
Configuring the Scheduler for Transport Requests Execution	136
System Settings for Troubleshooting Functions	138
Enabling or Disabling the Generation of Thread Dump Files	138
Implementation Tasks	139
Determining the Logging and Tracing Policy	139
Enabling the New Configuration of the Logging and Tracing Framework	141
Determining the Sizes of the Data Caches	143
Considering the Cache Warm-Up	145
Determining the Settings for the Cache Warm-Up	146
Implementing a Notification Handler in Your Java Application	148
Determining the Purge Schedule for Idempotent Services	150
Implementing Logging and Tracing in an External Monitoring System	151
Implementing Logging and Tracing in Your Java Application	151
Configuring the Allowances Purge Mechanism	153
5 CORE SERVER CONFIGURATION OF THE BUSINESS FEATURES	156
Usage Charging	157

<i>Chargeable Item Charging (Implementation Project)</i>	157
<i>Data Customizing: Setting up the Public Holidays</i>	158
<i>Creating Custom Public Holidays in a File</i>	159
<i>Setting up the Precision and Rounding for Rating and Charging (Implementation Project)</i>	165
Usage Online Charging	167
Event-Based Online Charging	168
<i>Configuring the Period Limit (Implementation Project)</i>	168
Session-Based Charging	169
<i>Setting-Up the Reservation Renewal Function</i>	169
<i>Implementation: Enabling the Resend Subfunction of the Reservation Renewal</i>	170
<i>System Advanced Configuration: Determining the Processing Threads of the Resend Subfunction of the Reservation Renewal</i>	170
<i>Customizing: Enable the Computation of Transactions to Cancel</i>	173
Online Refilling	174
<i>Refill Item Collection (Implementation Project)</i>	174
Spending Status Monitoring	176
<i>Implementing the Spending Status Report Management</i>	176
<i>Setting-Up the Communication Timeout of the Technical Acknowledgement</i>	177
<i>Enabling the Resend Subfunction of the Spending Status Reporting</i>	177
<i>Disabling the Resend Subfunction</i>	178
<i>System Advanced Configuration: Determining the Processing Threads of the Resend Subfunction of the Spending Status Reporting</i>	178
Usage Offline Acquisition and Data Collection	182
<i>Implementing the Chargeable Item Acquisition with the Java API (TCP/IP)</i>	182
Offline Usage Charging with BART Server	184
<i>Implementing the Batch Charging By Group Function</i>	184
<i>Data Customization: Setting up the Batch Rating Groups</i>	185
<i>Implementing the Batch Rating Group Assignment Function</i>	185
<i>Maintaining the Batch Rating Groups</i>	186
Rerating Function with BART	188
<i>Determining the Retention Period for Rerating</i>	188
<i>Changing the Retention Period for Rerating</i>	188
<i>System Customization: Implementing the Rerating Function with BART</i>	189
<i>System Advanced Configuration: Enabling the Rerating Function</i>	190
Refilling Function.....	192
<i>Refilling Directly a Prepaid Account (Implementation Project)</i>	192
<i>Refilling a Prepaid Account from a Technical Data (Implementation Project)</i>	192
Tax Function	194
<i>Quick Configuration</i>	194
<i>Setting up the Tax Functions</i>	194
<i>System Configuration: Enabling the VAT Management Function</i>	195
<i>Data Customization: Setting up the VAT Rates</i>	196
<i>Maintaining the VAT Rules</i>	197
<i>System Configuration: Implementing and Enabling the EZTax Management Function</i>	198
<i>Master Data Configuration: Setting up the Taxes for the Service Provider</i>	199
<i>Master Data Configuration: Setting up the Taxes for the Customers (Subscriber Accounts)</i>	199
<i>Implementation of VAT Rules</i>	199
<i>Implementation of Customized VAT Rules</i>	200
<i>Implementation: Creating a Customized VAT Rule</i>	203
Currency Function	206
<i>Quick Configuration</i>	206
<i>Data Customization: Setting up the ISO Currencies</i>	206

Data Customization: Setting up the SAP Currencies	207
Master Data Configuration: Setting up the Currencies for the Service Provider	207
Master Data Configuration: Setting up the Currency for the Customers (Subscriber Accounts)	208
Managing a Currency Reform (Implementation Project)	209
Output Result Data and Persistency	210
Charged Item Management	210
Refill Record Management	210
Charged Transaction Management	211
Advanced System Configurations	212
Advanced System Configuration: Setting up the Transaction Persistency Processing Mode (TIF)	212
Advanced System Configuration: Generating Files with Charged Transactions and Charged Items ..	213
Advanced System Configuration: Setting up the Transaction File Processor	214
Advanced system Configuration: Setting up the Data File Processor	214
Charged Items Persistency Functions	216
System Configuration: Setting up the Charged Item and Refill Record File Processor (CIF)	216
Enabling the Sequencing of File Names for Data Files Generated by Rater Instances	217
Enabling Line Numbering of File Records for Data Files Generated by Rater Instances	218
Enabling the Cleaning of Archived Files for Data Files Generated by Rater Instances	219
Modifying the Policy Relating to the Pre-Creation of Data Files	219
6 MASTER DATA FOR THE PRICING OF THE CUSTOMER SERVICE	221
Business Objects	222
Two Data Models	222
Master Data	222
Data Settings for the Service Provider and its Pricing Catalogs	224
Setting up Chargeable Item Classes	224
Setting up Refill Item Classes	225
Setting up Charged Item Classes	226
Recommendations for the Configuration of Charged Item Classes	227
Setting up Refill Record Classes	246
Setting up a Reusable Charge	247
Setting up the Refill Logic	248
Setting up the Counter Name Dictionary	248
Setting up the Spending Status Description	249
Designing and Setting up a Charge Plan	250
Designing and Setting up a Refill Plan	251
Designing and Setting up a Monitoring Plan	252
Recommendations for the Initialization of Counters Shared In Provider Contracts	253
Setting up an Offer	254
Catalog Transport	256
Implementation Tasks	257
Assigning a Charge/Refill Plan to a Commercial Product	257
7 MASTER DATA FOR THE END CUSTOMERS	259
Manual Configurations	260
Setting up a Subscriber Account for Testing	260
Setting up a Subscriber Mapping Table	261
Setting up a Subscriber Range Table	262
Setting up a Provider Contract	262
Setting up a Subscription and Accesses for Testing	264
Implementation Tasks	265
Setting up the Subscriber Accounts (Implementation Project)	266

Setting up the Subscriber Mapping Tables (Implementation Project)	267
Setting up the Subscriber Range Tables (Implementation Project)	269
Setting up the Provider Contracts and Accesses (Implementation Project)	271
Customizing the Batch Rating Group Assignment Policy	272
Migrating Subscriber Accounts and Provider Contracts (Implementation Project)	274
Setting up a Subscription and Accesses (Implementation Project)	275
8 CONFIGURATION WITH THE INTEGRATED SCENARIOS C2C AND 02C	277
Overview	278
Overall Prerequisites	279
SAP CRM Configurations and Customizing	279
SAP ERP/FI-CA Configurations and Customizing	280
Typical Configurations	282
Technical Customizing	283
System Settings	283
System Settings for JCo Communication	285
Basic System Settings for the JCo Communications	286
Setting up a JCo Destination Used to Connect to an SAP CRM or ERP/FI-CA System	288
Setting up the ERP Reference System Information	290
System Settings for Secured JCo Communications	292
Implementing Secured JCo Communications	292
Installing the SAP Cryptographic Library	293
Setting up a Personal Security Environment (PSE) for SNC	294
Creating Credentials	295
Exchanging Public-Key Certificates	296
Setting up the Secured JCo Configurations in SAP CC Core Server	297
Maintaining the System ACL on SAP NetWeaver	300
Maintaining the Extended User ACL on SAP NetWeaver	300
System Settings for Communications via the Web Services	302
System Settings for Customer Management Area	303
Enabling a New ERP System and a New Customer Management Area	304
Enabling a New CRM System and a New Customer Management Area	307
Setting up a Customer Management Area	311
System Settings for SAP ERP Reference System	312
Changing the ERP Reference System Information	312
Basic System Settings for Generating Both BITs and Consumption Items	314
Billable Item and Consumption Item Management	314
Setting up the Rater Instances (CIF)	315
Setting up the Bulkloader Instances (CIF)	318
Refreshing the Consumption Item Mapping	319
Basic System Settings for Generating Billable Items Only	320
Billable Item Management	320
Setting up the Rater Instances (CIF)	321
Setting up the Bulkloader Instances (CIF)	322
Setting up the Default Field Mapping Between CIT and BIT (Implementation Project)	326
Checking the Updater Instances (EIF)	330
Basic Settings for the CIF	332
Enabling the Event Date Shifting Function in the CIF	332
Disabling the Billable Item Validator in the Rater Instances	333
System Settings for Logging and Tracing	334
Basis Settings	334

System Settings for Tracing the JCo Communications	334
System Settings for Managing ABM Notifications via JCo	336
Setting up the Temporary Storage of ABM Notifications via JCo	336
Setting up the Network Notifications (Implementation Project)	340
Business Customizing	343
Rerating Function with SAP CI (Consumption Item Storage in SAP CI)	343
Determining the Retention Period for Rerating in SAP CC	343
Changing the Retention Period for Rerating	344
Setting up the SAP Currency	344
Implementing the Spending Status Monitoring in SAP BRIM	346
Master Data Basic Settings	347
Setting up the Master Data of the Service Provider	347
Data Settings for Allowance Management with SAP CRM	351
Data Settings for Recurring Fee and Recurring Refill Management	352
Data Settings for Price Management with SAP CRM	353
Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA	354
Data Settings for One-Off Fees in SAP CC	355
Setting up a Refill Item Class	356
Setting up a Refill Record Class and the Associated Billable Item Mapping	362
Setting up the Refill Logic	369
Setting up a Usage Refill for the Management of Refills Triggered by the SAP ERP System	376
Setting up a Usage Refill for the Management of Reversals	378
Setting up a Recurring Refill Triggered Periodically	379
Setting up a One-Shot Refill for the Creation of the Contract	380
Setting up a Refill Plan	381
Data Settings for Converting Charged Items and Refill Records into Billable Items	383
Setting up Billable Item Mapping	383
Setting up a Charge Plan	384
Setting up a Monitoring Plan	385
Master Data Maintenance	386
Maintaining the Billable Item Mapping	386
Maintaining the Consumption Item Mapping	388
Master Data Migration	389
Advanced Configurations	391
Setting up a Landscape Without SAP ERP	391
9 TECHNICAL CONFIGURATION OF THE USER INTERFACES	393
Settings for the Desktop Applications (such as Core Tool)	394
Setting Up the Primary Help	394
Setting Up the Core Tool User Interface	395
Setting Up the BART Tool User Interface	398
Setting Up the Connector Administration Tool (CAT Tool) User Interface	401
Settings for the Cockpit Application	403
Configuration Tools and Files	403
Initial Configuration	404
Basic Settings	404
Basic Settings for the Communications	405
Settings for the Security and User Management	406
Settings for the Tracing Function	407
10 CONFIGURATION OF BART SERVER	410
Configuration Tools and Files	411

Configuration File (bart.config)	411
System Settings for the Java Virtual Machine.....	413
Determining the JVM Options for an SAP CC BART Server System	413
System Settings for Database Communication.....	415
Setting up the Connection to the Database.....	415
Setting up the Database Connection SQL Failure Management	415
System Settings for Communications	416
Specifying a list of protocols and cipher suites for communications using SSL/TLS	416
Setting up the Connection to the SAP CC Core Server System	416
Changing the Technical User	418
Setting up the HTTP/HTTPS Connections of the BART Server.....	418
Enabling the Secured HTTP Connections	419
Installing the Private Key and Certificate	419
Setting up the TCP/IP Connection for the Acquisition or Rerating Functions	420
Settings for the User Management.....	422
Changing the Password to Log on to the Core Server System	422
System Settings for Logging and Tracing	423
Setting up the Logging and Tracing Function.....	423
System Settings for the System Landscape Directory.....	426
Enabling and Setting Up the SLD Data Supplier Function.....	426
Basic Settings	428
Setting up the Magic Number Pattern	428
Setting up the Scheduled Job Management	430
Monitoring and Event Broadcasting	431
Setting up the File Report Handler	431
Enabling the Monitoring Function.....	433
Advanced: Resetting the Customized File Report Handler	433
Technical System Settings	434
Technical Configuration for the Monitoring.....	434
Technical Configuration for Acquisition Sessions	434
Technical Configuration for CDR Consolidation Cache Management	434
Technical Configuration for Rating Sessions Management.....	435
Technical Configuration for Rerating	435
Implementation Tasks.....	437
Implementing the CDR Acquisition with the Java API (TCP/IP).....	437
Implementing the CDR Acquisition with an IEC.....	439
Advanced: CDR Acquisition with the Java API (XML/HTTP).....	439
Advanced: CDR Acquisition with the XML API	440
Supervision with the Event Handler Framework	441
Setting up the Customized Event Handlers.....	442
Job Framework	442
Implementing Logging and Tracing Functions in Your Java-Based Application	443
11 CONFIGURATION OF THE BART DATABASE	446
Partitioning.....	447
Determining the Keeping Days	448
Setting up the Partitioning Configuration	449
Setting up the Partitioning Configuration for Sybase ASE.....	449
Setting up the Partitioning Configuration for Oracle	450
Setting up the Partitioning Configuration for MS SQL Server.....	452

12	CONFIGURATION OF DIAMETER SERVER	454
	Technical System Settings	455
	<i>Setting up the Quick Configuration</i>	<i>455</i>
	<i>Setting up the Basic Configuration</i>	<i>455</i>
	System Settings for the Java Virtual Machine.....	457
	System Settings for Logging and Tracing	458
	<i>Setting up the Logging and Tracing Function.....</i>	<i>458</i>
	System Settings for the System Landscape Directory.....	459
	<i>Enabling and Setting Up the SLD Data Supplier Function.....</i>	<i>459</i>
	System Settings for Communications	461
	<i>Specifying a list of protocols and cipher suites for communications using SSL/TLS</i>	<i>461</i>
	Business Settings.....	462
	<i>Changing the Service Dictionary.....</i>	<i>462</i>
	<i>Changing the AVP Dictionary</i>	<i>462</i>
	Implementation Tasks.....	464
	<i>Implementing MSCC.....</i>	<i>464</i>
	<i>Implementing the Service Dictionary and the AVP Dictionnary</i>	<i>466</i>
13	CONFIGURATION OF THE IEC.....	469
	Basic Settings	470
	<i>Setting up a Scenario.....</i>	<i>470</i>
	Implementation Tasks.....	471
	<i>Implementing Java Classes for Adding Functions.....</i>	<i>471</i>
	<i>Implementing Logging and Tracing in a Java Task.....</i>	<i>471</i>
14	CONFIGURATION OF THE SAP CC CTS PLUGIN	472
15	CONFIGURATION OF THE DOCUMENTATION CENTER.....	473
	TYPOGRAPHIC CONVENTIONS.....	474
	ICONS.....	474
	COPYRIGHTS.....	475
	Disclaimer.....	477
	Documentation in SAP Help Portal	478



1 Introduction

Target Audience

This *SAP product document* contains both high-level information on an application and business process level as well as very detailed technical information. It is therefore intended for the following audiences:

- Technology consultants
- System administrators
- Solution consultants
- Application or business administrators
- Support specialists

This document is not included as part of the *Installation Guide*, *Security Guide*, *Operations Guide*, or *Upgrade Guide*. Such technical guides are only relevant for a certain phase of the software life cycle whereas the *Configuration Guide* provides information that is relevant for all the phases:

- Implementation project phase
 - Planning
 - Integration and Customizing (development, system configuration, master data configuration)
 - Installation (development system landscape, quality assurance landscape, production system landscape)
- Production operation phase
 - Business operations
 - Maintenance operations
- Upgrade phase

About This Document

This *Configuration Guide* contains information about the settings that are required for the business scenario *Convergent Charging*. This guide leads you through the process of performing the initial configuration of SAP CC 5.0. It can be used for other industries.



Configuration



Implementation



Integration

It provides information about the settings that are required for an integrated scenario with SAP CRM and SAP ERP/FI-CA components of S4/HANA or in the SAP Business Suite.

This guide requires that the prerequisite software is installed as described in the *SAP CC 5.0 Installation Guide*. It requires your knowledge about the software architecture and the key concepts of SAP Convergent Charging as described in the *SAP CC 5.0 Application Help* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 ◀.

For configuring and tuning SAP Convergent Charging (referred to as SAP CC in this document), the *Configuration Guide* provides some useful guidelines which:

- Gives some hints on main configuration parameters for business functions and technical functions
- Details the configurations of all the master data for the service provider (pricing implementation)
- Provides the implementation activities and tasks to be planned by the project teams during the implementation phase



NOTE

This document is available for both solution scenarios of SAP Convergent Charging for several industries:

- Standard scenario
 - SAP Convergent Charging must be interfaced with external systems to provide convergent charging services (stateless rating, charging, refilling, and rerating)

■ Integrated end-to-end scenario

- SAP Convergent Charging is interfaced with SAP CRM and SAP ERP/FI-CA components of SAP Business Suite: two scenarios *Consume-to-Cash in High-Volume Business* and *Sales and Order Management in Call Center* features the key functions to implement convergent rating, charging, rerating, and refilling services. A complete chapter is dedicated to this integration and its configurations in SAP CC.

This document contains the following main sections:

■ *Overview of the configurations and customizing for the implementation*

Overview of the different types of configurations including data customization, system configuration, and master data configuration

■ *Configuration of the technical features*

Settings of the Core Server for licenses and SAP CC users

■ *Configuration of the business features*

Settings of the Core Server for business features and key functions, master data including the management of input and output of transactional data, currency, and tax management

■ *Configuration of the Master Data for a service provider*

Settings of the master data included in the catalogs of the service provider

■ *Configuration of the master data for the end customers*

Settings of the master data from the end customers of the service provider

■ *Configuration used for the integrated SAP Solution scenario with SAP CRM and SAP ERP/FI-CA*

Settings of the master data and systems for the scenarios: *Consume-To-Cash in High-Volume Business* and *Sales & Order Management in Call Center*

■ *Configuration of the user interfaces*

Settings for all the tools (Core Tool, BART Tool, CAT Tool)

■ *Configuration of the BART Server system*

Settings of the BART Server for the CDR acquisition, rating and charging sessions, and jobs

■ *Configuration of the Diameter Server system*

Settings of the Diameter Server for the service dictionary and the AVP dictionary

■ *Configuration of an Import/Export Connector (IEC) application*

Settings for scenarios

What's New in This Document

This section highlights the main changes in this *SAP product document*. They relate both to new or changed features in the SAP Convergent Charging 5.0 software deliveries and to documentation enhancements to enrich your SAP user experience continuously.

What's New in SP 0

As of [SP 0](#), consider the following topics in your document:

- Configuration of the new user interface Convergent Charging Cockpit, page [\[393\]](#)

Document Abbreviations

The table below shows the list of abbreviations used throughout this document.

Abbreviation	Meaning
AVP	Attribute-Value Pair
BIT	Billable Item (SAP Convergent Invoicing)
BART	SAP CC Batch Acquisition and Rating Toolset
CAT	Connector Administration Tool
CA APM	CA Application Performance Monitoring
CC	SAP Convergent Charging (SAP CC)
CCCIT	Convergent Charging Charged Item <i>See the chapter about the configuration for SAP CI [page 277]</i>
CCA	Credit-Control Answer
CCR	Credit-Control Request
CDR	Consumption Detail Record (SAP CC BART Sever)
CI	SAP Convergent Invoicing (in SAP ERP/FI-CA) <i>See the chapter about the configuration for SAP CI [page 277]</i>
CIF	Charging output Integration Framework <i>See the chapter about the configuration of the transaction persistency [page 255]</i>
CIT	Charged Item
CMA	Customer Management Area <i>The management are of end customers</i>
CTS	Change and Transport System
EIF	Exportable item Integration Framework
GC	Garbage Collection
GUI	Graphical User Interface
HA	High Availability
HCI	HTTP Communication Interface
HTTP	HyperText Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
IEC	SAP CC Import/Export Connector
JCo	SAP Java Connector
JKS	Java Key Store
JRE	Java Runtime Environment
JVM	Java Virtual Machine (JRE)

Abbreviation	Meaning
MB	Mega Bytes (different from Mb: mega bit)
MS	Microsoft Windows
MSCC	Multiple Services Credit-Control
PSE	Personal Security Environment
RDBMS	Relational Database Management System
RIF	Rerating Integration Framework
SNC	Secure Network Communications
SDK	Software Development Kit <i>SAP CC 5.0 provides several kits including API libraries.</i>
SID	SAP system ID (see also: SYST_ID)
SLD	System Landscape Directory (of SAP Netweaver)
SMD Agent	Solution Manager Diagnostics Agent <i>The Diagnostics Agent of SAP Solution Manager</i>
TIF	Transaction Integration Framework <i>See the chapter about the configuration of the transaction persistency [page 255]</i>
UI	User Interface
URL	Uniform Resource Locator
VAT	Value Added Tax
WS	Web Services
WSDL	Web Services Description Language
XML	eXtended Markup Language
XSD	XML Schema Definition

2 Before You Start

Fundamental User Assistance and Guides

SAP is the thought leader in providing people with the knowledge they need to deploy and use software successfully. Our user assistance is a seamless part of the attractive, simple, and enjoyable experience of using SAP software.

We assist you, before you even know you need help.

For a complete list of the available technical guides, application help, primary help, or other *product documentation* related to SAP Convergent Charging 5.0, see in SAP Help Portal at the following location: ► <https://help.sap.com/cc50> ◀.

Primary Help	Application Help
SAP CC Admin+ SAP CC BART+ SAP CC BART Setup Tool SAP CC BART Tool SAP CC CAT Tool SAP CC Cockpit SAP CC Config Tool SAP CC Core Tool SAP CC HTTP Client SAP CC Import/Export Connector (IEC) SAP CC Message Client SAP CC Setup Tool	SAP CC Application Help ■ Scope and Feature Description ■ Architecture ■ Master Data ● Pricing catalog of the digital service ● Customer Master Data ■ Processes and Functions
Guides	References
SAP CC Configuration Guide SAP CC Installation Guide SAP CC Master Guide SAP CC Operations Guide SAP CC Release and Information Note (RIN) SAP CC Security Guide SAP CC Sizing Guidelines SAP CC Tuning Guide SAP CC Transition Guide (Offline Charging in SAP CI) SAP CC Upgrade Guide	SAP CC Database References SAP CC Error Code Reference SAP CC Java/XML API References SAP CC Log Message Reference and Error Troubleshooting SAP CC Metric Reference and Performance Troubleshooting SAP CC Notification Reference SAP CC System Parameter Reference SAP CC Web Services Documentation

Product Documentation Set

The documentation set of [SAP Convergent Charging 5.0](#) includes the following SAP product documents:

[Admin+](#)
[Application Help](#)
[BART+](#)
[BART Setup Tool](#)
[BART Tool](#)
[CAT Tool](#)
[Cockpit](#)
[Config Tool](#)
[Configuration Guide](#)
[Core Tool](#)
[Logic Component Reference](#)
[Database References \(Core Database, BART Database, Session Database, IEC Database\)](#)
[Error Code Reference](#)
[HTTP Client](#)
[Import/Export Connector \(IEC\)](#)
[Installation Guide](#)
[Java/XML API References \(Core Library, BART Library, IEC Library\)](#)
[Log Message Reference and Error Troubleshooting](#)
[Master Guide](#)
[Message Client](#)
[Metric Reference and Performance Troubleshooting](#)
[Notification Reference](#)
[Operations Guide](#)
[Release Information Note \(RIN\) of SAP CC 5.0](#)
[Release Restriction Note of SAP CC 5.0](#)
[Security Guide](#)
[Setup Tool](#)
[Sizing Guidelines](#)
[System Parameter Reference](#)
[Technical Implementation of SAP CC 5.0 SP 0](#)
[Transition Guide \(Offline Charging in SAP CI\)](#)
[Tuning Guide](#)
[Upgrade Guide](#)
[Web Services Documentation](#)
[What's New in SAP CC SP 0](#)



Master Guides

SAP CC 5.0 Master Guide

You can find the latest version of the relevant *Master Guide* documentation in SAP Help Portal at the following location: ► <https://help.sap.com/cc50> → *Getting Started Information* ◀.



Getting Started

SAP for Telecommunications Master Guide

You can find the latest version of the *Master Guide - SAP for Telecommunications* based on the SAP Business Suite 7i2016 in SAP Help Portal at the following location: ► <https://help.sap.com> → *Industry Solutions* → *Industry Solution Guides* → [SAP for Telecommunications](#) ◀.

Configuration Guides (Integrated Solution Scenario)

When implementing an end-to-end solution scenario with SAP CRM and SAP ERP/FI-CA, you need to be aware of how to configure and customize these components:

- The *Integration Guide for the Order-to-Cash End-to-End Process* is the central starting point for this integrated scenario. It gives an overview of the scenario and guides you through the configuration activities. You can find the latest version of the guide on SAP Service Marketplace at: ► <http://service.sap.com/brim> → Resources ◀. Make sure you have the latest version of these documents:
 - *Integration Guide for Offer-to-Cash (BS 7i2016)*
 - *Integration Guide for Offer-to-Cash (S/4HANA On-Premise Editions 1511 and 1610)*
- For more information about the relevant configurations for SAP CRM, consult:
 - The *Configuration Guide for SAP CRM 7.0 EhP4* available for the *SAP for Telecommunications* business scenario *Sales and Order Management*
 - The guide *Common Object Layer for SAP Business Suite*



NOTE

This documentation is available in SAP Solution Manager at: ► *Solutions/Applications* → *SAP For Telecommunications* → *Scenarios* → *Sales and Order Management in Call Center* → *Configuration* ◀.

- For more information about the relevant configurations for SAP ERP and SAP ERP/FI-CA, consult:
 - *Financial Customer Care and Dispute Management*



NOTE

This documentation is available in SAP Solution Manager at: ► *Solutions/Applications* → *Cross Industry Scenarios* → *Scenarios* → *Consume to Cash in High Volume Business* → *Configuration* ◀.

- For more information about the relevant configurations for SAP Convergent Charging 5.0, consult the chapter dedicated to this integrated end-to-end scenario: [Configuration with the Integrated Scenarios C2C and O2C](#) on page [277].

Global Definitions

SAP Application

An SAP application is an SAP software solution that serves a specific business area like ERP, CRM, PLM, SRM, SCM, and CC.

Business Scenario

From a microeconomic perspective, a business scenario is a cycle which consists of several different interconnected logical processes in time. Typically, a business scenario includes several company departments and involves other business partners. From a technical point of view, a business scenario needs at least one SAP application (SAP ERP, SAP SCM, or others) for each cycle and perhaps other third party systems. A business scenario is a unit which can be implemented separately and reflects the customer's prospective course of business.

Component

A component is the smallest individual unit considered within the Solution Development Lifecycle. Components are separately produced, delivered, installed, and maintained.

Business Scenario

Convergent Charging

Purpose

Implementing the *Convergent Charging* business scenario, you can charge:

- Different kinds of services such as Telecommunications, Banking, High-tech and so on
- Different types of customers (individual, families, companies, and so on) using any form or combination of payment methods such as prepaid, postpaid, or both

Convergent Charging runs on a single system with a single customer base and uses a single set of processes, interfaces, and operational procedures. With a low TCO, the SAP CC system enables you to manage all your customers and services.

Convergent Charging provides real-time credit control for prepaid accounts so that you can:

- Control services and manage prepaid balances in real time by checking balances before delivering services to the end customer
- Notify the customer when a balance threshold is reached
- Terminate the service session when the balance is depleted

Convergent Charging also provides refill management functions that enable your end customers to credit their prepaid accounts manually or automatically.

Convergent Charging does not manage customer postpaid accounts internally but enables you to refer to postpaid accounts stored in an external billing system. At the time of charging, *Convergent Charging* generates data items, and then forwards them to a billing system such as SAP ERP, where the customer invoice is created (see SAP Convergent Invoicing in SAP ERP/FI-CA).

The *business processes* available in SAP CC are:

- [Processing Refilling](#), see page [30]
- [Processing Charging](#), see page [32]



NOTE

The business process *Processing Refilling* is only available for the end customers who hold a prepaid account in the customer master data.

In a *solution scenario* with SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, the following business processes are available in SAP CC:

- Creating Billable Items
- Creating Consumption Items

Variants

You can implement different variants of this business scenario depending on your business requirements and environment.

Online Charging

Description	Real-Time	Functions	Performances
The SAP CC system processes in real time mass incoming chargeable items sent by a third-party client application or system. The chargeable items result from current customer service usage. The downstream system is permanently connected to SAP CC.	Real-Time Charging: ■ Stateful ■ Stateless ■ Event-Based ■ Session-Based Environment: ■ Prepaid and postpaid	Credit Control Credit Reservation Reservation Renewal Diameter Support Policy Control for Telecommunications industry Account and Balance Management (ABM)	High Volume High Throughput High Availability

Offline Charging

Description	Real-Time	Functions	Performances
The SAP CC system processes in batch mass incoming chargeable items sent by a third-party client application or system. The consumption detail records (CDR) or the chargeable items result mainly from past customer service usage. The downstream system connects to SAP CC when necessary.	Stateful Event-Based Batch Charging Rerating with BART Rerating with SAP CI Environment: ■ Postpaid		

Business Processes

Processing Refilling

Purpose

You use this *business process* to refill the prepaid accounts for your customers. Also known as a top-up process in the telecommunications sector, this process credits the prepaid account for a customer. A credit is usually a monetary amount but can also include a quantity of services, such as 100 SMS, 20 MB of data, for example. The customer can use the credit to purchase goods or services (see the process Processing Charging).

This business process refills a prepaid account:

- **Manually:** The customer refills their prepaid account directly by using different points of services (ATM, call center, or website) to transfer a credit from a refill card, a bank account, or a prepaid account to their prepaid account.
- **Automatically:** The system triggers the refills automatically for the customer. The system can trigger a refill either periodically or when the prepaid account balance goes below a threshold defined by the customer.

When a customer requests a manual refill, the application that manages it (for example, a Voucher Management System) sends a refill item to the system. To define the refill, the refill item includes some properties, such as its origin (point of service) or associated gifts. After processing the refill item, the system generates a refill record.

The system triggers automatic refills internally and also generates some refill records.

Prerequisites

To use this business process, you first need to enter master data such as:

- Refill plans combined in a CRM application
- Subscriber account with a prepaid account
- Provider contract that refers to both a refill plan and a prepaid account

Refill plans can be created for the system from the user interface. Subscriber accounts, prepaid accounts, and provider contracts are created from a CRM application such as SAP CRM.

Process Flow

The following *business process* runs in SAP CC as follows:

Sequence	Step	Description
1	Receive a refill item	The system receives a refill item through APIs. This refill item refers to a prepaid account that is known to the system.
2	Guide the refill item	The system retrieves the unique refill plan activated in a provider contract for the customer and that refers to the prepaid account to be refilled.
3	Execute the refill logic	The system executes the refill plan logic, computes the credit to add to the prepaid account, and updates the prepaid balance and the counters of the related services accordingly.
4	Generate refill records	The system generates refill records and stores them in files. Refill records are configurable and can include: ■ Refill plan characteristics (for example, the identifier of the refill plan executed) ■ Provider contract data ■ Origin of the refill (for example, one-time, periodic, or voucher) ■ Properties of the refill item ■ Computed properties (for example, the added credit per service) ■ Prepaid account information (for example, the balance or the state of the prepaid account)



NOTE

Steps 1 and 2 are not required for automatic refills.

Result

This *business process* uses a prepaid channel to generate the refill record files. These files can be converted and loaded in SAP Convergent Invoicing in SAP ERP/FI-CA (see the business process *Creating Billable Items*).

Processing Charging

Purpose

You use this *business process* to charge customers for usage events that come from network elements (for example, SCP, GGSN, and MMSC) or from application servers. Examples of usage events are a ringtone download, the sending of an SMS, or a voice call.

When an end customer uses a service, the network element or application that delivers it sends chargeable items to the system. Once the system has processed the chargeable items, it generates charged items.

In this business process, a network element or an application can interact with the system to:

- Deliver a service and send a chargeable item to the system. If the service delivery fails, the chargeable item is not sent. However, the system can reject the chargeable item even if the service delivery succeeds.
- Send a chargeable item before delivering a service. This avoids the chargeable item being rejected but requires the service delivery to be successful. A prerequisite for this is that the quantity of service used is known before the delivery, which is not the case for session-based services such as voice calls, or GPRS sessions.
- Send a chargeable item and request credit authorization. If the service is delivered, the credit is deducted from the account balance; otherwise, the reserved credit is refunded.

This business process also provides a credit reservation management function when credit authorization is requested.

Prerequisites

To use this *business process*, you first need to enter master data such as:

- Charge plans for your services, which are combined in a CRM application
- Subscriber accounts including prepaid accounts and external postpaid accounts
- Provider contracts that refer to both charge plans and accounts

Charge plans can be created for the system from the user interface. Subscriber accounts and contracts are usually created from a CRM application such as SAP CRM.

Process Flow

The business process runs in SAP CC 5.0 as follows:

Sequence	Step	Description
1	Receive a chargeable item	
2	Guide the chargeable item	The subscriber account is located by using the technical identifiers of the subscriber (e-mail address, IMSI, MSISDN, and URI SIP) which are part of the chargeable item. The charge plan to be applied is also retrieved according to the service used and the provider contract of the customer.
3	Execute the charge plan	The system executes the charge plan to select the correct tariff based on the properties of the usage item or subscriber data. The chargeable item is then rated to calculate a monetary amount. The charge plan also identifies the account to be charged. Depending on the charging request type, the monetary amount can be either debited from the account or simply reserved for authorization.
4	Generate charged items	The system generates charged items and stores them in files. Charged items are configurable, and they can include: ■ Charge plan characteristics ■ Properties that come from the chargeable item ■ Properties computed by the rating and the charging processes ■ Provider contract data (for example, the identifier of the charge plan applied) ■ Account information

Result

This business process uses a prepaid channel and a postpaid channel to generate charged item files. These files can be converted and loaded into the billing system.

Variants (Online Charging)

In prepaid and postpaid environment, you can implement different variants of this business process depending on your business requirements:

Process Variant	Usage Information (Real-Time)	Credit Control	Credit Reservation	Reservation Renewal
Session-Based Charging <i>Multiservice</i>	Session	Yes	Yes <i>Partial reservation management</i>	Yes <i>Full reservation</i> <i>Partial reservation management</i>
Session-Based Charging with SAP CM by DigitalRoute	Session	Yes	Yes	Yes
Session-Based Charging with Diameter	Session	Yes	Yes	No
Event-Based Charging with Credit Control	Event	Yes <i>Prepaid environment</i>	Yes <i>No cancellation</i>	No
Event-Based Charging without Credit Control	Event	No <i>Immediate charging (direct debiting)</i>	N/A	No
Stateless Rating	Event	Not in CC	No	No

Variants (Offline Charging)

In postpaid environment, you can implement different variants of this business process depending on your business requirements:

Process Variant	Usage Information	Credit Control	Credit Reservation
Batch Charging	Past Event	No	Yes

**NOTE**

Consider *Rerating with BART* and *Rerating with SAP CI*.

Creating Billable Items

Purpose

You use this *business process* to create billable items from either the charged items (prepaid and postpaid) generated by the charging process or the refill records generated by the refilling process.

The system converts charged items and refill records into billable items, and sends them to Convergent Invoicing in SAP ERP/FI-CA.

You can configure the way in which charged items and refill records are mapped onto billable items. However, some of the fields in a billable item are mandatory. The account identifier is for example used to link the billable item to an account in SAP ERP/FI-CA.

**NOTE**

This business process is only relevant for a *solution scenario* with SAP CRM and SAP ERP/FI-CA components of SAP Business Suite. It is interfaced with the business processes of the *Convergent Invoicing* business scenario.

Prerequisites

To use this *business process*, you first need to set up the billable item mapping for the charging and refilling processes in the system.

Process Flow

The business process runs in SAP CC 5.0 as follows:

Sequence	Step	Description
1	Convert charged items and refill records	The system periodically reads charged items and refill records from files in both the postpaid and prepaid channels. Charged items and refill records are then converted into billable items according to how they are mapped.
2	Send billable items	The system sends billable items to the billing and invoicing functions in SAP ERP/FI-CA.

Result

Convergent Billing is the follow-on business process in SAP Convergent Invoicing.

Creating Consumption Items

Purpose

You use this *business process* to create consumption items from the chargeable items generated by the charging process. Basically, the system converts chargeable items into consumption items and sends them to SAP Convergent Invoicing in SAP ERP/FI-CA.

You can configure the way to map chargeable items onto consumption items. However, it is usually a one-to-one mapping that enables to reverse the mapping in the case of deferred rating, rerating or invoice correction.



NOTE

This business process is only relevant for a *solution scenario* with SAP CRM and SAP ERP/FI-CA components of SAP Business Suite. It is interfaced with the business processes of the *Convergent Invoicing* business scenario.

Prerequisites

To use this *business process*, you first need to set up the consumption item mapping for the charging process in the system.

Process

The following *business process* runs in SAP CC as follows:

Sequence	Step	Description
1	Convert chargeable items	The system periodically reads chargeable items from files generated by the charging process. Chargeable items are then converted into consumption items according to their mapping.
2	Send consumption items	The system sends consumption items to SAP Convergent Invoicing in SAP ERP/FI-CA.

Result

The follow-on business process can be:

- Triggering rating in SAP Convergent Invoicing (in the case of a deferred rating)
- Triggering rerating in SAP Convergent Invoicing
- Executing Billing and Invoicing Correction

Rerating with BART Server

Purpose

You can use this *business process* to fix billing and pricing errors. You correct the consumption detail records or the pricing logic and you re-charge these service consumptions. Re-invoicing and re-billing is triggered.

Process Flow

The business process runs in SAP CC 5.0 as follows:

Sequence	Step	Component
0	Correct pricing errors	SAP CC Core Tool
1	Correct errors	SAP CC BART Server
2	Trigger rerating operations	SAP CC Core Tool
3	Re-inject service usage	SAP CC BART Server

Sequence	Step	Component
4	Re-charge service usage	SAP CC Core Server
5	Re-invoice	Third-Party Billing or Invoicing System

Variant

You can implement the *Rerating with SAP CI* process variant.

Rerating with SAP CI

Purpose

You can use this *business process* to receive and process rerating requests in SAP Convergent Invoicing. You use rerating requests to schedule rerating activities in SAP Convergent Charging and SAP Convergent Invoicing.

Process Flow

The business process runs in SAP CC 5.0 and in SAP Convergent Invoicing as follows:

Sequence	Step	Component
0	Trigger rerating operations	SAP CC
1	Receive rerating requests	SAP Convergent Invoicing (SAP CI) in SAP ERP
2	Process rerating requests	SAP CI
3	Monitor rerating requests	SAP CI



NOTE

For more information on this business process, consult the documentation of SAP Convergent Invoicing in SAP ERP/FI-CA component of SAP Business Suite.

Key Functions of SAP CC 5.0

The business processes are implemented by the following functions:

Key Function Name	Process Variants		SAP CC Software Unit
	Offline Charging	Online Charging	
	Postpaid	Postpaid Prepaid	
Usage Acquisition and Collection Functions			
CDR Acquisition and Consolidation			BART Server
Credit Control Messages Conversion			Diameter Server
Chargeable Item Collection			Core Server
Refill Item Collection		Prepaid only	Core Server
Rating, Charging, Rerating and Refilling Functions			
Usage Rating and Subscriber Account Charging			Core Server
Session-based Rating and Charging			Core Server
Refilling		Prepaid only	
Activation			Core Server
Rerating (with BART)			Core Server, BART Server
Rerating (with SAP CI)			Core Server, SAP CI in SAP ER/FI-CA
Stateless Usage Rating			Core Server
Inverse Rating (deprecated)			Core Server
Prerating and Postrating (deprecated)			Core Server

Key Function Name	Process Variants		SAP CC Software Unit
	Offline Charging	Online Charging	
	Postpaid	Postpaid Prepaid	
Output Data Record Management			
Charged Transaction Persistency			Core Server
Charged Item Generation			Core Server
Refill Record Generation			Core Server
Charged Item or Refill Record Bulk Loading (*)			Core Server
Master Data Management			
Service Provider Pricing Catalog Configuration			Core Server
Customer Data Provisioning			Core Server

Consult the [SAP CC 5.0 Application Help documentation](#) for more information about these processes, see page [51].



NOTE (*)

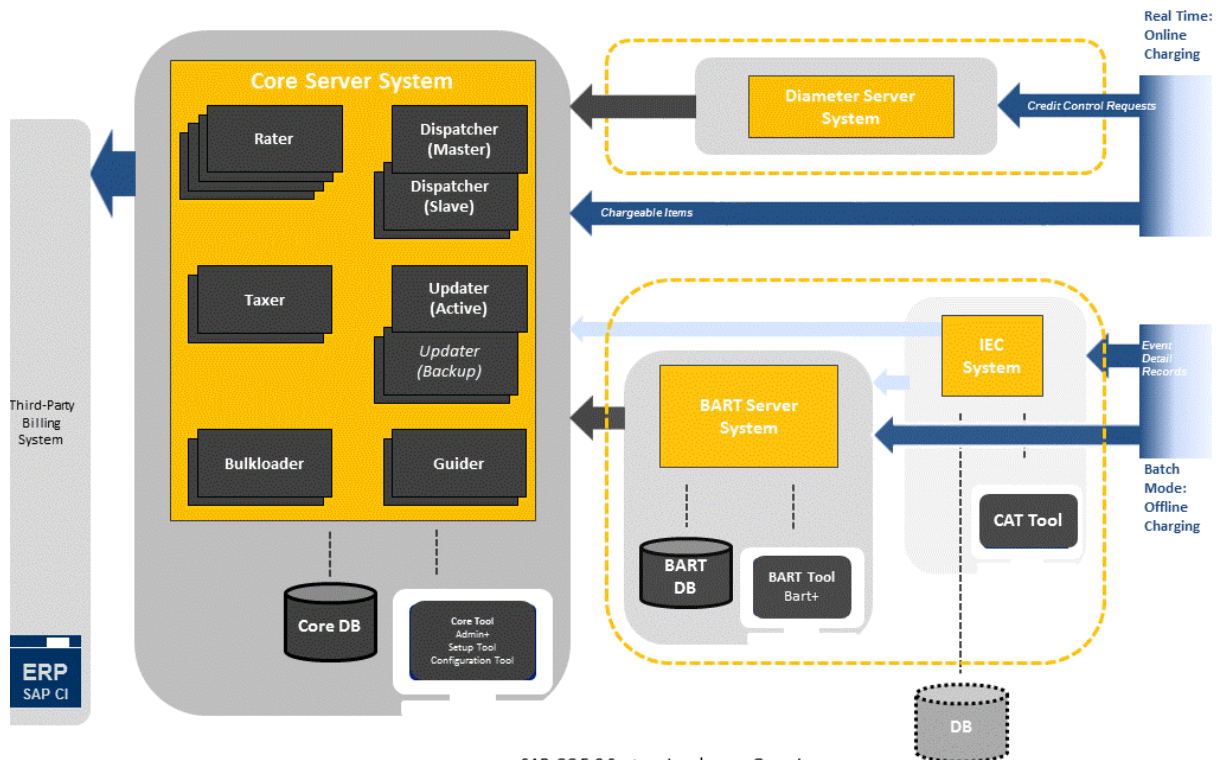
Only available in an integrated *SAP Solution* scenario with SAP ERP/FI-CA component of SAP Business Suite.

Technical System Landscape

The following SAP product version and instance is mandatory for the implementation of SAP Convergent Charging software:

SAP CC 5.0 Software Component Instance - Applications	Optional
Core Server <i>Core Server system</i> <i>Admin+</i> <i>Setup Tool</i> <i>Configuration Tool</i>	Mandatory
Core SDK <i>Java libraries</i>	X <i>This component is recommended for sending usage events to be charged to the Core Server from a Java based application. It is also used for the provisioning services.</i>
Core Tool <i>Core Tool</i> <i>Admin+</i>	Mandatory for configuring the Core Server
Cockpit	
BART Server <i>BART Server system</i> <i>BART+</i> <i>BART Setup Tool</i>	X <i>These components are recommended for providing batch mode rating and charging services to your network element or application.</i>
BART SDK <i>Java libraries</i>	
BART Tool <i>BART Tool</i> <i>BART+</i>	
Diameter Server <i>Diameter Server</i>	X <i>This component is mandatory for providing real time credit control services (via diameter protocol) to your network element or application.</i>
IEC <i>Import/Export Connector</i>	X <i>These components may be used with BART components for the offline charging services</i>
IEC Tool <i>CAT Tool (Communication Administration Tool)</i>	

Consult the *Master Guide* for the software component matrix to know which software components to use for your business scenario.



SAP CC 5.0 System Landscape Overview

Starting and Stopping the Server Systems

The same procedure is available for all the server systems of SAP Convergent Charging:

- Core Server
- BART Server
- Diameter Server

MS Windows

The SAP Management Console (sapmmc) was installed during the installation of SAP CC 5.0. It enables you to see all your SAP systems and to manage them.

To start a server system of SAP CC:

- Double-click the icon on your computer desktop to start the SAP Management Console
- Click the SAP system containing the server system you want to start
- Right-click the system instance or the SAP CC system you want to start, and then choose *Start*

Use the same procedure to stop the server systems of SAP CC. For the last step, right-click the instance or the server you want to stop, and then choose *Stop*.

UNIX Operating Systems

SAP Management Console (MC)

The SAP Management Console (sapmc) was installed during the SAP CC Core Server system installation. It enables you to see all your SAP systems and to manage them. It is installed in the following folders:

- /usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/servicehttp/sapmc/sapmc.html
- /usr/sap/<SID>/<INST_NB>/exe/servicehttp/sapmc/sapmc.html (in each instance folder)

To launch this tool:

- Launch a web browser capable of running Java applications
- Open the sapmc.html file from the host

SAP Control

Use the `sapcontrol` program to start and stop the servers. This program is installed in the `/usr/sap/hostctrl/exe` directory.

Use the following options:

- **-host:** To specify on which host is the server you want to manage
- **-user:** To specify the user you want to use for managing the server (use the `sapadm` user created during the installation, for example)
- **-function:** To specify the command to apply to the server (`start`, `stop`, and so on)
- **-nr:** To specify the number of the SAP instance

Configuration and Administration Tools

SAP Convergent Charging 5.0 provides multiple user interfaces to configure and administer your SAP CC systems.



NOTE

For more information, refer to the [primary help](#) of these SAP CC user interfaces, see page [21].

Admin+

SAP CC Admin+ is a console program that allows you to manage local or remote instances of the SAP CC Core Server system and changes their parameters. This user interface is included in the SAP CC Core Tool software unit.

The main functions of Admin+ allow you to:

- Get the list and details about the known instances of the server (see command: `list`)
- Get server properties (see command: `get`)
- Set server properties (immediate temporary changes or permanent changes)
- Manage batch rating groups
- Reset cache, SQL connections, and user work sessions

The changes are not immediate and some instances of the SAP CC Core Server must be restarted manually.

For more information about the commands and user tasks, consult the primary help of the Admin+ user interface, page [21].



NOTE

Do not use the Admin+ user interface to stop an instance of the server system because it will be automatically restarted.

Setup Tool

SAP CC Setup Tool is a command line program that helps you manage the SAP CC Core Server system by changing its configurations directly in the Core Database (back-end database system). This user interface is included in the Core Server component.

The main functions allow you to:

- Manage the licenses – for all instances
- Manage the certificates and the key entries for secured HTTP service
- Manage the notification policy
- Manage the CIF configuration – for the rater and the bulkloader instances
- Manage the RIF configuration – for the rater instances
- Manage the SAP CI (SAP ERP / FI-CA) configuration – for the Updater instance
- Manage the SAP CI (SAP ERP / FI-CA) configuration – with the storage of consumption data in SAP CI
- Manage the VAT taxation policies
- Manage the EZTax transaction/service types

For more information about the commands and user tasks, consult the primary help of the Setup Tool user interface, page [\[21\]](#).

Cockpit

SAP CC Cockpit is a Web application based on SAP Fiori and SAP UI5. It enables the SAP CC administrators to configure the system parameters of the SAP CC Core Server systems.

For more information about the user tasks, consult the primary help of the Cockpit user interface, page [\[21\]](#).

Config Tool

SAP CC Config Tool is a command line program that helps you manage the SAP CC Core Server system by changing its configurations directly in the Core Database. This user interface is included in the Core Server software component.

The main function allows you to export and import the persistent values of all the configuration parameters of the Core Server system. The changes are not immediate and some relevant instances of the Core Server must be restarted according to your actions. If you want to change only one parameter or if you want to apply changes temporary, you can use the Admin+ user interface with the [set](#) and [get](#) commands.

You can use this tool to transport a complex configuration of the Core Server system from a development landscape to a quality assurance landscape.

Each command must be authenticated with an SAP user login and password (except for the [help](#) command).

For more information about the commands and user tasks, consult the primary help of the Config Tool user interface, page [\[21\]](#).

Core Tool

SAP CC Core Tool is a graphical user interface that helps you manage the master data of the service provider (pricing catalog) and the business data relevant for your system landscape.

If the SAP CC system is not integrated with a CRM application or a provisioning system, you can use Core Tool to manage the master data related to the end customers of the service provider.

For more information about the commands and user tasks, consult the primary help of the Core Tool user interface, page [\[21\]](#).



NOTE

You can access to the primary help from the graphical user interface when configured after its installation.

BART+

SAP CC BART+ is a console program that helps you manage the SAP CC BART Server system by changing its parameters. This user interface is included in the BART Server component.

The main functions allow you to:

- Get or set the values of the configuration parameters of the BART Server system (see `get` and `set`)
- Change immediately the log level of the BART Server system
- Monitor the acquisition sessions (see `monitor`)
- Intercept messages and redirect them to a specified file
- Ping the BART Server system

For more information about the commands and user tasks, consult the primary help of the BART+ user interface, page [\[21\]](#).

BART Setup Tool

SAP CC BART Setup Tool is a command line program that helps you manage the SAP CC BART Server system by changing its configurations directly in the BART Database (back-end database system). This user interface is included in the BART Server component. The main functions allow you to manage the certificates and the key entries used:

- During communications with the Core Server, which use both the XML over HTTP and Packets over TCP/IP channels
- During communications with client applications, which use both the XML over HTTP and Packets over TCP/IP channels

For more information about the commands and user tasks, consult the primary help of the BART Setup Tool user interface, page [\[21\]](#).

BART Tool

SAP CC BART Tool is a graphical user interface that allows you to perform offline charging operations (batch acquisition and batch charging) of service consumption when the BART Server system is in your SAP system landscape.

Available business operations:

- CDRs batch acquisition
- Batch charging pre-processing

For more information about the commands and user tasks, consult the primary help of the BART Tool user interface, page [\[21\]](#).

CAT Tool

SAP CC CAT Tool is a graphical user interface that allows you to configure scenario scripts used to customize the SAP CC Import/Export Connector (IEC) applications.

For more information about the commands and user tasks, consult the primary help of the CAT Tool user interface, page [\[21\]](#).



Important SAP Notes

SAP Note Number	Title
1647059	Integration within the Order to Cash End-to-End Process
797147	CA Wily Introscope Installation for SAP Customers ■ Implementation and installation of the different components of the CA APM Introscope (CA IS): Enterprise Manager (EM), Agent, Workstation, and WebView CA APM Introscope is the new commercial name of CA Wily IS.
1579474	Management Modules for Introscope delivered by SAP ■ Post-installation of CA IS Enterprise Manager with a package provided by SAP
1453216	CA Wily Introscope for SAP Convergent Charging ■ Extension of <i>SAP Note</i> 797147 CA APM Introscope is the new commercial name of CA Wily IS.
669669	Updating the SAP Component Repository in the SLD

Related Documentation

The following table lists where you can find more information about SAP CC 5.0 features and functions in SAP Help Portal at: <https://help.sap.com/cc50>.

Document	Location
Master Guide	Getting Started
Application Help (Secondary Help)	Application Help
Java API References (Java API Specifications)	Development
Web Services Documentation (SOAP API Specifications)	Development
Error Code Reference	Development
Sizing Guidelines	Implementation
Configuration Guide (This document)	Configuration
System Parameter Reference	Administration
Operations Guide	Operations
Log Message Reference and Error Troubleshooting	Troubleshooting
Metric Reference and Performance Troubleshooting	Troubleshooting



NOTE

You can download all the publications that are directly accessible in SAP Help Portal. You need an authorized user ID to access this information.

Additional Information

For more information about specific topics, see the quick links shown in the table below.

Content	Quick Links
Security Guides	https://service.sap.com/securityguide
Related SAP Notes	https://support.sap.com/notes
Released Platforms	https://service.sap.com/platforms
SAP Solution Manager	http://support.sap.com/solutionmanager
SAP Convergent Charging User Assistance	https://help.sap.com/cc ■ Use and remember the quick link for your main version 5.0 of SAP Convergent Charging: cc50

3 Configuration Overview

Typical Configuration Activities

Typical Configuration Activities	Description	Example
System Integration	SAP Convergent Charging is not a standalone solution. It must be interfaced with several external systems to perform its key rating and charging functions.	The relevant scopes are: ■ Usage Charging (Online and Offline) ● Mediation system ● Web Application ● Network Element ■ Billable Data Transfer and Process Synchronization ● billing system ● invoicing system ● financial system ■ Master Data Management and Provisioning ● CRM system ● Provisioning or legacy system ■ Alert, Monitoring and Reporting Functions
Customizing		
	System Customization The behavior of certain systems of SAP Convergent Charging must be customized to implement your business scenario.	Online usage acquisition
	Data Customization Certain types of data can be customized for each implementation project after the initial installation. This data are not the master data. SAP Convergent Charging provides always default sets of data.	Public holidays, tax rates, VAT rules
Configuring		
	System Configuration	■ Technical settings:

Typical Configuration Activities	Description	Example
	Some configurations are managed at system level and include two types of settings: ■ Technical settings are not related to a business function or have no specific sense for a business function ■ Business settings are related to a business function of the system	● number of output channels ● licensing ● user management ■ Business settings:
	Master Data Configuration Key business data must be created in SAP Convergent Charging: ■ Charging data for the service provider ■ Charging data for each customer	

Key Implementation Activities

The key activities for implementing SAP Convergent Charging in your system landscape include:

- Standard Deployment
- Solution Deployment with SAP CRM and SAP ERP

Standard Deployment

The following project implementation scenarios may be scheduled for implementing SAP Convergent Charging 5.0 in your SAP system landscape:

Key Implementation Scope	Scope of the Implementation	
Usage Charging (Online and Offline)	The data records resulting from the usage and the consumption of a marketable service of a service provider must be acquired by SAP Convergent Charging from mediation systems or application servers. There are two main variants depending on the business requirements: ■ Online charging (real-time, prepaid and postpaid environments) with credit control and top-up features ■ Offline charging (batch processing, postpaid environment) This also includes the collection of refill requests.	Input Data
Billable Data Transfer and Process Synchronization	The data records resulting from the rating, charging, and refilling functions performed by SAP Convergent Charging must be taken into account by an external billing system	Output Data
Master Data Management and Provisioning	A CRM or an external provisioning system must combine charging data related to a service provider A CRM or an external provisioning system must create and maintain charging data related to the customers of a marketable service	Master Data Creation and Exchange
Alert, Monitoring and Reporting Functions		Output Data

Solution Deployment with SAP CRM and SAP ERP

When SAP Convergent Charging is integrated with SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, all the relevant implementations are provided by default as part of the integration between these components.

You need only to implement the Usage Acquisition and Collection process, customize, and configure the other processes:

Key Implementation Scope	Description	Default Integration
Usage Charging (Online and Offline)	The data records resulting from the usage and the consumption of a marketable service from a service provider must be acquired by SAP Convergent Charging from mediation systems or application servers In this end-to-end scenario, the refill request management is available by default There are two main variants depending on the business requirements: ■ Online charging (real-time, prepaid and postpaid environments) with credit control and top-up features ■ Offline charging (batch processing, postpaid environment)	No <i>(only for the refill management)</i>
Billable Data Transfer and Process Synchronization	Billable Items (BIT) are massively transmitted to SAP Convergent Invoicing in the SAP ERP system as the results of the charging, re-charging, and refilling functions	Yes
Master Data Management and Provisioning	The SAP CRM and SAP ERP systems can create and maintain relevant master data in SAP Convergent Charging	Yes
Alert, Monitoring and Reporting Functions	Notifications are transmitted to the SAP CRM and the SAP ERP/FI-CA systems	Yes

For more information, see the chapter dedicated to the customizing and configuration, [Configuration with the Integrated Scenarios C2C and O2C](#), on page [277].

Transport Management

You can manually transport the configurations by using the following tools of SAP Convergent Charging 5.0 from a development landscape to a test landscape and to the final production landscape:

Configurations	Tool	Description
System Customization		You need to transport the Java binaries between two landscapes from your developments. The transport tools depend on the development environment of the SAP client.
Data Customization	Core Tool	You can export and import customized data stored in files between two system landscapes.
System Configuration	Admin+	
Master Data Configuration	Core Tool	Between two landscapes, you can export master data stored in files and related to a service provider (pricing catalog). Note that customer master data (subscriber accounts, subscriptions, and provider contracts) is out of scope of the transport concept.

Activities of the Implementation Project

Implementation of the Online or Offline Charging Services

Depending on your business requirements en environemnts (prepaid or postpaid, real time or batch), you can implement the following business services in your system landscape:

Business Services	Description	Configuration
Online Charging	The data records resulting from the usage and the consumption of a marketable service of a service provider must be acquired by SAP Convergent Charging from mediation systems or application servers Different variants are available: ■ Event-based charging with or without credit control ■ Session-based charging ■ Session-based charging with SAP Convergent Mediation by DigitalRoute ■ Session-based charging with Diameter Server ■ Stateless rating	The implementation is a Java development and system configurations of the Core Server
	The data records resulting from the usage and the consumption of a marketable service of a service provider are available via a technical interface based on Diameter protocol. SAP Convergent Charging includes a system to acquire data from the related channel (Diameter Server).	The implementation is mostly a modeling of the Service Dictionary and of the AVP Dictionary used by the Diameter Server See page [454]
Offline Charging	Billable Items (BIT) are massively transmitted to SAP Convergent Invoicing in the SAP ERP system as the results of the rating, charging, rerating, and refilling functions Different variants are available: ■ Offline acquisition from connected system ■ Offline acquisition from repository (file, database)	Depends on the following variants: ■ The implementation is a Java development and system configurations of the BART Server ■ System configurations of the BART Server and of the IEC See page [410]

**NOTE**

Consult first the *SAP CC Application Help* for more information about the concepts and processes.

Implement the Multiservice Session-Based Charging

Refer to the Java API Reference.

Implement the reservation renewal function

- Determine the function options that are relevant for your business requirements; See the *Session-Based Charging* section in this document for more details about the system settings (technical and business features)
- Enable and configure the function and subfunctions in the system
- Develop your Java Application; you can develop a charging application and a notification application. See the *Java API Reference*.
- Test the implemented function and subfunctions
- Tune the RENEW_RESERVATION_RESEND_THREAD_COUNT system parameter

Customizing

- Tune the TRANSACTIONS_TO_CANCEL_IN_RESULT_ENABLED system parameter

Implementing the Session-Based Charging with SAP CM by DigitalRoute

SAP Convergent Charging 5.0 is integrated with SAP Convergent Mediation by DigitalRoute.

Refer to the previous section.

**NOTE**

Consult first the *SAP CC Application Help* for more information about the concepts and processes.

Consult the *product documentation* of SAP Convergent Mediation by DigitalRoute.

Implementing the Session-Based Charging with Diameter Server

**NOTE**

Consult first the *SAP CC Application Help* for more information about the concepts and processes relating to SAP CC Diameter Server.

Implementing the Event-Based Charging with Credit Control

Refer to the Java API Reference.

Implementing the Event-Based Charging without Credit Control (Immediate Charging)

Refer to the Java API Reference.

Implementing the Event-Based Batch Charging (Offline Charging Services)

To implement offline charging services in your system landscape, SAP CC provides you with the following implementation scenarios:

- Implement the BART Server component
 - Implement the CDR batch acquisition
 - Customize the batch charging
- Implement the direct acquisition of chargeable items in the Core Server component. Refer to the Java API Reference.

Advanced: Implementing the Spending Status Monitoring

Refer to the Java API Reference.

Implement the spending status monitoring feature

Components:

- Policy or monitoring system (or a connector application)
- CRM or provisioning system
- SAP CC 5.0

Customizing

- Determine the function options that are relevant for your business requirements; See the *Session-Based Charging* section in this document for more details about the system settings (technical and business features)
- Enable and configure the function and subfunctions in the system
- Develop your Java Application; you can develop a policy or monitoring application or a connector application between these systems. See the *Java API Reference*.
- Test the implemented function and subfunctions
- Tune the RENEW_RESERVATION_RESEND_THREAD_COUNT system parameter

List of Implementation Activities

The following activities may be scheduled for integrating SAP Convergent Charging 5.0 in your system landscape:

Software Component	Implementation Tasks	Development	Integrated Scenario (*)
Core Server	Determining the sizes of the data caches	-	
	Implementing the notification handler	Integration Java technology	N/R
	Implementing the Chargeable Item Acquisition (Offline Charging)	Integration Java technology	Relevant
	Implementing the Refill Item Collection	Integration Web Services	N/R <i>Available by default</i>
	Pricing and Modeling of charging master data for the Service Provider	Data configuration	Relevant
	Implementing the Customer Master Data Provisioning (Subscriber Accounts)	Integration Web Services or Java technology	N/R
	Implementing the Customer Master Data Provisioning (Provider Contracts)	Integration Web Services	N/R <i>Available by default</i>
	Implementing the Customer Master Data Provisioning (Subscription and Accesses)	Integration Java technology	N/A
	Setting up the default field mapping between CIT and BIT	System configuration	Relevant

Software Component	Implementation Tasks	Development	Integrated Scenario (*)
	Implementing the rating function	Integration Java or other technology	N/R <i>Available by default</i>
	Determining the purge schedule for idempotent services	Integration Web Services	Relevant
BART Server	Acquiring CDRs for offline charging	Integration Java technology	
	Implementing the supervision function		
Diameter Server	Setting up the Service Dictionary	System configuration	
	Setting up the AVP Dictionary	System configuration	
IEC	Implementing the Java Classes for adding functions	Yes	
All Server Systems	Implementing the logging and tracing in an external monitoring system		

All these tasks are described in this document.



NOTE (*)

When SAP CC is integrated with SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, most of the implementation activities are not relevant.

Data Customization Activities

The following table lists the data customization activities that you can perform after installing your landscape. *SAPInst* applies the relevant settings according to the options selected during the installation.

Customized Data	Configuration Tool	Procedure	Condition for a Development Landscape	Quality Assurance or Production Landscape
SAP Users	Core Tool	[94]	Mandatory	Mandatory
Public Holidays	Core Tool	[156]	Not relevant <i>The default settings are enough</i>	Mandatory
ISO Currencies	Core Tool	[206]	Not relevant <i>The default settings are enough</i>	Mandatory
SAP Currencies (*)	Core Tool	[344]	Not relevant <i>The default settings are enough</i>	Mandatory
VAT Tax Rates	Setup Tool	[196]	Not relevant <i>The default settings are enough</i>	Mandatory
VAT Rules	Setup Tool		Not relevant <i>The default settings are enough</i>	Mandatory to support VAT2010 standard
EZTax (Tax Rates)	Setup Tool	[196]	Not relevant <i>The default settings are enough</i>	Mandatory if the US taxes are managed on the landscape



NOTE (*)

Customizing certain data is only relevant in an integrated scenario including the SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite.

4 Core Server Configuration of the Technical Features

This chapter lists the system configurations of the SAP CC 5.0 Core Server system.



NOTE

The SAP CC 5.0 Core Server system checks the consistency of the system parameters at startup. Before to change the value of a system parameter, verify the constraints that apply. Consult the *System Parameter Reference* documentation for detailed information, see page [\[51\]](#).

Startup Configuration File

The SAP CC 5.0 Core Server system uses startup configuration files (jstart.config) to initiate the startup of each system instance. These files are stored in the *SAP Profile Folder* in the *Central Repository* of an SAP system.



NOTE

The [Setup Tool](#) and [Config Tool](#) user interfaces use a local version of this file.

You can configure the following settings in a startup configuration file:

Entry Key	Entry	Description
<code>.javaParameters</code>	Options for the Java Virtual Machine (JVM)	The value of this entry includes all the JVM options that are used by the Java Runtime Environment to execute an SAP CC instance. Each JVM option has the same prefix: “-D” or “-X”
<code>.classPath</code>	Class Path of Customized Function	If a TIF is customized and includes new java classes.
<code>.libPath</code>	Library Path of Customized Function	You can customize this entry when classPath is modified and when the customized java classes require a native library (DLL or .SO).

Do not modify the other entry keys (like `.Id`, `.Name`).



NOTE

Consult the *System Settings for the Java Virtual Machine* section in this guide for more information about the [available and recommended JVM options](#), page [71].

Working with the Startup Configuration Files

As a system administrator, you can configure the following options in a startup configuration file (jstart.config):

- Class path: xxx.classPath (and xxx.libPath)
- JVM Options: xxx.javaParameters
 - Memory settings
 - Logging and tracing settings

Setting Up the JVM Options in a Startup Configuration File

In this *Customizing* activity, you change or maintain the jstart.config file available for an instance of the SAP CC system. You can manage all the files of all the system instances.

Prerequisites

You have defined the new JVM options and values that relate to your system landscape. Consider the preparation tasks detailed in the *System Settings for the Java Virtual Machine* section in this document:

- [Determining the JVM Options for an SAP CC Core Server System](#), page [77]

Procedure

You change the jstart.config located in a subdirectory of the /usr/sap/<SID>/SYS/profile/jstart/<SID>_<INST_NB>_<HOSTNAME> directory on the *SAP Global Host*:

- On the global host of the SAP CC Core Server system:
 - Go to the *SAP Central Repository* in the /sapmnt/<SID>/SYS/ directory (or the \usr\sap\<SID>\SYS\) and view its content
 - In the *SAP Profile Folder* (profile directory), go to the subdirectory jstart
 - Select the subdirectory /<SID>_<INST_NB>_<HOSTNAME> that corresponds to the appropriate instance of the SAP CC system
 - Edit the jstart.config file
 - Change the value of the javaParameters entry by adding, modifying, or deleting information
- Restart the instance of the SAP CC system

Boot Configuration File

The SAP CC 5.0 Core Server system uses boot configuration files (boot.config) to configure the connection to the back-end database. These files are stored in the *SAP Profile Folder* in the Central Repository of an SAP system.



NOTE

To connect directly to the back-end database, both the SAP CC [Setup Tool](#) and [Config Tool](#) user interfaces handle the boot configuration file in the installation folder of the dispatcher instances of the SAP CC system.

System Settings for the License Management

SAP Convergent Charging 5.0 is protected by licenses. A license key file is necessary for each host machine of your system landscape. At the time of installation, temporary licenses can be set up and must be replaced by valid license keys.

Applying for the Permanent License

Use

To obtain a permanent license key, see ► <http://support.sap.com/licensekey> ◀ in SAP Support Portal.

When applying for a permanent license, you need to indicate the hardware key for each machine hosting an instance of the Core Server system. The hardware keys are written in a file called `hardware_keys.txt` stored in one of the following directories on any host of the SAP CC system:

- `<DRIVE>:\usr\sap\<SID>\SYS\profile\` (MS Windows operating system)
- `/usr/sap/<SID>/SYS/profile/` (UNIX or other operating systems)

Installing the Permanent License

Use

To install the permanent license, you must use the [Setup Tool user interface](#) on any machine hosting a dispatcher instance of the SAP CC Core Server system.

Procedure

- Go to one of the following directories of a dispatcher instance of the SAP CC system:
 - `<DRIVE>:\usr\sap\<SID>\CCD<SAP_INST_NB>\script` (MS Windows operating system)
 - `/usr/sap/<SID>/CCD<SAP_INST_NB>/script/` (UNIX or other operating systems)

Where `<INST_NB>` is the instance number automatically assigned to the dispatcher instance by *SAPInst* at installation time

- Type the following command: `./setup.sh license import <LIC_FILE>`

Where `<LIC_FILE>` is the path to the file containing the license

- Confirm and authenticate the command as system administrator.

System Settings for the Java Virtual Machine

SAP Convergent Charging 5.0 must accommodate to hardware which ranges from a basic laptop up to 64-CPU machines. The default values that are used in the setups are very low so that the SAP CC system can be installed on a small configuration without being modified.

The default values are usually not suitable for a production environment. The memory allocated to the JVM must be customized for each instance to ensure high-level performance.

JVM Options

The following table lists the JVM options. You can change some of these options during the implementation project phase (installation, test and validation, tuning) or during the production operation phase:

- Various settings
- Log settings for SAP CC
- Log settings for the Java garbage collection (GC) in the JVMs
- Log settings for the Java garbage collection (GC) and history in the SAP JVMs



NOTE

The JVM options include some important options only featured by SAP JVM.

The JVM options are:

JVM Option	Description	Comment
-Dsapcc.home=	Example: C:\releases\CC_50\working_directory\C49	Do not change manually this option.
-Dboot.config=	File path and name of the boot.config file	Do not change manually this option.
-Dfile.encoding=	Encoding settings	Do not change manually this option. Must be: UTF-8

JVM Option	Description	Comment
-Dsun.nio.ch.useIPv6Stack	Note: JVM option required for IPv6 on MS Windows	Do not change manually this option.
-Dcom.sap.jvm.xerces.disallowDoctypeDecl.failEarly		Do not change manually this option. Must be: true
Log settings for SAP CC For the list of supported JVM options, refer to the Determining the Logging and Tracing Policy section.		
Log settings for the JVM about the Java garbage collection (GC) and history Not set by default; mandatory configuration in production systems.		
-XX:+PrintGC (or the alias: <code>-verbose:gc</code>)	Enables the basic GC logging mode, which records a line for every young generation GC and every full GC.	Not set by default. See note below (*).
-XX:PrintGCDetails	Enables the detailed GC logging mode, which differs depending on the GC algorithm used.	Not set by default. See note below (*).

JVM Option	Description	Comment
-Xloggc:<FILE_AND_PATH>	Sets the output file (filename and path).  TIP Note that this flag implicitly sets -XX:+PrintGC and -XX:+PrintGCTimeStamps as well.	Not set by default. See note below (*).  EXAMPLE -Xloggc:<PATH_TO_WORK_FOLDER>/garbage-<instanceID>.txt
-XX:LogGcMaxFileSize=		Not set by default. See note below (*).
-XX:LogGcMaxFileCount=		Not set by default. See note below (*).
-XX:PrintGCCause		Not set by default. See note below (*).
-XX:PrintGCDateStamps	Enables to add absolute date and time information to the basic or detailed GC logs.	Not set by default. See note below (*).
-XX:PrintTenuringDistribution		Not set by default. See note below (*).

JVM Option	Description	Comment
-XX:PrintPromotionFailure		Not set by default. See note below (*).
-XX:PrintFLSStatistics=		Not set by default. See note below (*).
Log settings for the JVM about the Java garbage collection (GC) and history in SAP JVM Not set by default; mandatory configuration in production systems. SAP JVM features an advanced logging of the Java garbage collection (GC) in the SAP JVMs.  NOTE See the <i>product documentation</i> of SAP JVM for more configuration information.		
-XX:{+}GCHistory	Enables/disables the garbage collection history, a feature of SAP JVM that continuously writes garbage collection data into a file using a compressed binary format (*.prf).	Not set by default. See note below (*).
-XX:GCHistoryFilename=<FILE_NAME_AND_PATH>	Sets the name of the file used for storing the garbage collection history information.  TIP A @PID in the filename will be replaced by the process identifier of the JVM and @VMID by the VM identifier.	Not set by default. See note below (*).

JVM Option	Description	Comment
-XX:GCHistoryMaxFileSize=<SIZE_IN_BYTES_OR_MB>	Sets the maximum size of the garbage collection history file. New values may overwrite older ones when the threshold is reached.  TIP If this option is set to zero, no maximum size is imposed. The default value is 20 MB.	Not set by default. See note below (*).
-XX:GCHistoryMaxFileCount=<NB_OF_FILES>	Sets the maximum number of files that are used for the garbage collection history. Format: The allowed range is 1..99.  NOTE A new garbage collection history file is created when the JVM is restarted.  TIP The extension .b<00..99> is added to the backup files, e.g. garbage-<INSTANCE_ID>gc.prf.b00 is the newest backup file.	Not set by default. See note below (*).

JVM Option	Description	Comment
-XX:GCHistoryCompressionLevel=<LEVEL>	Sets the compression level (0 is no compression, 9 is maximum compression) of the garbage collection history file.  NOTE The default is 5 (medium compression, medium CPU cost) and is not recommended for SAP CC.	Not set by default. See note below (*).
Memory, garbage collection, and direct buffers settings  CAUTION These JVM options are critical for the performance and stability of the SAP CC systems.		
-Xmn	Examples You can set up the following values: ■ -Xmn4G ■ -Xmn1G ■ or -Xmn512M	Default: Set in the file
-Xms	Examples You can set up the following values: ■ -Xms8G ■ -Xms4G	Default: Set in the file
-Xmx	Examples You can set up the following values: ■ -Xmx8G ■ -Xmx2G	Default: Set in the file
-Xss		Default: 256K
-XX:+UseParallelOldGC		

JVM Option	Description	Comment
-XX:+UseSplitVerifier		
-XX:MaxDirectMemorySize=<YOUR SIZING>		
-XX:CompileThreshold		Default: 100000
-XX:SurvivorRatio		Default: 16
-XX:ConcGCThreads=<YOUR SIZING>		
-XX:ParallelGCThreads=<YOUR SIZING>		
-XX:TargetSurvivorRatio		Default: 90
-XX:+ScavengeBeforeFullGC		
-Dcom.sap.jvm.xerces.disallowDoctypeDecl.failEarly		Default: true
-XX:+DisableExplicitGC		Default: set up this option to the dispatcher and updater instance types

**IMPORTANT NOTE**

The recommended JVM options may change during the life cycle of SAP Convergent Charging; the preceding table may not totally reflect the state of the art.

Enrich your SAP user experience and refer to the [SAP Note 2006073 – JVM options recommendations for SAP CC](#) for more information about the following critical JVM settings:

- Fine configuration of the memory heap
- Fine configuration of the garbage collection (GC)
- Fine configuration of direct buffers

See Also

- [Determining the JVM Options for an SAP CC Core Server System](#), page [77]
- Setting up the Logging for the Java GC in SAP CC instances

Determining the JVM Options for an SAP CC Core Server System

Use

In this *Customizing* activity, you define the JVM options recommended for your SAP CC Core Server systems and their instances.

Some options may be critical. The most critical JVM options are about the:

- configuration of the memory heap
- configuration of the garbage collection (GC)
- configuration of direct buffers



NOTE

To perform this activity, refer to the following central notes:

- SAP Note [2006073 – JVM options recommendations for SAP CC](#)
- SAP Note [1950168 – Generate Java GC Log for SAP Convergent Charging](#)

They include up-to-date recommendations, rules, and instructions. You use a configuration pattern and make some adjustments.

Default Settings

At installation time, *SAPInst* sets up the recommended JVM options for each instance of the deployed SAP CC Core Server system. When the host machines have enough memory, *SAPInst* adapts the recommended memory options.

As an administrator, you configure and tune the JVM options as needed regarding the usage planned for SAP Convergent Charging.

Prerequisites

You know the:

- integration of SAP CC (system landscape, features, master data volume)
- numbers of CPU core of the hosts where the instances are installed
- [JVM options](#) and SAP JVM options

You want to:

- [set up the JVM_options in the startup configuration file](#), page [67]

Activity

Depending on your business requirements, data volume, and the architecture of your SAP system landscape, apply the recommendations given in the central notes to define the JVM options and values for your SAP CC systems:

- During the project implementation phase
 - After the initial installation
 - During the tuning step
 - During the validation step
- During the production operation phase

Results

Apply these settings by configuring the startup configuration files (jstart.config) as described in the beginning of this chapter:

- [Setting Up the JVM Options in a Startup Configuration File](#), page [67]

Setting up the Logging for the Java Garbage Collection (GC) in the SAP CC Instances

Use

In a production, quality control, or test system landscape, **you enable and configure the logging for the Java garbage collection (GC)** in the SAP CC instances:

- **System initial configuration:** After the initial installation, you enable and configure the logging for the Java garbage collection (GC) in the SAP CC instances.
- **System administration:** During the *project implementation phase* or the *production operation phase*, you adapt this system configuration depending on the volume of master data or because of performance issues with the garbage collection processing in the JVMs.



NOTE

The logging feature for the Java garbage collection (GC) functions is composed of two parts:

- Standard GC logging in the JVMs
- Advanced GC logging only available in SAP JVM

See the [JVM Options](#) section, page [71].

Prerequisites

You have determined the JVM options and values that are relevant for your business requirements; see the [Determining the JVM Options for an SAP CC Core Server System](#) section, page [77].

Procedure

To change the configuration settings, apply the central SAP Note [1950168 – Generate Java GC Log for SAP Convergent Charging](#).

Results

The critical activity that relates to the Java garbage collection is recorded in specialized logs. Log analysis and log monitoring is now possible. See the *SAP CC Operations Guide* for more information about the corresponding technical operations.

System Settings for the Database Communication

Changing the Login and Password for the Database (Advanced Procedure)

Use

For development or test purpose, you can change the login and password of the back-end database after installing SAP CC 5.0. The SAP CC system handles this information in:

- The central boot configuration file
- The local boot configuration files
- Some system parameters stored in the back-end database

In a production system landscape, you must avoid using this procedure.



CAUTION

Before doing the changes, you must stop all the instances of the Core Server system of SAP Convergent Charging.

Prerequisites

- The SAP CC Core Server system must be down when resetting the database login and password.
- The new login and password is set in the database system.

Procedure

- Stop all the instances of the SAP CC Core Server system
- Identify the installation folder of the master dispatcher instance
- Edit its local boot.config file in:
 - <DRIVE>:\usr\sap\<SID>\CCD<SAP_INST_NB>\config\boot.config (MS Windows)
 - /usr/sap/<SID>/CCD<SAP_INST_NB>/config/boot.config (UNIX)
- Change the entries related to the database credentials (SQLHELPER_LOGIN, SQLHELPER_PASSWORD) to the new login and password; The database password is not cyphered.
 - Save and close the file

- Use the [Config Tool](#) user interface to export all the system parameters to a temporary text file.
 - Edit the exported file and change all the values of the parameters SQLHELPER_LOGIN and SQLHELPER_PASSWORD to the new database credentials; Set up the values with the plain text password.

```
<?xml version="1.0" encoding="utf-8"?>
<clusterConfig>
  <instanceConfiguration name="rater" lastModificationDate="2013-09-03T18:16:58">
    . . .
    <configParameter name="SQLHELPER_LOGIN" value="NEWCREDENTIALS"/>
    <configParameter name="SQLHELPER_PASSWORD" value="TEST"/>
    . . .
  </instanceConfiguration>
  <instanceConfiguration name="updater" lastModificationDate="2013-09-03T18:16:58">
    . . .
    <configParameter name="SQLHELPER_LOGIN" value="NEWCREDENTIALS"/>
    <configParameter name="SQLHELPER_PASSWORD" value="TEST"/>
    . . .
  </instanceConfiguration>
  . . .
</clusterConfig>
```

Extract of Exported File

- Import the file with [Config Tool](#); This import operation cyphers both the values of the SQLHELPER_PASSWORD parameters and the value of the SQLHELPER_PASSWORD entry in the local boot configuration file.
- Delete the parameter export file after importing it.
- Open again the local boot.config previously modified
 - Copy the password (SQLHELPER_PASSWORD) that is now cyphered
- Edit and modify the reference boot.config file in the *Central Repository* located in (/usr/sap/<SID>/SYS/profile/boot/)
- Change the values to the new database login and new cyphered database password (see the SQLHELPER_LOGIN and SQLHELPER_PASSWORD entries)
- Restart the instances of the Core Server system



CAUTION

Check the parameter export file is removed.

Results

Each instance of the Core Server system is started and establishes its permanent connection to the back-end database using the new database credentials (login and password). All the local boot configuration files are updated.

System Settings for Communications

At the end of the installation, the initial communication settings of SAP Convergent Charging 5.0 are stored in the Core Database.

Specifying a list of protocols and cipher suites for communications using SSL/TLS

As of SP 2, SAP CC 5.0 gives the possibility to specify a list of protocols and cipher suites that can be enabled for communications:

- Encrypted using SSL/TLS
- Related to the Core Server, BART Server and Diameter Server systems

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command
- Change the `TLS_PROTOCOLS` and `TLS_CIPHER_SUITES` system parameters accordingly
- Restart the Core Server system

Setting up the HTTP/HTTPS Connections

Use

The SAP CC 5.0 Core Server system uses HTTP or HTTPS connections to communicate with external systems via the following technical interfaces:

- Web Services (SOAP messages)
 - For the Updater instances
 - For the Dispatcher instances
- HTTP Communication Interface (HCI) for proprietary XML messages
 - For the Updater instances
 - For the Dispatcher instances

The same system settings are used for both technical interfaces.

To connect to the Core Server system, the following applications or systems must use the communication settings:

- SAP CC [Core Tool](#)
- SAP CC BART Server system
- CRM application
- External provisioning system

You can maintain the settings of these communications for a development landscape.

Default Settings

HTTP Secured (HTTPS) connections are set up.



NOTE

These settings may have been changed at the installation time. See the *Installation Guide* for details.

Prerequisites

- If you want to enable secured HTTP connections, private keys and associated certificates must already exist in the Core Database

Procedure

- Export the *instance map* of the SAP CC Core Server system by using the [Setup Tool user interface](#), see page [46]
 - `./setup.sh instancemap export current_instance_map.csv`
- Copy and rename this file to `new_instance_map.csv`
- Edit this new configuration file and change the configurations of all the updater instances and all the dispatcher instances of the Core Server system:
 - HTTP Communication Interface (HCI): HTTP Host, HTTP Port Number, and HTTP Secure
 - Web Services (WS): WS Host, WS Port, and WS Secure
- Do not change the value of the HTTP Secure parameters to true if you have not first generated and installed the necessary private keys and their associated certificates (see the next procedures)
- Import the new instance map:
 - `./setup.sh instancemap import current_new_instance_map.csv`
- Restart the updater instances and the dispatcher instances of the Core Server system

**NOTE**

If you enable HTTPS connections and create certificates for the SAP CC Core Server system, you must change the communication and security settings of all the applications and systems interfaced with the Core Server. They must accept the certificates. For example, you must configure the SAP CC Core Tool user interface, the SAP CC BART Server system, and a CRM application.

Enabling the Secured HTTP Connections

Use

You can change or enable the secured HTTP connections. You need to generate private keys and their associated certificates. A unique certificate can be used for all the instances of the SAP CC Core Server system, but you can also generate different certificates for each host machine of the Core Server system.

The connected applications or systems must share the public certificates.

Consult the *Installation Guide* to generate private keys and associated certificates for the HTTPS connections.

Activities

- Generate the private keys and their associated public certificates
- Install the keys/certificates in the SAP CC Core Server system
- Enable the HTTPS connections
- Share the public certificate(s) with the connected applications or systems

Installing the Private Keys and Certificates

Use

To use HTTP Secured (HTTPS) connections, the private keys and associated public certificates must be uploaded to the SAP CC Core Server system.

**NOTE**

These private keys and associated certificates are physically uploaded to the Core Database of the SAP Convergent Charging.

Prerequisites

- The private keys and public certificates have been generated in files
- The SAP CC Core Server system is up and running
- The Core Database system is up and running
- You have an SAP User with an administrative role

Procedure

To install the private keys and their associated certificates in the SAP CC Core Server system:

- For each host machine of the Core Server system:
 - Import the private key and the associated certificate for the host into the SAP CC Core Database by using the [Setup Tool user interface](#) (see page [46]) (each `alias` must be unique for the complete system landscape):

```
./setup.sh keyentry import <alias> <private_key_file> <certificate_file>
```

- Enter the logon and password of your SAP User declared in SAP CC
- Identify all the Dispatcher and Updater instances present in this host
- Link the key/certificate pair to the dispatcher and updater instances of the host:

```
./setup.sh keyentry link <alias> <instance1_ID> <instance2_ID> ...  
<instanceN_ID>
```



NOTE

A simplified procedure is available for development, training, or test landscapes using only one host machine:

- Import the private key and the associated certificate:


```
./setup.sh keyentry import <alias> <private_key_file>  
<certificate_file>
```
- Link the key/certificate pair to all the instances of the system:


```
./setup.sh keyentry link <alias> all
```
- Restart the updater and dispatcher instances of the SAP CC Core Server system

Results

You can share the certificate files with connected applications and systems.

**EXAMPLE (TWO HOST MACHINES)**

Use the [Setup Tool user interface](#) to manage the keys and their associated certificates:

```
./setup.sh keyentry import keyhost1 myprivatekey1file mycertificate1file  
./setupsh keyentry link keyhost1 dispatcher#1 updater#1  
./setup.sh keyentry import keyhost1 myprivatekey1file mycertificate1file  
./setup.sh keyentry link keyhost2 dispatcher#2 updater#2
```

Setting up the Communications via the Web Services

Use

SAP CC 5.0 provides a *Web Services* technical interface based on SOAP and HTTP standards. You can maintain the system settings for the updater and dispatcher instances of the SAP CC Core Server system.

Default Settings

- The Web Services are available
- The HTTP port number and the identifier of the host were configured with *SAPinst*
- The encryption of the HTTP connections is activated

Activities

- Consult the [Security Guide documentation](#) for more information about the security management relating to the web services interface and on the user management
- Create the necessary SAP users for these communications
- Set up the HTTP connection information for the Web Services (see below)
- Set up the encryption of the HTTP connections

Enabling the UDP Discovery Function (Postinstallation)

Use

SAP CC 5.0 provides a discovery function based on the UDP protocol for detecting the available dispatcher instances of the Core Server system. The import/export connector (IEC) applications and

the mediation systems based on the Java APIs and Java libraries of SAP Convergent Charging can easily discover an SAP CC Core Server system in a system landscape to connect to it.

**NOTE**

The network configuration may not permit this function in the SAP CC system landscape.

You set up the SAP CC system parameters:

- EXTERNAL_DISCOVERY_ENABLED
- EXTERNAL_DISCOVERY_MULTICAST_ADDRESS
- EXTERNAL_DISCOVERY_PORT

Consult the *SAP CC System Parameter Reference* for more information.

**RECOMMENDATION**

Consult the [Security Guide documentation](#) for more information about communication channel security.

Default Settings

The UDP discovery function is disabled since main release 4.0.

Prerequisites

- The network configuration supports the UDP communications in the system landscape
- Determine the multicast address in the network configuration

Procedure

- Launch the SAP CC [Admin+](#) user interface and log on
- Set up the EXTERNAL_DISCOVERY_ENABLED system parameter to **true** in each dispatcher instance of the SAP CC system:
 - `set EXTERNAL_DISCOVERY_ENABLED true all dispatcher`
- Set up the EXTERNAL_DISCOVERY_MULTICAST_ADDRESS system parameter to the relevant address:
 - `set EXTERNAL_DISCOVERY_MULTICAST_ADDRESS <PERMANENT_VALUE> all dispatcher`
- Set up the EXTERNAL_DISCOVERY_PORT system parameter to the relevant communication port number:
 - `set EXTERNAL_DISCOVERY_PORT <PERMANENT_VALUE> all dispatcher`
- Restart the master dispatcher instance of the SAP CC system

- Restart the other dispatcher instances

Advanced Settings for Message Queues

SAP CC 5.0 allows you to fine configure the queue management of incoming messages via the different technical interfaces.

The size of each queue must be configured to hold the maximum number of requests sent by the client applications or systems. Determine the traffic peaks that are relevant for your business requirements depending on your business scenario variant (online, offline).



NOTES

If a queue size is too small, the SAP CC system cannot successfully handle all the operation requests.
If a queue size is too huge, the SAP CC system requires too much memory.

Business Scenario Variant	Settings	Technical Interface
Online charging	■ STATEFUL_SERVICE_QUEUE_SIZE (stateful charging operation requests) ■ STATELESS_SERVICE_QUEUE_SIZE (stateless rating operation requests)	Message TCP
Offline charging	BATCH_SERVICE_QUEUE_SIZE (batch charging operation requests)	■ Message TCP ■ Web Services



NOTE

You can also fine configure the following queues:

- MULTICAST_SERVER_QUEUE_SIZE (inter-instance communications)
- DISPATCHER_SERVER_QUEUE_SIZE
- WS_SERVER_QUEUE_SIZE

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command
- Determine the relevant queue sizes (in incoming messages)

- Set up the new size with the `set` command. For example: `set BATCH_SERVICE_QUEUE_SIZE <MAX_MSG_NB> all`

**IMPORTANT NOTE**

You must also change the JVM memory parameters if the size of the queues is huge.

Settings for the User Management

SAP Convergent Charging 5.0 allows you to manage the profile of each SAP CC user and their roles or rights. You can also configure:

- The rules for changing passwords and the complexity of password encryption by taken into account individual users (for humans) and service users (for machines).
- The management of user sessions for the delivered user interfaces:
 - Core Tool
 - BART Tool
 - Cockpit



NOTE

See also the system settings that relate to the User Operation Auditing feature.

Consult the [Security Guide documentation](#), see page [21].

Enabling or Disabling the Security Policy for the User Passwords

Use

SAP CC 5.0 allows you to configure and apply a security policy for managing the user passwords. By default, this function is enabled at the time of installation.

Procedure

- Launch the SAP CC [Admin+](#) user interface, see page [45].
- Connect to the SAP CC Core Server system with the `host` command.
- Log on as administrator with the `user` command.
- Change the `PASSWORD_MANAGEMENT_ENABLED` parameter to true or false.
 - If you enable this function, configure the security policy for user passwords.

Setting Up the Security Policy for the User Passwords

Use

You can configure all the security parameters by taking into account the global recommendations of SAP presented in SCN (at: scn.sap.com/community/security) or at: service.sap.com/security.

Processing Mode	Value
Password Mandatory	Passwords are always mandatory
Password Different from Login	The password must be different from the login (user name)
Password Minimum Length	You can specify the minimum length allowed for the passwords. Only positive integer values are allowed.  NOTE The value 0 means that there is no lower limit to the length of the passwords.
Password Complexity	You can specify the type of characters that must be present at least once in the password. It is possible to force the use of upper case letters, lower case letters, digits and special characters. Parameter format: It consists of a list of comma-separated values whose values are "uppercase", "lowercase", "digit", and "special"  NOTE An empty list means that there is no restriction on the complexity of the password.
Password Failed Login Limit	You can specify the maximum number of failed logins allowed beyond which the user is locked and cannot be used anymore until an administrator unlocks it  NOTE The value 0 means that there is no limit to the number of times a user can enter a wrong password.
Password Duration Limit	You can specify the time limit of the expiration period (in days) of a password beyond which it is expired and must be changed

**NOTE**

The value 0 means that there is no expiration delay for the passwords, and they do not need to be changed.

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Log on with the *Administrator* role
- Change the security parameters according to your security strategy

Setting up the SAP Users

Use

SAP CC 5.0 is protected by dedicated login/password management functions. You must set up such SAP users and configure their roles by using the [Core Tool user interface](#).

**NOTE**

You must also create users for the network elements (mediation system) or service applications (CRM) that communicate with the SAP CC Core Server system.

If you have installed the BART Server system or the Diameter Server system, you must create a user for it.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: help.sap.com/cc → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* ↩. You can access to the primary help directly from the graphical user interface when configured.

Procedure

- Launch the SAP CC [Core Tool](#) user interface
- Log on as administrator or user administrator
- Create the users and assign roles

Changing the Client Application Credentials for the Message TCP Technical Interface

Use

As of SP 2, SAP CC allows you to authenticate, authorize, and audit (AAA) external or internal client applications that use the *Message TCP* technical interface (Java Charging APIs). For security reasons, you can change the credentials of any client application that uses this technical interface.



EXAMPLE

A client application tried to log on to the SAP CC Core Server system, but the attempt was refused because the logon or the password is incorrect. The SAP CC system then provides a security log message that warns of a possible attack and asks the IT administrator to investigate the security issue before changing the credentials of the client application if necessary.

Procedure

- Create a new service user with new credentials in SAP CC Core Tool
- Change credentials of all the client applications by setting the new credentials (for example, in the configuration files or the database)
- Re-launch or reconnect the client applications one by one
- Close the remaining connections with the old client credentials and SAP CC Admin+ (use the commands `list_clients` and `disconnect_client`)



CAUTION

Changing the existing user password instead of creating a new service user with new credentials is possible but not reliable. If you change the existing user password in SAP CC, this change is immediate in SAP CC, but meanwhile the client application can try to reconnect to SAP CC with its old password before you update it. Therefore, the reconnection to SAP CC will be rejected and the service will be interrupted.

Enabling or Disabling the User Isolation

Use

SAP CC 5.0 gives the possibility to specify whether service users must be isolated from individual users, or not. By default, this function is enabled at the time of installation.

**NOTE**

Consult the [SAP CC System Parameter Reference documentation](#) for more information about the USER_ISOLATION_ENABLED system parameter; see page [21].

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command
- Change the USER_ISOLATION_ENABLED parameter to `true` if you want to activate the user isolation, or to `false` otherwise

Setting up the Number of SHA-256 Steps for Hashing User Passwords

Use

SAP CC 5.0 allows you to configure the complexity of password encryption by specifying the number of steps of the algorithm applied to hash the password before storing it in the back-end database.

**NOTE**

The number of steps applied to the password has a performance impact each time the HCI, the Web Services, and the Message TCP technical interfaces are used to communicate with SAP CC. For each call, the password is hashed using the same number of steps as if it is stored in the database.

SAP CC 5.0 makes a distinction between individual users and service users. This allows to trade-off between complexity of the hashing algorithm and performance.

Default Settings

By default, the number of rounds for hashing passwords is set to 10,000 for both individual and service users.

**CAUTION**

10,000 rounds ensure a good strength for passwords of individual users, but make the latency on web services and HCI increase of 10 milliseconds approximately. To reduce the impact on performances, we recommend using a lower value for service users such as 1,000 rounds or 100 rounds. For 1,000 rounds, the latency is expected to increase of 1 millisecond approximately. For 100 rounds, the increase of latency is non-measurable.

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command
- Change the `PASSWORD_HASH_ROUNDS_FOR_INDIVIDUAL_USERS` parameter to the value you want for the number of steps applied for hashing the password of individual users
- Change the `PASSWORD_HASH_ROUNDS_FOR_SERVICE_USERS` parameter to the value you want for the number of steps applied for hashing the password of service users

**NOTE**

Changing the value of these parameters is not taken into account immediately. It affects the users when their password is modified.

Advanced: Resetting the Emergency User (Normal Procedure)

Use

In emergency situations where you configured user management incorrectly and can no longer log on to any SAP CC systems or user interfaces, you can re-activate the *emergency user* for SAP CC 5.0. The emergency user is the first super administrator logon set in SAP CC during the installation. It enables you to log on to SAP CC user interfaces, in particular [Core Tool](#) and [Setup Tool](#), and to change the configuration.

Prerequisites

- The SAP CC Core Server system is running
- You need to work with [Core Tool](#) or [Admin+](#)
- You can access to the SAP CC Core Database system

Procedure

This emergency procedure resets the default user 'admin' with the password 'admin' and resets the administrator privileges directly in the back-end database of SAP CC 5.0.



CAUTION

For security reasons, you must specify a password when you activate the user.

To activate the emergency user:

- Connect to the SAP CC Core Database with sufficient privileges to modify the tables in the schema used by SAP Convergent Charging.
- Use the following SQL queries:

```
DELETE FROM USER_PASSWORD WHERE USER_OID = 1;
DELETE FROM USER_RIGHT WHERE USER_OID = 1;
DELETE FROM HCI_USER WHERE OID = 1;
INSERT INTO HCI_USER (OID, LOGIN_ID, PASSWORD, PASSWORD_CHANGE_DATE,
FAILED_LOGIN_COUNT, LOCKED, IS_HUMAN, CHANGE_PASSWORD)
VALUES (1, 'admin', '6989cd27e1ebb4d8f266d5c09469989f1caae07', NULL, 0, 0, 1, 1);
INSERT INTO USER_RIGHT(USER_OID, USER_RIGHT) VALUES (1, 'admin');
INSERT INTO USER_RIGHT(USER_OID, USER_RIGHT) VALUES (1, 'useradmin');
```

- Restart the dispatcher instances of the SAP CC Core Server system
- Launch the [SAP CC Core Tool user interface](#)
- Log on with the 'admin' login
- Change the password
- You can work with Core Tool or Admin+

Results

The emergency user is available.

Advanced: Resetting the Emergency User (System Down)

Use

In emergency situations where you configured user management incorrectly and can no longer log on to any SAP CC systems or user interfaces, you can re-activate the *emergency user* for SAP CC 5.0. The emergency user is the first super administrator login set in SAP CC during the installation. It enables you to log on to SAP CC user interfaces, in particular [Core Tool](#) and [Setup Tool](#), and change the configuration.

The SAP CC Core Server system is down or you need to use Setup Tool.



EXAMPLE

The SAP CC system is down due to the license expiration. You must use the [Setup Tool user interface](#) to change the license.

Prerequisites

- The SAP CC Core Server system is down
- You need to work with [Setup Tool](#)
- You can access to the SAP CC Core Database system

Procedure

This emergency procedure resets the default user 'admin' with the password 'admin' and resets the administrator privileges directly in the back-end database of SAP CC 5.0.



CAUTION

For security reasons, you must specify a password when you restart the SAP CC Core Server system.

To activate the emergency user:

- Check that the SAP CC Core Server system is down
- Connect to the SAP CC Core Database with sufficient privileges to modify the tables in the schema used by SAP Convergent Charging.
- Use the following SQL queries:

```
DELETE FROM USER_PASSWORD WHERE USER_OID = 1;
DELETE FROM USER_RIGHT WHERE USER_OID = 1;
DELETE FROM HCI_USER WHERE OID = 1;
INSERT INTO HCI_USER (OID, LOGIN_ID, PASSWORD, PASSWORD_CHANGE_DATE,
FAILED_LOGIN_COUNT, LOCKED, IS_HUMAN, CHANGE_PASSWORD)
VALUES (1, 'admin', '6989cd27e1ebb4d8f266d5c09469989f1caae07', <TODAY>, 0, 0, 1,
0);
```

```
INSERT INTO USER_RIGHT(USER_OID, USER_RIGHT) VALUES (1, 'admin');
INSERT INTO USER_RIGHT(USER_OID, USER_RIGHT) VALUES (1, 'useradmin');
```

Where **<TODAY>** is the current date, to be replaced by one of the following statements depending on the database technology:

- SAP HANA: `CURRENT_DATE`
 - Sybase ASE: `GetDate()`
 - Oracle: `SYSDATE`
 - MS SQLServer: `GetDate()`
 - IBM DB2: `currentdate`
- You can work with the [SAP CC Setup Tool user interface](#)
 - Restart the SAP CC Core Server system
 - Reset the password with the Core Tool user interface:
 - Launch the [SAP CC Core Tool user interface](#)
 - Log on with the 'admin' login
 - Change the password

Results

The emergency user is available.

Enabling or Disabling the User Session Management and the Concurrent Edition Management

Use

For security reasons, SAP CC 5.0 allows you to configure the user session management feature. By default, this function is enabled at the time of installation. When you enable the user session management, the concurrent edition management in [Core Tool](#) is automatically enabled.

As of release 5.0 of SAP Convergent Charging, Convergent Charging Cockpit is a new graphical user interface. This Web application does not support the user session management feature that is described in this section. It provides another function.

Procedure

- [Launch the Admin+ Tool user interface](#), see page [45].
- Connect to the distant SAP CC Core Server system with the `host` command.
- Log on as IT administrator with the `user` command.
- Change the `USER_SESSIONS_ENABLED` parameter to `true` if you want to enable the user session management, or to `false` otherwise

Setting Up the User Session Management in Core Tool and BART Tool

Use

SAP CC 5.0 enables you to manage sessions for the individual users of Core Tool and BART Tool connected to the Core Server system. You must configure this function by defining:

- the maximum number of simultaneous logons to the same GUI by the same user (parameter `USER_SESSION_SESSION_LIMIT_PER_USER_AND_TOOL`).
- the maximum period during which the session can be left inactive (parameter `USER_SESSION_VALIDITY_PERIOD`), inactive meaning that there is no interaction between the GUI and the Core Server system.

For more information, consult the *Feature* section in the [Application Help documentation](#) for more information; see page [21].

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Log on as administrator
- Change the `USER_SESSION_ENABLED` parameter to **true**
- Change the values of the `USER_SESSION_SESSION_LIMIT_PER_USER_AND_TOOL` and the `USER_SESSION_VALIDITY_PERIOD` parameters



NOTE

For deleting a user session that has failed, use the command `delete_user_session` in the SAP CC Admin+ user interface. When a session in Core Tool is deleted, the objects opened in edition mode during this session are released and can be modified in another session.

System Settings for Logging and Tracing

SAP Convergent Charging 5.0 features logging and tracing functions to monitor or troubleshoot the Core Server systems.

- Main settings
- Settings for JCo

Changing the Settings of the Logging and Tracing Functions

Use

SAP CC 5.0 generates log messages and trace messages that are recorded in different file destinations and printed in a console. Logs are mainly addressed to an IT administrator to fix errors or prevent future errors. Traces are mainly addressed to a support specialist to locate the issues. You can perform the following changes:

- Immediate changes
 - You can only set up all the severity thresholds and domains for a specific instance of the system, for the complete SAP system, or for all the instances with the same type
 - These changes can be temporary or permanent
 - Use the [Admin+ user interface](#)
- Deferred changes
 - You can set up all the parameters
 - A restart is needed
 - For modifications relating to severity thresholds and domains, use the Admin+ user interface (for few changes) or the Configuration Tool (for mass changes)
 - For modifications relating to destinations, storage location, file rotation rules and format, update the Startup Configuration Files

Prerequisites

- You are aware of the default settings and the SAP recommendation for a production system
- You have defined the new logging and tracing policy you want to configure the system: See [Determining the Logging and Tracing Policy](#), page [139]

Procedure (Immediate Changes)

**CAUTION**

Use the default settings in a production system. Do not use a debug configuration for a productive landscape with the SAP CC 5.0 Core Server system. If you use the debug mode, check that the file rotation mechanism is possible with your new settings.

- Launch the SAP CC [Admin+ user interface](#) and log on
- Change the level of generated logs with the command and apply immediately and permanently this change for all the instances of the system:
 - `Admin+> set LS_APP_SEVERITY <NEW_LOG_LEVEL> all all`
- Increase temporarily the level of traces generated by a particular instance of the system
 - `Admin+> set LS_TRC_SEVERITY DEBUG memory <INST_ID>`
- Reset the severity thresholds for the complete system:
 - `Admin+> set LS_APP_SEVERITY INFO all all`
 - `Admin+> set LS_SYS_SEVERITY INFO all all`
 - `Admin+> set LS_TRC_SEVERITY ERROR all all`

Use the `help` command for more information.

Procedure (Deferred Change with Admin+)

- Launch the [SAP CC Admin+ user interface](#) and log on
- Change the parameter with the command:
 - `Admin+> set <PARAM_NAME> <NEW_VALUE> persistent all`
- Restart the system or the impacted instances of the system

**EXAMPLE**

You can:

- Change the number of files generated in file destination #1 and apply this change for all the instances of the system:
 - `Admin+> set ldf1_fileset_size <NEW_NB_OF_FILES> persistent all`
- Change the maximum size of files generated in destination #1 and apply this change for all the instances of the system:
 - `Admin+> set ldf1_file_size <MAX_FILE_SIZE> persistent all`

Procedure (Deferred Change with Configuration Tool)

- Export the system parameters in a file:
 - Use the command: `config configuration export`
- Edit the file
- Change the values

- Import the file
- Restart the SAP CC system or the impacted instances of the system

Procedure (Deferred Change in Startup Configuration Files)

- Refer to the table located in the *Determining the Logging and Tracing Policy* section to retrieve the list of JVM options to configure
- Use the *Setting up the JVM Options in a Startup Configuration File* section to perform the modification for each concerned instance
- Restart the SAP CC system or the concerned instances

Changing the Version of the Error Files for Bulkloading

Use

SAP CC rater instances generate data files during charging and refilling operations. Then the bulkloader instances read these data files and generate error files when some items cannot be converted. SAP Convergent Charging provides different versions of the error files generated by the bulkloader instances. Consult the *SAP CC Application Help* for more information about these versions.

Procedure

- Export the CIF configuration of the bulkloader instances
 - Execute the following command in [Setup Tool](#):
`./setup cif export bulkloader bulkloader.cif.xml`
 - Check that the `bulkloader.cif.xml` file has been successfully created
- Set or change the version of the error files
 - Open the `bulkloader.cif.xml` file with a text editor
 - Update the `bulkWriter` XML elements by setting or by updating the `fileVersion` attribute to "1" or "2"
 - Save the file
- Import the CIF configuration of the bulkloader instances
 - Execute the following command in [Setup Tool](#):
`./setup cif import bulkloader bulkloader.cif.xml`
 - Check in the console that the configuration has been successfully imported
- Restart the bulkloader instances to take your modification into account

Enabling the Sequencing of File Names for Error Files Generated by Bulkloader Instances

Use

The version 2 of error files generated by the bulkloader instances has been enhanced to give the possibility to add a sequence number to the names of the files. Consult the SAP CC Application Help for more information about this enhancement.

Procedure

To enable the sequencing of file names for error files generated by the bulkloader instances, use the following procedure:

- Get the current value of the SQLHELPER_CONNECTION_COUNT parameter for the bulkloader instances
 - Execute the following command in [Admin+](#):
`get SQLHELPER_CONNECTION_COUNT persistent bulkLoader`
- Increase the value of the SQLHELPER_CONNECTION_COUNT parameter by 1
 - Execute the following command in [Admin+](#) where `<increased_value>` is the current value of the parameter plus one:
`set SQLHELPER_CONNECTION_COUNT <increased_value> persistent bulkLoader`
- Enable the sequencing of file names by setting the value of the ITEM_FILE_SEQUENCE_ENABLED parameter to `true`
 - Execute the following command in [Admin+](#):
`set ITEM_FILE_SEQUENCE_ENABLED true persistent bulkLoader`
- Export the CIF configuration of the bulkloader instances
 - Execute the following command in [Setup Tool](#):
`setup cif export bulkloader bulkloader.cif.xml`
 - Check that the `bulkloader.cif.xml` file has been successfully created
- Set or change the version and the sequence of the error files
 - Open the `bulkloader.cif.xml` file with a text editor
 - For each “`bulkWriter`” XML element located under the “`bulkReader`” XML element:
 - Set or update the “`fileVersion`” attribute to “2”
 - Set or update the “`fileSequenceId`” attribute to a unique value (e.g. “COM_EXCEPTION”)
 - Save the file
- Import the CIF configuration of the bulkloader instances
 - Execute the following command in [Setup Tool](#):
`setup cif import bulkloader bulkloader.cif.xml`
 - Check into the console that the configuration has been successfully imported
- Restart the bulkloader instances to take your modifications into account

System Settings for the System and Data Auditing

Your security policy covers the auditing aspect. To manage the audit and control level of your system landscape, you use the *System and Data Auditing* fundamental feature of SAP Convergent Charging.

You implement and manage the following technical features:

- Product Usage Measurement
 - Usage Metric Recording
 - [Setting up the Customer Usage Measurement in SAP Solution Manager](#), page [Setting up the Customer Usage Measurement in SAP Solution Manager¹⁰⁷]
- Data and Operation Auditing
 - Data Object Auditing and Change Log Recording, page [110]
 - Object Snapshot Recording, page [111]
 - User Operation Auditing, page [113]

System Settings for the Product Usage Measurement

Depending on your requirements, consider the following tasks:

- Setting up the Product Usage Metric Recording Feature
- Setting up the Customer Usage Measurement in SAP Solution Manager

Setting up the Product Usage Metric Recording Feature

Use

SAP CC 5.0 enables you to audit the product usage measurement. In the Core Tool user interface, you can audit the volume of transactional data and customer master data that represent the product usage of the SAP CC software product.

As an IT administrator, you configure the SAP CC Core Server system by enabling the *Product Usage Metric Recording* feature (see the METRIC_RECORDING_SCHEDULER_ENABLED parameter) and by determining the following parameter values:

- Recording time: METRIC_RECORDING_DAY_TIME
- Retention period: METRIC_RECORD_TIME_WINDOW

Tip: Refer to the primary help of [Core Tool](#), page[47] for more information about how to view usage metrics.

Default Settings

- The *Product Usage Metric Recording* feature is enabled in the SAP CC Core Server system.
- The time of the daily business metric recording: at 00:00.
- The number of retention days during which the usage metrics are recorded in the database: 1,825 days.

Implementation and Customizing

As an IT consultant, determine if the technical and business requirements involve this feature. Define or determine the relevant system configuration settings.

Procedure

- Determine the retention days that are relevant.
- Determine the recording time that is appropriate.
- Launch the SAP CC [Admin+](#) user interface, see page [45].
- Log on as an IT administrator.
- Change the METRIC_RECORDING_SCHEDULER_ENABLED parameter values to `true`.
- Change the other system parameters to the customized values.

Next

Technical operations:

- To know the product usage measurement, you can view the usage metrics in [Core Tool](#).

Associated system configuration and Customizing:

- [Setting up the Customer Usage Measurement in SAP Solution Manager](#), page[107].

Setting up the Customer Usage Measurement in SAP Solution Manager

Use

The functionality *Customer Usage Measurement* enables the SAP CC Core Server system to communicate with the SAP SMD Agent in order to provide information on the usage of SAP CC to SAP Solution Manager. You enable this function by configuring both SAP CC and SAP Solution Manager; see the procedures in this section.

**NOTE**

In the SAP CC system, the updater instance is responsible for answering to the SAP Solution Manager Diagnostics Agent (SAP SMD Agent). The *Customer Usage Measurement* feature is not available if the HTTP communications with the updater instance are secured. See the [SAP CC Application Help documentation](#) for more information on securing communications with the instances of the SAP CC systems, page [21].

Prerequisites

- The *Product Usage Metric Recording* feature is enabled in the SAP CC Core Server system.
- SAP Solution Manager is installed in your system landscape.
- SAP CC is registered in SAP Solution Manager as a technical system. For further information, refer to the section “Managed Systems” of SAP Solution Manager documentation available in the SAP Help Portal at the following location:
<http://help.sap.com/solutionmanager71>
- An SMD Agent is installed on each machine hosting an SAP CC system instance. Refer to the [SAP Note 1365123](#).
- You know:
 - the `SID` of the Core Server system
 - the name of the machines hosting the updater instances
 - the port number used for HTTP (HCI) communications for each updater

To retrieve these values, use the `get` command with the parameters `SYSTEM_ID`, `HOSTNAME` and `HTTP_SERVER_PORT` in the [SAP CC Admin+ user interface](#).

Procedure

On SAP CC Side

In SAP CC, create a technical user named `SM_COLL_<SID>` where `<SID>` is the system identifier of SAP CC Core Server.

**NOTES**

- Do not assign any role to this SAP CC user.
- For further information about creating users in SAP CC, refer to the topic *User Profiles* in the primary help of SAP CC Core Tool.
- Remember the password entered for this user: you need it to configure SAP Solution Manager in the next steps of this procedure.

On SAP Solution Manager Side

- Logon to *SMD Agent Administration* as administrator
- Select the *Application Configuration* tab
- Select Agent Applications ->
`com.sap.smd.agent.application.global.configuration`
- For each updater instance in the SAP CC system:
 - Choose the name of the machine hosting the updater instance in the field *Select scope*
 - Click *Edit*
 - Add the property `<SID>/sapj2ee/com/pwd` and enter the password of the user `SM_COLL_<SID>`
 - Add the property `<SID>/sapj2ee/com/user` and enter the name of the user `SM_COLL_<SID>`
 - Add the property `<SID>/sapj2ee/ msgserver/httpport` and enter the HTTP port number of the updater instance.
 - Save the modifications.

System Settings for the Data and Operation Auditing

SAP Convergent Charging provides you with the *Data and Operation Auditing* feature and functions to inspect your running SAP CC Core Server system about the operations requested by SAP CC users (individual or service users) and about the data changes processed by the SAP CC system. SAP recommends that you implement and customize this end-to-end auditing in your system landscape.

You manage the following technical features:

- Data Object Auditing
 - Object change log recording
 - Object snapshot recording
- User Operation Auditing
 - User operation execution recording

Consider the following activities:

- [Implementing the Data Object Auditing Feature](#), page [110]
- [Customizing the Object Snapshot Recording Feature](#), page [111]
- [Customizing the User Operation Auditing Feature](#), page [113]



IMPLEMENTATION NOTE

These features may significantly impact the performance of the whole SAP CC Core Server system and the storage capacity and performance of the back-end database system. SAP recommends that you customize the features and that you perform purge operations manually and regularly to

optimally maintain and run your SAP CC system. Refer to the *SAP CC 5.0 Operations Guide* documentation, page [21].

As an IT consultant, you translate business and technical needs into requirements and determine if these technical and business requirements involve these technical feature of SAP Convergent Charging.

Define the audit domains that are expected to conform to the required IT strategy and implementation scope in term of:

- security
- audit and control level
- database storage and performance

Consider or reconsider the sizing of the back-end database in term of data storage and performance. SAP CC stores high volume of audit data recordings in the database system. Consider the required reserved spaces when you manage tablespaces, filegroups, or segments. See the implementation recommendation provided with each feature.

Implementing the Data Object Auditing Feature

Use

SAP CC 5.0 enables you to track and view the changes of data objects resulting from the processing of user operations (creation, modification, or deletion). SAP recommends that you enable the *Data Object Auditing* feature.

Refer to the [SAP CC 5.0 Application Help documentation](#) for more information; see page [21].

This feature may significantly impact the performance of the whole SAP CC Core Server system. SAP recommends that you perform purge operations manually and regularly to optimally maintain and run your SAP CC system. You keep the highest global performance levels. See the Admin+ user interface and its `purge_object_change_logs` command.

Default Settings

The *Data Objects Auditing* feature is enabled in the SAP CC system. You cannot deactivate it.

Implementation and Customizing

1. As an IT consultant, you translate business and technical needs into requirements and determine if these technical and business requirements involve this feature of SAP Convergent Charging.

2. Define the audit domains that are expected to conform to the required IT strategy and implementation scope in term of:

- security
- audit and control level
- database storage and performance

3. Consider the sizing of the back-end database in term of data storage and performance. SAP CC stores high volume of audit data recordings in the OBJECT_CHANGE_LOG table. Consider the OBJECT_CHANGE_DATA reserved space when you manage tablespaces, filegroups, or segments.



NOTES

- When the *Object Snapshot Recording* feature is enabled, consider the OBJECT_SNAPSHOT database table. See page [111].
- When you implement the end-to-end auditing, consider the following activities:
 - [Implementing the Data Object Auditing Feature](#), page [110]
 - [Customizing the Object Snapshot Recording Feature](#), page [111]
 - [Customizing the User Operation Auditing Feature](#), page [113]

Procedure: To disable the auditing functions

You cannot disable this feature.

Next

Technical operations:

- You can manage audits in [Core Tool](#).
- You can view change logs of audited data objects.

Associated system configuration and *Customizing*:

- You can configure the *Object Snapshot Recording* subfeature; see page [111].
- You can configure the *User Operation Auditing* feature; see page [113].

Customizing the Object Snapshot Recording Feature

Use

SAP CC 5.0 enables you to track and view the detailed changes of data objects resulting and view SAP user operations (creation, modification, or deletion). SAP recommends that you enable the *Data Object Snapshot Recording* feature.

Refer to the [SAP CC 5.0 Application Help documentation](#) for more information; see page [21].

This feature may significantly impact the performance of the whole SAP CC Core Server system. SAP recommends that you perform purge operations manually and regularly to optimally maintain and run your SAP CC system. You keep the highest global performance levels. See the Admin+ user interface and its `purge_object_change_logs` command.

Default Settings

The *Object Snapshot Recording* feature is enabled in the SAP CC system. All the predefined audit domains are enabled.

Prerequisites

The *Data Object Auditing* feature must be enabled in the SAP CC system.

Implementation and Customizing

As an IT consultant, you translate business and technical needs into requirements and determine if these technical and business requirements involve this feature of SAP Convergent Charging.

Define the audit domains that are expected to conform to the required IT strategy and implementation scope in term of:

- security
- audit and control level
- database storage and performance

When the configuration of master data is managed from a CRM application (or provisioning system) connected to SAP CC and when the CRM application provides the necessary auditing functions, you can optimize the implementation of SAP Convergent Charging by excluding some audit domains such as:

- CATALOG_TABLE_DATA, when the CRM configures mapping tables or range tables in SAP CC
- CUSTOMER, when the CRM configures subscriber accounts and provider contracts in SAP CC
- CUSTOMER_TABLE_DATA, when the CRM configures subscriber mapping/range tables in SAP CC

You select only the CATALOG and TECHNICAL audit domains.

Consider the sizing of the back-end database in term of data storage and performance. SAP CC stores high volume of audit data recordings in the OBJECT_SNAPSHOT table. Consider the OBJECT_CHANGE_DATA reserved space when you manage tablespaces, filegroups, or segments.

Procedure: To enable the auditing function

- Determine the required audit domains to apply to all the system instances whatever their type
- Launch the SAP CC [Admin+](#) user interface, see page [45]
- Log on as an IT administrator
- Set up the AUDIT_OBJECT_DOMAIN parameter values to the relevant values determined by the implementation project team
- Set up the AUDIT_OBJECT_ACTIVATION parameter values to `true`
- Restart the SAP CC system

Procedure: To disable the auditing function

- Launch the SAP CC [Admin+](#) user interface, see page [45]
- Log on as an IT administrator
- Change the AUDIT_OBJECT_ACTIVATION parameter values to `false`:
 - Change the permanent values
 - Change the runtime values

As you changed both the permanent and the runtime values, you do not need to restart the SAP CC system to restart. The system is able to apply this change immediately.

Next

Technical operations:

- You can manage audits in [Core Tool](#).
- You can view snapshots of audited data objects.

Customizing the User Operation Auditing Feature

Use

SAP CC 5.0 enables you to track and view some user operations requested by the SAP CC users (individual or service users) via the Web Services or HCI technical interfaces. SAP recommends that

you enable the *User Operation Auditing* feature. It enriches the auditing functions in your SAP CC system (Data Object Auditing, Object Snapshot Recording).

Refer to the [SAP CC 5.0 Application Help documentation](#) for more information; see page [21].

This feature may significantly impact the performance of the whole SAP CC Core Server system. SAP recommends that you perform purge operations manually and regularly to optimally maintain and run your SAP CC system. You keep the highest global performance levels. See the Admin+ user interface and its [purge_user_operations](#) command.

Consider the additional functions provided by of SAP Convergent Charging; see in the next section.

Default Settings

The *User Operation Auditing* feature is enabled in the SAP CC system. All the predefined audit domains are enabled.

Implementation and Customizing

As an IT consultant, you translate business and technical needs into requirements and determine if these technical and business requirements involve this feature of SAP Convergent Charging.

Define the operation audit domains that are expected to conform to the required IT strategy and implementation scope in term of:

- security
- audit and control level
- database storage and performance

For example, you may exclude the CUSTOMER audit domain when the configuration of customer master data is managed from a CRM application (or provisioning system) connected to SAP CC. If the CRM application provides some auditing functions, you can optimize the implementation of SAP CC.

Consider the sizing of the back-end database in term of data storage and performance. SAP CC stores high volume of audit data recordings in the USER_OPERATION table. Consider the CATALOG_DATA reserved space when you manage tablespaces, filegroups, or segments.

Procedure: To enable the auditing function

- Determine the required operation audit domains to apply to all the system instances whatever their type
- Launch the SAP CC [Admin+](#) user interface, see page [45]
- Log on as an IT administrator
- Set up the AUDIT_DOMAIN parameter values to the relevant values determined by the implementation project team

- Set up the AUDIT_ACTIVATION parameter values to `true`
- Restart the SAP CC system

Procedure: To disable the auditing function

- Launch the SAP CC [Admin+](#) user interface, see page [\[45\]](#)
- Log on as an IT administrator
- Change the AUDIT_ACTIVATION parameter values to `false`:
 - Change the permanent values
 - Change the runtime values

As you changed both the permanent and the runtime values, you do not need to restart the SAP CC system to restart. The system is able to apply this change immediately.



NOTE

If you performed an immediate change, note that the SAP CC system continues auditing the mass operations already started.

Next

Technical operations:

- You can manage audits in [Core Tool](#).
- You can view audited user operations.

Associated system configuration and *Customizing*:

- You can configure the *Data Object Auditing* feature; see page [\[110\]](#).

Settings for Time Zones and Dates

System Customization: Setting up the Time Zone and Date Management (Implementation)

Use

The applications of SAP CC 5.0 manage all the dates in local time. When it is needed by your business, the connected systems and the architecture of the landscape manage the conversion of the required date formats from and to SAP CC 5.0.

Activities

When it is relevant, the implementation must take into account the management of the time zones outside SAP CC 5.0. The following data are available:

- Incoming data:
 - Master data: Provider contracts, subscriptions, and subscriber accounts
 - Transactional data: Chargeable items or refill items (Core Server), CDRs (BART Server), and CCRs (Diameter Server)
- Outgoing data:
 - Master data: Offers, charges, charge plans, and refill plans
 - Transactional data: Charged items, refill records, billable items, rated transactions, charged transactions, and CCAs (Diameter Server)

System Settings for the System Landscape Directory

The SAP CC 5.0 Core Server system can send information about installed hardware and software components in your SAP system landscape. It updates regularly the System Landscape Directory (SLD) in the SLD server system of SAP NetWeaver.



NOTE

For more information about System Landscape Directory of SAP NetWeaver, consult the documentation in SAP Help Portal at: <http://help.sap.com/nw70> → SAP NetWeaver 7.0 → SAP NetWeaver 7.0 Library (English) → SAP NetWeaver Library → SAP NetWeaver by Key Capability → Solution Life Cycle Management by Key Capability → Software Life Cycle Management → [System Landscape Directory](#) ↩.

Enabling the SLD Data Supplier Function

Use

In an SAP system landscape, your SAP CC Core Server system can regularly send information data to the System Landscape Directory (SLD) system.

Default Settings

By default, this function is not enabled by *SAPInst*.

Prerequisites

- An SLD server system is up and running in your SAP system landscape.
- The Component Repository Content (CR Content) in the System Landscape Directory (SLD) is up to date (see SAP Note [669669](#)).
- The required credentials (SLD user, password) are available in the SLD server system. An SLD user is dedicated to your Core Server system.

Procedure

- Launch the [SAP CC Admin+ user interface](#).
- Connect to the SAP CC Core Server system with the `host` command.

- Log on as an IT administrator with the `user` command.
- Change the `SLD_SCHEDULER_ENABLED` parameter to `true` to enable the data supplier function in the Core Server system.
- Set up the other relevant parameters as described in the next section.
- Restart all the dispatcher instances of the running Core Server system.

Setting Up the SLD Data Supplier Function

Use

You must manually configure the SAP CC Core Server system to connect to the SLD server system and send information data periodically. You can define the communication settings and the time period between two updates of the SLD.

Prerequisites

- The SLD data supplier function is activated in the Core Server system.
- An SLD server system is up and running in your SAP system landscape.
- The Component Repository Content (CR Content) in the System Landscape Directory (SLD) is up to date (see SAP Note [669669](#)).
- The required credentials (SLD user, password) are available in the SLD server system. An SLD user is dedicated to your Core Server system.

Procedure

- Launch the [SAP CC Admin+ user interface](#).
- Connect to the Core Server system with the `host` command.
- Log on as an IT administrator with the `user` command.
- Change the communication and scheduling parameters to the appropriate values:

Communication Parameters	
SLD_URL	The URL of the <i>SLD Data Supplier Service</i> in the SLD server system. Enter the URL in the following format: http://<SLD_HOST>:<SLD_PORT>/sld/ds  NOTE The required URL must end with the <code>'/ds'</code> fragment to refer the Data Supplier service in the SLD server.

SLD_USER	The user name (or ID) that is used by your Core Server system to log on to the SLD server system for authentication. This required user account is configured in the SLD server system.
SLD_PASSWORD	The password for the SLD user needed for authentication

Scheduling Parameter	
SLD_SCHEDULER_RECURRENCE	Recurrence pattern for the scheduler responsible for sending updates to the System Landscape Directory (SLD) By default this parameter is set to every day at 1:00 AM

- Restart all the dispatcher instances of the Core Server system.

**NOTE**

Consult the *SAP CC System Parameter Reference* for more information about the syntax relating to the value of the [SLD_SCHEDULER_RECURRENCE parameter](#).

System Settings for CA APM Introscope (IS)

CA APM/Wily Introscope (IS) is the monitoring application specialized for SAP Convergent Charging. It includes:

- A server system (CA APM IS Enterprise Manager) that monitors information from agents
- A user interface (CA APM IS Enterprise Manager)
- Agents plugged to each instance of the running SAP CC systems (CA IS Java Bytecode Instrument Agent) to collect information from probes and to send this data to the monitoring system of CA APM IS

For more information, consult the *SAP CC Operations Guide* documentation.

Configuring the Introscope Agent

In this *Customizing* activity, you manually configure the *CA Introscope Java Bytecode Instrumentation Agent* that is pre-installed in each SAP CC Core Server system.

Use

When the configuration is performed during the initial installation of the Core Server system, do not perform this task.



NOTE

You can also use the bellow procedure to check for correctness.

Default Settings

SAPinst always pre-install the binaries of the CA APM IS Java Agent for SAP Convergent Charging. During the installation enable the automted configuration.

Procedure

Refer to the SAP Note [1453216 - CA Wily Introscope for SAP Convergent Charging](#) about the procedure to perform.

Results

You restart the Core Server system and verify it connects to the CA APM Introscope Enterprise Manager system.

System Settings for Publishing Public Notifications

SAP Convergent Charging 5.0 features notifications and alerts at business and administrative levels that allow you to monitor events and receive alerts or notifications when these events occur. SAP CC 5.0 provides a framework based on Java APIs for implementing this feature in your client application (provisioning system, billing system, and SMS gateway).

The event types are organized into Notification Groups, and the notifications are configured in the Notification Policy which is configured in an XML file that must be imported into the database.

Overview of the Function

Notification Groups

The event types that generate notifications are defined in the following notification groups:

- **ABM Group:** During the rating and charging functions related to an usage of a marketable service by a customer, SAP CC triggers Account Balance Management (ABM) notifications when:
 - The balance of a prepaid account or of a credit limit goes below a specified threshold
 - Or when a prepaid account has expired



NOTE

For test or training purposes, you can use the [SAP CC Core Tool user interface](#) to configure the alerts which are part of the subscriber account settings (refer to the [Core Tool primary help](#) for more information about the alert settings related to credit limit balances and prepaid accounts).

- Or when an alert has been set up in the price plan or the charging plan of a charge activated in a provider contract or a subscription (by using the [Alert Triggering Operator](#)).
- **Administrative Group:** It triggers administrative notifications related to the connections between the systems (for example, database, and instances of the Core Server).

Notification Policy

An administrator can define the rules to publish notifications by setting up a notification policy. This policy defines:

- The filters that can be applied to limit the internal events that will generate a notification
- The outputs for these notifications

Notification Output

The master dispatcher instance provides a network notification service used for publishing both the ABM notifications and the administrative notifications. The feature uses the *Message TCP* technical interface. Your application can handle these notifications by implementing the Java framework.



NOTES

- Consult the *SAP CC Application Help* for more information about the BARBus communication layer (see page [51]).
- In an *SAP Solution* scenario with the SAP CRM and SAP ERP/FI-CA components of SAP Business Suite, some publications are extended to the JCo interface.
- The notification function is provided by the SAP CC Core Server system. The BART Server system provides other mechanisms.

Implementation Project

You need to use the Java Libraries provided with SAP CC 5.0 and its `com.highdeal.notification` Java package to implement the handling of notifications in your application system. A Software Development Kit (SDK) includes these libraries and the relevant documentation.

The implementation project is detailed in the next Implementation section.

Function	Technical Interface	Software Units	Technical Operation or API
Handling of Notifications	Java	Core SDK	Java Package: <code>com.highdeal.notification</code> Java Class: <code>NotificationHandler</code>



NOTE

For more details, consult the *Java API Reference* of the Core SDK (see page [51]).

Notifications

ABM Notifications

The Account Balance Management (ABM) notifications are described in the following table:

Notification Name / ID	Level	Scope	Description
Amount alert (ID: 0)	inform	Prepaid account or a credit limit balance	Thrown when an amount alert is triggered, that is, when a prepaid account or a credit limit balance goes below the amount threshold of the alert The following information is provided: ■ The service provider of the subscriber account ■ The ID (code) of the subscriber account ■ Is "prepaid" or "creditLimit" if the related balance is a prepaid account or a credit limit balance ■ The ID (code) of the balance for which an amount alert has been triggered ■ The current amount of the balance with its currency ■ The message of the alert as configured in the subscriber account ■ The amount threshold of the alert These alerts are configured for each subscriber account by the external CRM or the provisioning system during the customer data provisioning process.
Expiration alert (ID: 1)	inform	Prepaid account	Thrown when the expiration alert of a prepaid account is triggered The following information is provided: ■ The service provider of the subscriber account ■ The ID (code) of the subscriber account ■ The ID (code) of the balance for which an amount alert has been triggered ■ The message of the alert as configured in the subscriber account ■ The state related to the alert ■ The date when the state change occurs ■ The period when the alert is triggered around the change date These alerts are configured for each subscriber account by the external CRM or the provisioning system during the customer data provisioning process.
User alert (ID: 12)	inform	Price plan or charging plan	Thrown when a user defined alert is triggered This message includes: ■ The code that identifies the user alert ■ The message describing the user alert

Notification Name / ID	Level	Scope	Description
			■ The service provider of the subscriber account ■ The code of the subscriber account ■ A list of properties that gives additional information about the user alert Use the Core Tool user interface to configure your own alerts by using the Alert Triggering Operator in a reusable charge defined for the service provider.

You can get the last list of notifications from the Core SDK in the [NotifBook](#) topic of the Core Java API Reference.

Administrative Notifications

The following notifications can be sent by:

Notification Pretty Name / ID	Level	Availability	Description
Instance is up (ID: 2)	inform	common	The instance of the Core Server is running
Instance is Down (ID: 3)	inform	common	The instance of the Core Server was manually stopped This trap may not be sent when the instance crashes.
Database link is down (ID: 4)	failure	common	The instance of the Core Server has lost its connection with its database There are several reasons: ■ The database is stopped (accidentally or voluntarily) ■ The network interface is down ■ The instance cannot contact the database host because of a network problem (for example, the firewall configuration) This trap is not thrown when the instance has been launched if the instance cannot contact the database because of a wrong configuration.
Database link is up (ID: 5)	inform	common	The instance of the Core Server has opened new database connections
Database failure	failure	common	The database has returned a failure exception

(ID: 6)			The argument “alertMessage” of the trap describes the reason of the problem.
Out of memory (ID: 7)	fatal	common	The instance of the Core Server has been stopped because its JVM has thrown an OutOfMemoryException The trap may not be sent because the JVM has not enough memory to process the trap.
pnrShedulerWakesUp / 8	inform	common	The Updater instance scheduler wakes up. The scheduler starts a new activation cycle.
pnrShedulerSleeps / 9	inform	Updater instance	The Updater instance scheduler sleeps. The Updater instance scheduler may be waiting for its next activation cycle.
pnrShedulerInterrupted / 10	inform	Updater instance	The Updater instance scheduler has been interrupted. The environment of the instance prevents the scheduler to complete its cycle (the activation has failed, there is a problem of memory, and so on). The argument “alertMessage” of the trap describes the reason of the interruption.
authenticationFailure / 11	security	common	An XML message has been received without a valid authentication (unknown login or wrong password) The argument “alertMsg” of the trap is set to “unknown login” or “wrong password”. It has also one argument “alertData” set to the login (if specified) or set to “no login”.

You can get the last list of notifications from the Core SDK in the [NotifBook](#) topics from the Core Java API Reference.

Setting up the Notification Policy Function

Prerequisites

The notification function has been implemented in your landscape by your project team and consultants.

Activities

To set up the notification policy, do the following:

- Define your notification policy concept
- Create the configuration file of the notification policy (xml format)
- Enable the function
- Restart the Core Server system (all instances)

Defining a Concept for the Notification Policy

By default, all the notifications are sent. You must decide if you want to limit the notifications to a group (ABM, admin) and if you want to filter some particular notifications.

Creating a Notification Policy Configuration File

Use

A configuration file (XML format) is used to define the notification policy. It includes a main XML element (`notificationPolicy`) that can include two nested elements: `filters` and `network`.

Nested Element	Nested Element	Attribute	Description
<code>filters</code>			
	<code>all</code>	<code>accept</code> (optional)	Enables or disables all the notifications The possible values are: ■ true (default) ■ false

Nested Element	Nested Element	Attribute	Description
	range	accept	Enables or disables the notifications with the ID belonging to a defined range [lower, upper] The possible values are: ☐ true ☐ false
		lower	Lower ID of the range
		upper	Upper ID of the range
	set	accept	Enables or disables a notification specified by its ID
		id	
	name	accept	Enables or disables the notifications by their name
		pattern	A regular expression about the name of the notifications
	prettyName	accept	Enables or disables the notifications by their pretty name
		pattern	A regular expression about the name of the notifications
	level	accept	Enables or disables the notifications by their level
		lowerLevel	Level values are: 'inform', 'warn', 'security', 'failure', and 'fatal'
network		groups	Specify the notification groups that send notifications The possible values are: ☐ abm ☐ admin ☐ abm,admin

Default Settings

A template configuration file is provided as an example.

Prerequisites

- You have determined a concept for the notification policy management
- The notification function has been implemented in your system landscape by your project team and consultants, and a Java based application can retrieve the notifications published by SAP CC on the network (see page [\[148\]](#)).

Procedure

To create a new configuration file:

- Copy the notification_policy.xml.sk template file from the configuration folder of the Core Server (/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/)
- Edit this new file and insert your settings according to the XML format
- Save the file in a work folder

Enabling the Notification Policy Function

Use

SAP CC 5.0 can regularly send notifications to connected Java applications. By default, this function is not enabled at the installation time.

Default Settings

- No notification is published by the SAP CC Core Server system
- In the standard installation, *SAPinst* does not set up this function
- A template configuration file is provided as an example (see notification_policy.xml.sk)

Prerequisites

- You have created a configuration file for your notification policy.
- The notification function has been implemented in your landscape by your project team and consultants, and a Java based application can retrieve the notifications published by SAP CC on the network.

Procedure

To import your policy from a file:

- From a dispatcher instance of the SAP CC Core Server system, use the [Setup Tool](#) user interface and use the `notificationpolicy` command with the `import` option.

**EXAMPLE**

Enter the command: `notificationpolicy import <MY_FILE_NAME_AND_PATH>`

- Restart all the instances of the Core Server system

System Settings for the Management of Provider Contracts

Enabling the Optimization of Provider Contracts

Use

The provider contracts in master data are optimized to reduce their memory footprint and improve performances. Some versions of the provider contracts are merged or removed to make the number of versions decrease. To optimize the master data management and benefit from this function, you change the `CONTRACT_PACKING_ENABLED` parameter.

Prerequisites

The first version of the SAP CC software that you implemented was older than SAP CC 4.0 SP09.



NOTE

As of SAP CC 4.0 SP09, the provider contracts are automatically optimized by the SAP CC Core Server system.

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Log on as administrator
- For each updater instance of the SAP CC Core Server system:
 - Change the value of the system parameter `CONTRACT_PACKING_ENABLED` to `true`
- Restart all the instances of the SAP CC system

System Settings for Data Cache Management

SAP Convergent Charging 5.0 uses data caches for optimizing all the processes and increasing performance.

Setting up the Cache Sizes

Use

After installing the production landscape, you must change the values of the data cache sizes to take into account the business traffic supported by SAP CC 5.0.

The memory set for the caches must not exceed the value of `MaxDirectMemorySize`; otherwise, the process causes an `OutOfMemory` error.

Prerequisites

These sizes have been determined on a test platform during the implementation phase (see the implementation section in this chapter).

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Log on as administrator
- For each updater instance of the SAP CC Core Server system
 - Change the value of the `SUBSCRIPTION_CACHE_SIZE` parameter according to the cache sizing results
- For each Guider Instance
 - Change the value of the `GUIDING_CACHE_SIZE` parameter
- For each rater instance
 - Change the value of the `SUBSCRIPTION_CACHE_SIZE` parameter
 - Change the value of the `SESSION_MEMORY_SIZE` parameter when applicable
- Restart all the instances of the SAP CC system



NOTE

For setting the sizes of the caches, you can:

- Use a number immediately followed by k or K for kilobytes, m or M for megabytes, and g or G for gigabytes
- Or use a number without letters to express the size in bytes

Advanced: Enabling the Cache Warm-Up Function

Use

SAP CC 5.0 can preload data related to the end customers to increase performance of charging services.

You need to restart partially the SAP CC Core Server system. Do not enable this function in a production system landscape without validations on a quality control landscape.



NOTE

Consult the *SAP CC Application Help* for more information about the cache warm-up mechanism.

Default Settings

This function is disabled.

Prerequisites

- You want to optimize the performances of the online and offline charging services in the production system landscape
- You have determined the appropriate settings for the cache warm-up function



NOTE

Consult the *SAP CC System Parameter Reference* for more information about the configuration parameters of the SAP CC 5.0 systems.

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command

- Change the CACHE_WARMUP_THREAD_COUNT parameters to the relevant values
- Change the SQLHELPER_CONNECTION_COUNT parameters to the relevant values
- Restart all the guider instances of the SAP CC system
- Restart all the rater instances

Result

The cache warm-up function is enabled.

System Settings for Catalog Transport

Importing Transport Destinations

Use

In this *Customizing* activity, you determine the transport destinations used in the catalog transport feature, when transporting change lists from the current SAP CC system to these transport destinations.

Prerequisites

The SAP CC systems which will be used as transport destinations are already installed and configured with the appropriate SAP CC technical users granted with the `Administrator` role. For further information about User Management, Roles and Authorizations, refer to the [Security Guide documentation](#).

Default Settings

By default, the transport destination list is empty.

Activities

- Export the transport destination list:
 - Launch the [Setup Tool user interface](#)
 - Confirm and authenticate the command as system administrator
 - Export the transport destination list using the `transportdestination exportList` command
- Optionally, in case of secured transport destinations, import the certificates of the remote SAP CC systems:
 - Launch [Setup Tool](#)
 - Confirm and authenticate the command as system administrator
 - Import the certificate of the remote SAP CC system using the `certentry import` command. For further information about this operation, refer to the *Securing the Core Server* section of the *SAP CC Application Help* documentation
- Configure the transport destination list:
 - Edit the exported file to add and/or remove transport destinations. Consult the primary help of the `transportdestination importList` command for a description of the content of the transport destination file and the XML schema corresponding to this file

- Optionally, in case of secured transport destinations, specify the alias of the associated certificate entry using the “trustedCertificateEntryAlias” XML element. If this alias is not specified, the certificates defined for the “ws” communication channel of the updaters will be used by default.
- Import the transport destination list:
 - Launch [Setup Tool](#)
 - Confirm and authenticate the command as system administrator
 - Import the transport destination list using the `transportdestination importList` command

Result

The transport destination list is updated in the back-end Core database. New transport destinations will be used by transport requests created after the modification without the need to restart the updater instance in the SAP CC system.

Security Restrictions

If the Catalog Transport feature is used to transport change lists to secured SAP CC systems, please note that these remote SAP CC systems must respect the following constraints:

- The external communications (relying on the XML over HTTP or SOAP over HTTP communication channels) of the dispatcher and updater instances must be configured with the “off” or “oneway” secure mode. **The “dual” authentication mode is not supported.**
- The certificates associated to the remote SAP CC systems must be valid for all the external communications

Configuring the Scheduler for Transport Requests Execution

Use

In this *Customizing* activity, you determine the behavior of the scheduler responsible for executing the transport requests whose status is set to ‘CREATED’.

Prerequisites

This activity is only relevant if you have implemented the catalog transport feature during the implementation project, and if you have imported a list of transport destinations in SAP CC using the Setup Tool user interface.

Default Settings

By default, the scheduler in charge of executing transport requests is deactivated. To activate the scheduler, you must modify the value of the `TRANSPORT_SCHEDULER_ENABLED` system parameter, in conjunction with the `TRANSPORT_SCHEDULER_RECURRENCE` parameter which gives the possibility to change the execution recurrence to fit specific needs.

Refer to your technology consultant to modify these parameters with the [Admin+ user interface](#).

**NOTE**

Only one execution of this scheduler is possible at the same time.

More Information

Consult the *SAP CC 5.0 Application Help* for more information about the Catalog Transport feature. Refer to the *SAP CC 5.0 System Parameter Reference* for more information about the parameters relating to the configuration of the scheduler in charge of executing transport requests.

System Settings for Troubleshooting Functions

Enabling or Disabling the Generation of Thread Dump Files

Use

As of SP 1, SAP CC 5.0 gives the possibility to generate files containing detailed information about the execution context of the processing threads that are executed within each instance of the SAP CC Core Server system in your system landscape. In case a problem occurs during the execution of a business or technical operation, or if the execution exceeds some defined thresholds, the related instance generates these dump files automatically. This function provides your *SAP Support Team* with a new supportability tool that completes the `dump` command of SAP CC Admin+. It facilitates the troubleshooting investigations.



NOTE

Consult the description of the “*Troubleshooting (Advanced): Thread Dump Generation*” group available in the [SAP CC System Parameter Reference documentation](#) for more information about this function and the defined system parameters; see page [21].

Procedure

- Launch the SAP CC [Admin+](#) user interface
- Connect to the SAP CC Core Server system with the `host` command
- Log on as administrator with the `user` command
- Change the `THREAD_DUMP_ENABLED` system parameter to `true` if you want to activate the thread dump generation, or to `false` otherwise.
- Depending on your technical requirements, change the related system parameters

User assistance:

- Operations Guide
- Primary help of Admin+

Implementation Tasks

Determining the Logging and Tracing Policy

Use

In this *Customizing* activity, you define the policy for logging and tracing. You determine the data generated by the SAP CC system, the formats, and the storage locations. You determine the possible impacts on maintenance operations.



NOTES

- For more information about logging and tracing functions, see the *SAP CC Application Help* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → *Application Help* → *Features* → *Logging and Tracing* ◀.
- For more information about the system parameters, see the *SAP CC 5.0 Core Server - System Parameter Reference* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → *Administration* → *Core Server* → *Parameter Reference* ◀.

Default Settings

The default settings are defined and recommended for a productive system:

- The log function is activated. The severity thresholds are set to `inform`.
- The trace function is activated. The severity threshold is set to `error`.
- Each instance of the system stores the files in its local working folder.
- Logs and traces are not mixed in the same destination files
- File rotation is activated



RECOMMENDATION

The following settings are recommended for a productive landscape:

- Log generation is activated
- Trace generation is activated
- Severity thresholds for logs are set to inform level
- Severity threshold for traces is set to error level

- Logs and traces are generated to different file destinations

Activities

- When relevant, export the settings from the SAP CC Core Server system
- Define your policy for the management of log messages and trace messages:
 - Define the severity thresholds for logs and traces
 - Define the destination(s) of the events recorded
 - Define the formats of these records
 - Define the storage locations (shared directory, individual work folder)
 - Define the rotation rules for files (number of files, file size)
- Determine the appropriate configuration parameters for the SAP CC Core Server system
 - Determine if you need to define some different values for certain types of instance of the system
- Use the *Changing the Settings of the Logging and Tracing Functions* section to apply the logging and tracing policy
- Determine the possible impacts for a production landscape. If you have customized the filenames and the directory names, the rotation mechanism will not be efficient enough: Some old log and trace files will remain in the hosts and maintenance operations may be necessary to check the available space.

The following table contains the list of available settings related to the logging and tracing policy, including the correspondence between system parameters and JVM options:

Settings	Description	System Parameter	JVM Option
Logs (business processing level)	Severity threshold for logs	LS_APP_SEVERITY	ls.app.severity
	Identifier(s) of the destination(s)	LS_APP_DESTINATION	ls.app.destination
Logs (system processing level)	Severity threshold for logs	LS_SYS_SEVERITY	ls.sys.severity
	Identifier(s) of the destination(s)	LS_SYS_DESTINATION	ls.sys.destination
Traces	Severity threshold for traces	LS_TRC_SEVERITY	ls.trc.severity
	Identifier(s) of the destination(s)	LS_TRC_DESTINATION	ls.trc.destination
	Domain(s) for traces	LS_TRC_DOMAIN	ls.trc.domain
Console Destination	Enable/Disable	LDC_ENABLED	ld.console.enabled
	Output format	LDC_FORMATTER	ld.console.formatter
Fileset Destination #1	Enable/Disable	LDF1_ENABLED	ld.file1.enabled
	Output format	LDF1_FORMATTER	ld.file1.formatter
	Number of files available for the rotation	LDF1_FILESET_SIZE	ld.file1.setsize
	Maximum file size before rotation	LDF1_FILE_SIZE	ld.file1.size
	File path, name, and extension	LDF1_FILE_NAME	ld.file1.name
	Enable/Disable	LDF2_ENABLED	ld.file2.enabled

Fileset Destination #2	Output format	LDF2_FORMATTER	ld.file2.formatter
	Number of files available for the rotation	LDF2_FILESET_SIZE	ld.file2.setsize
	Maximum file size before rotation	LDF2_FILE_SIZE	ld.file2.size
	File path, name, and extension	LDF2_FILE_NAME	ld.file2.name
Fileset Destination #3	Enable/Disable	LDF3_ENABLED	ld.file3.enabled
	Output format	LDF3_FORMATTER	ld.file3.formatter
	Number of files available for the rotation	LDF3_FILESET_SIZE	ld.file3.setsize
	Maximum file size before rotation	LDF3_FILE_SIZE	ld.file3.size
	File path, name, and extension	LDF3_FILE_NAME	ld.file3.name
Fileset Destination #4	Enable/Disable	LDF4_ENABLED	ld.file4.enabled
	Output format	LDF4_FORMATTER	ld.file4.formatter
	Number of files available for the rotation	LDF4_FILESET_SIZE	ld.file4.setsize
	Maximum file size before rotation	LDF4_FILE_SIZE	ld.file4.size
	File path, name, and extension	LDF4_FILE_NAME	ld.file4.name
Fileset Destination #5	Enable/Disable	LDF5_ENABLED	ld.file5.enabled
	Output format	LDF5_FORMATTER	ld.file5.formatter
	Number of files available for the rotation	LDF5_FILESET_SIZE	ld.file5.setsize
	Maximum file size before rotation	LDF5_FILE_SIZE	ld.file5.size
	File path, name, and extension	LDF5_FILE_NAME	ld.file5.name

Log and Trace Policy Determination Form

Enabling the New Configuration of the Logging and Tracing Framework

As of the release 4.1 of SAP CC, the configuration of the logging and tracing mechanism relating to the Core Server system has changed. It is now possible to write all logging and tracing information in the same location (before and after connecting to the back-end database).

For backward compatibility reasons, the existing logging and tracing configuration is not modified during the upgrade process. You must thus manually change this configuration to benefit from this enhancement.

Procedure

- Connect to the *SAP Global Host* of your SAP CC Core Server system in the system landscape
- Open a system console
- Open the “/usr/sap/<SID>/CCD<SAP_INST_NB>/script/” directory
- Launch the [Config Tool user interface](#)
- Execute the following command to export the system parameters of your SAP CC Core Server system:
`./config.sh configuration export <system parameters file> all`
- Open the newly created <system parameters file> file
- For each instance type (dispatcher, updater, guider, rater, bulkloader, taxer), execute the following operations:
 - Mark down the values of the system parameters relating to destinations, storage location, file rotation rules and format, for which the value is not empty. The names of these parameters start with “LDF” or end with “DESTINATION”
 - Find the names of the JVM options that correspond to these system parameters using the following table:

System Parameter	JVM option
LDF<id>_ENABLED	ld.file<id>.enabled
LDF<id>_FILE_NAME	ld.file<id>.name
LDF<id>_FILE_SIZE	ld.file<id>.size
LDF<id>_FILESET_SIZE	ld.file<id>.setsize
LDF<id>_FORMATTER	ld.file<id>.formatter
LS_APP_DESTINATION	ls.app.destination
LS_SYS_DESTINATION	ls.sys.destination
LS_TRC_DESTINATION	ls.trc.destination

- For each system parameter:
 - Set the corresponding JVM option to the same value than the system parameter one
 - Remove the “value” attribute of the system parameter
- In addition, update the following JVM options:
 - Dls.trc.severity=PATH
 - Dls.trc.domain=SQL,NET,HB
- In addition, remove the following JVM option:
 - Dld.console.enabled=true



EXAMPLE

Considering the following list of system parameters:

- LDF1_ENABLED = true
- LDF1_FILE_NAME = work/log/@INSTANCE_ID@.log
- LDF1_FILE_SIZE = 4
- LDF1_FILESET_SIZE = 200M
- LDF1_FORMATTER = LIST
- LS_APP_DESTINATION = LDF1
- LS_SYS_DESTINATION=LDF1
- LS_TRC_DESTINATION=LDF2

The corresponding JVM options to set are:

- -Dld.file1.enabled=true
 - -Dld.file1.name=work/log/@INSTANCE_ID@.log
 - -Dld.file1.size=4
 - -Dld.file1.setsize=200M
 - -Dld.file1.formatter=LIST
 - -Dls.app.destination=LDF1
 - -Dls.sys.destination=LDF1
 - -Dls.trc.destination=LDF2
 - -Dls.trc.severity=PATH
 - -Dls.trc.domain=SQL,NET,HB
- Edit the Startup Configuration File of each instance of the current type and set the JVM options determined above. Refer to the *Setting up the JVM Options in a Startup Configuration File* section for the exact procedure
 - Execute the following command to import the modified version of the system parameters within your SAP CC Core Server system:
`./config.sh configuration import <system parameters file>`
 - Restart all the instances of your SAP CC Core Server system to apply the modifications

Determining the Sizes of the Data Caches

Use

SAP CC 5.0 has three different caches which must be sized according to the volume of data (master data or transactional data):

- Master data related to end customers
 - Subscription level cache
 - Access level cache
- Transactional data
 - Rating Session Cache
 - This cache is not used if the Business Scenario does not use the session-based rating and charging services of SAP CC



NOTE

Other caches such as the offer level cache exist but they are automatically sized. Consult the *SAP CC Application Help* for details about the data cache structures.

This *Customizing* activity explains how you can size these caches to optimize the functioning of the SAP CC Core Server system.

You cannot guess the average size of the objects to be cached because the size is different for every SAP CC 5.0 platform. Therefore, the instances of the Core Server are first started with a predefined size, and the size of caches must be fine-tuned.

To determine the size of a cache, the best way consists in having a sample of objects contained in the cache and determine the average size of these objects.

The recommended method consists in simulating the presence of 1,000 end customers of a service provider and creating all relevant and necessary business objects relevant for your implementation:

- Customer master data: 1,000 subscriber accounts, 1,000 provider contracts or subscriptions (and relevant accesses), relevant business data tables (subscriber mapping tables and subscriber range tables)
- Master data related to a service provider: Relevant pricing objects (charge plans, offers, and suboffers, charges with price plans, and charging plans including pricing macros or business data tables like tier or translation tables, mapping or range tables)

This simulation is important and must model the future usage of the SAP CC system.

Prerequisites

- The system is up and running
- You have determined a model for your *Business Scenario*

Activities

Size your caches manually by applying the following method for each cache type:

- Start an instance of each type (Dispatcher, Updater, Guider, Rater, and Taxer when relevant) with the default values for sizing the cache
- Write down the size S_1 and the free memory FM_1 for each cache and for each instance type
 - Launch the [SAP CC Admin+ user interface](#)
 - Connect to the Core Server with the `host` command
 - Log on as administrator with the `user` command
 - Use the `get` command with the following parameters: `SUBSCRIPTION_CACHE_SIZE`, `GUIDING_CACHE_SIZE` and `SESSION_MEMORY_SIZE`
 - Write down the current sizes of the data caches: Subscription cache, access cache (`GUIDING_CACHE_SIZE`), and rating session cache (`SESSION_MEMORY_SIZE`)
 - Use the `get` command with the following parameters: `SUBSCRIPTION_CACHE_FREE_MEMORY`, `GUIDING_CACHE_FREE_MEMORY` and `SESSION_FREE_MEMORY`
- Create N_o typical objects (about 1,000, for example) to be stored in the caches: Subscriber accounts, subscriptions or provider contracts, and accesses
- Restart all the instances of the Core Server system
- Write down the size S_2 and the free memory FM_2 again
- Compute the memory needed for the newly created objects:
 - If the size of the cache has not changed, calculate the difference between the free memory size at the first launch and the free memory size at the second launch ($FM_1 - FM_2$).

- If the size has changed, apply the following formula $(S_2 - FM_2) - (S_1 - FM_1)$.
- Divide the previous result by the number of objects you have created in the cache, and then multiply the result by the number of objects you plan to have in the future N_f .
- Add the result to the first computed size: You obtain the size of your cache
- Increase S_2 and the total size of the JVM with this number to prevent the memory for the cache from being taken by another cache or the JVM. See the following sections to know how you can modify the size of the caches and the memory for the JVM.
- To sum up, the cache size is estimated as follows:

$$\frac{FM_1 - FM_2}{N_o} * N_f$$

Or:

$$\frac{(S_2 - FM_2) - (S_1 - FM_1)}{N_o} * N_f$$

- Divide this result by the number of instances of the same type
- Use these values when configuring the production landscape

Result

You can set up the SAP CC system.

Considering the Cache Warm-Up

Use

In this *Customizing* activity, you determine if you need to activate the cache warm-up function to increase the performances of both the online and offline charging services provided by the SAP CC 5.0 Core Server system in your production system landscape.



CAUTION

The data cache warm-up function is mandatory with a HA setup.

Prerequisites

- The data caches have been sized (see previous topic) and the SAP CC system has been configured
- The hardware configuration has been adapted

Activity

Use the following table to make the decision:

Landscape Setup	Cache Warm-Up Function	Description
High Availability (HA) <i>High availability is required for the online charging services provided by your SAP CC landscape</i>	Mandatory	In case of a crash of an instance of the SAP CC system, the cache warm-up function quickly preloads the necessary customer data.  NOTE Consult the <i>SAP CC Application Help</i> for more information about the High Availability (HA) feature.
Non HA	Recommended	We recommend that you enable the function.  NOTE It is highly recommended with SAP CC systems that are regularly restarted (on a daily basis for example).

Determining the Settings for the Cache Warm-Up

Use

In this *Customizing* activity, you fine configure the SAP CC 5.0 Core Server system by setting up the number of running threads necessary to handle the cache warm-up function processed by each of the following system instances:

- Rater instances
- Guider instances

Prerequisites

- You need to enable the data cache warm-up function (see previous topic)

Activities

- Define the configuration for the rater instances of the SAP CC system:
 - Determine the value of the `CACHE_WARMUP_THREAD_COUNT` parameter: It must be equal to the number of CPUs available minus one.
 - When necessary, increase the value of the `SQLHELPER_CONNECTION_COUNT` parameter
- Define the configuration for the guider instances:
 - Determine the value of the `CACHE_WARMUP_THREAD_COUNT` parameter: It must be equal to the number of CPUs available minus one.
 - When necessary, increase the value of the `SQLHELPER_CONNECTION_COUNT` parameter
- Validate this configuration
 - Set up the SAP CC system in the quality control landscape (See [Error! Reference source not found.](#) on page [\[Error! Bookmark not defined.\]](#))
 - Restart the test and quality control system
 - Monitor the CPU, the thread resources, and the processing time of the executions of the warm-up mechanism
- Set up the SAP CC system in the production landscape

RECOMMENDATION

Consider the CPU resources of the machines hosting a rater instance or a guider instance of the SAP CC system. Set up the values of the `CACHE_WARMUP_THREAD_COUNT` parameters with the number of CPUs minus one.

Consult the *SAP CC Sizing Guidelines* about the number of CPUs expected for the host machines dedicated to the SAP CC Core Server system.



EXAMPLE

You want to enable the data cache warm-up function.

Your landscape includes 8 CPU machines that host the rater instances and the guider instances of the SAP CC Core Server system. `CACHE_WARMUP_THREAD_COUNT` is set to 0 for both types of instances. `SQLHELPER_CONNECTION_COUNT` is set to 20 for the rater instances and to 8 for the guider instances.

Possible values for the system parameters are:

- Rater
 - `CACHE_WARMUP_THREAD_COUNT`: 7
 - `SQLHELPER_CONNECTION_COUNT`: 27
- Guider
 - `CACHE_WARMUP_THREAD_COUNT`: 7

- SQLHELPER_CONNECTION_COUNT: 15

Implementing a Notification Handler in Your Java Application

In this customization activity, you develop a client application based on Java to implement the notification handling function. From the Core SDK, you use the `com.highdeal.notification` package of the SAP CC 5.0 Java Libraries.

Perform the following steps to implement the notification handler for Balance Alerts in your Java application:

- Implement the `NotificationHandler` interface
- Instantiate the `NotificationServiceClient` object



NOTE

For more information see the SAP CC Java API Reference (Core) in the technical library from the Software Development Kit (SDK) or in SAP Help Portal at the following location: <https://help.sap.com/cc> → SAP CC 5.0 → Core Server APIs → All Classes → [NotificationHandler](#).

Implementing the Notification Handler Interface

In this *Customizing* activity, you develop your own notification handler by implementing the `com.highdeal.notification.NotificationHandler` interface. This interface has only one method invoked each time a notification is received:

```
void handleNotification(String clusterName,
                        int instanceID,
                        long timestamp,
                        int uid,
                        String... args);
```

In this method, you receive all the information about the notification:

- `clusterName` – the name of the cluster which the instance that has sent the notification belongs to
- `instanceID` – The ID of the instance which has sent the notification
- `timestamp` – The date on which the notification has been sent
- `uID` – The unique identifier of the notification
- `args` – The arguments of the notification

To get the description of the notification, invoke the method:

```
NotificationDescription desc =
NotifBook.searchNotificationDescription(uid);
String notifName = desc.getName();
String notifPrettyName = desc.getPrettyName();
NotificationLevel notifLevel = desc.getSeverityLevel();
String[] notifArgNames = desc.getAdditionalInfoKeys();
```

This description contains the name, the pretty name, the level of severity, and the name of the arguments of the notification.



CAUTION

Note that the thread invoking the handler is the one listening on the socket. Thus, the thread must be quickly freed by using a thread pool to handle the received notification; otherwise, some notifications may be lost if the listening thread is busy.

Consult the Java classes `NotificationDescription` and `NotifBook` that are detailed in the package `com.highdeal.notification`.

Instantiating the Notification Service Client Object

In this *Customizing* activity, you develop your Java application (client side).

Perform the following steps to instantiate your program:

- Instantiate a `NotificationHandler` object
- Instantiate an `InstanceMap` object with the `searchInstanceMap` method
- Instantiate a `NotificationServiceClient` object
- Initialize this client object with the `setNotificationHandler` and the `addAllConnections` methods
- Connect the client object to receive notifications

Your notification handler will be invoked each time an instance of the Core Server system sends a notification using the notification service.



EXAMPLE

```
NotificationHandler notifHandler = ...  
InstanceMap map = NotificationServiceClient.searchInstanceMap(bootHostName, bootPort,  
bootMode);  
client = new NotificationServiceClient();  
client.setNotificationHandler(notifHandler);  
client.addAllConnections(map);  
client.connect(null, 10000);
```

Results

- Your Java application can receive and handle the notifications sent by the SAP CC Core Server system
- You can define a concept for the notification policy

- You can configure the Core Server system to enable the notification function with this policy
- For test purpose you can create prepaid accounts or credit limit balances in the subscriber accounts
- You can implement the provisioning function of end customer master data (subscriber account, prepaid account, credit limit balance) to define alerts based on amount threshold

**NOTE**

For more information about this configuration of master data for the end customers of a service provider in SAP Convergent Charging, see the *SAP CC product documentation* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Subscriber Accounts → Prepaid Accounts → Alerts ◀.

Determining the Purge Schedule for Idempotent Services

Use

In this *Customizing* activity, you determine the schedule of the purge of all the idempotency table entries in the back-end database.

Prerequisites

This activity is only relevant for the following contexts:

- During the implementation project, you have implemented the safe invocation mechanisms provided by the SAP CC Web Service
- During the implementation project, you have implemented the refilling services provided by the SAP CC Web Service

Activities

- You determine the time frame for which the SAP CC system must keep traces for already processed Web service calls
- You determine the peak and average volumes of operation requests via the SAP CC Web Service technical interface. Consider only the operations that implement the idempotent service and safe invocation.
- You determine the peak and average volumes of refill operation requests via the SAP CC Web Service technical interface
- You determine the best schedule of the purge
- You write down this information in an operations book

Result

During the operation phase of a production landscape, the SAP CC system administrator knows when to purge this data.

Implementing Logging and Tracing in an External Monitoring System

Use

In this *Customizing* activity, you determine the configuration of an SAP CC system to be able to exchange log and trace data with an external monitoring system.

Default Settings

By default, you can view and analyze the logs and traces generated by SAP CC in SAP Management Console (SAP MC or SAP MMC).

Activities

- You determine if the XML format is relevant for your external monitoring system
- You determine if a file transfer is necessary and how to implement it
- You determine the final settings for log and trace file management by the SAP CC system

Implementing Logging and Tracing in Your Java Application

Use

In this Customizing activity, you develop a Java-based application to redirect the logs and traces generated by the SAP CC 5.0 Java Libraries dedicated to the following processes:

- Acquisition and collection
- Charging
- Provisioning via HCI
- System administration via HCI



NOTE

For more information about the SAP Logging API, see in SAP Help Portal at the following location: <http://help.sap.com> → SAP Netweaver → Using Central Development Services → Developing Logging-Enabled Applications → [SAP Logging API](#).

Prerequisites

- You use the SAP JVM
- Your developments use the Java libraries from the SAP CC 5.0 Core SDK
 - client.jar
 - sap.com~tc~logging~java.jar
- Your source code uses
 - The `com.highdeal.cnd.message` package of the SAP CC Java Libraries
 - The `com.highdeal.hci.http` package of the SAP CC Java Libraries

Activities

Insert the `sap.com~tc~logging~java.jar` file in the Java class path of your developed application

Create a configuration file and set up the necessary system properties used by the SAP CC 5.0 Java Libraries:

System property for your custom application	Similar parameter available in SAP CC systems
ls.app.severity	LS_APP_SEVERITY
ls.sys.severity	LS_SYS_SEVERITY
ls.trc.severity	LS_TRC_SEVERITY
ls.app.destination	LS_APP_DESTINATION
ls.sys.destination	LS_SYS_DESTINATION
ls.trc.destination	LS_TRC_DESTINATION
ls.trc.domain	LS_TRC_DOMAIN
ld.console.formatter	LDC_FORMATTER
ld.file1.enabled	LDF1_ENABLED
ld.file1.name	LDF1_FILE_NAME
ld.file1.size	LDF1_FILE_SIZE
ld.file1.setsize	LDF1_FILESET_SIZE
ld.file1.formatter	LDF1_FORMATTER
ld.file2.enabled	LDF2_ENABLED
ld.file2.name	LDF2_FILE_NAME

System property for your custom application	Similar parameter available in SAP CC systems
ld.file2.size	LDF2_FILE_SIZE
ld.file2.setsize	LDF2_FILESET_SIZE
ld.file2.formatter	LDF2_FORMATTER
ld.file3.enabled	LDF3_ENABLED
ld.file3.name	LDF3_FILE_NAME
ld.file3.size	LDF3_FILE_SIZE
ld.file3.setsize	LDF3_FILESET_SIZE
ld.file3.formatter	LDF3_FORMATTER
ld.file4.enabled	LDF4_ENABLED
ld.file4.name	LDF4_FILE_NAME
ld.file4.size	LDF4_FILE_SIZE
ld.file4.setsize	LDF4_FILESET_SIZE
ld.file4.formatter	LDF4_FORMATTER
ld.file5.enabled	LDF5_ENABLED
ld.file5.name	LDF5_FILE_NAME
ld.file5.size	LDF5_FILE_SIZE
ld.file5.setsize	LDF5_FILESET_SIZE
ld.file5.formatter	LDF5_FORMATTER

**NOTE**

For more information about these properties, see the SAP CC 5.0 Core Server Parameter Reference in SAP Help Portal at the following location: <https://help.sap.com/cc> → SAP CC 5.0 → Administration → Core Server → Parameter Reference.

Configuring the Allowances Purge Mechanism

Use

In this *Customizing* activity, you determine the behavior of the purge operations dedicated to the allowances which have exceeded a given retention period (and are thus expired). As explained in the Application Help documentation, these purge operations can be executed:

- Automatically using a dedicated scheduler
- Manually using a dedicated command of the Admin+ user interface

Prerequisites

This activity is only relevant if you have implemented the allowances management feature during the implementation project.

Default Settings

Both manual and automatic executions of purge operations relies on the following parameters and indicators, which thus concern the configuration of the Allowances Purge mechanism itself:

- `ALLOWANCES_PURGE_RETENTION_PERIOD`, which represents the number of days until which expired allowances are kept into the back-end database and cannot be deleted
- `ALLOWANCES_PURGE_THREAD_COUNT`, which gives the possibility to specify the number of threads to use when performing allowances purge operations
- `ALLOWANCES_PURGE_LAST_TRIGGER`, which contains the date of the last manual execution of an allowances purge operation

The following additional parameters and indicators only concern the automatic purge operations, which are performed by dedicated scheduler:

- `ALLOWANCES_PURGE_SCHEDULER_LAST_TRIGGER`, which contains the date of the last execution of a purge operation performed by the dedicated scheduler
- `ALLOWANCES_PURGE_SCHEDULER_ENABLED`, which gives the possibility to activate or deactivate the scheduling of purge operations related to expired allowances
- `ALLOWANCES_PURGE_SCHEDULER_RECURRENCE`, which corresponds to the recurrence of the scheduler execution
- `ALLOWANCES_PURGE_SCHEDULER_MAX_THROUGHPUT`, which corresponds to the maximum number of charging contracts per second that the scheduler can consider when purging allowances

By default, the scheduler in charge of executing allowances purge operations is pre-configured:

- To be triggered every day at midnight
- To be executed using 1 thread per rater and purging the allowances of 10 charging contracts per second at the most
- To take into account a default retention period for allowances which must be the same than the retention period used for rating purposes (set as 40 days by default)

This default behavior can be modified to fit specific needs. Refer to your technology consultant to modify these parameters.

**NOTES**

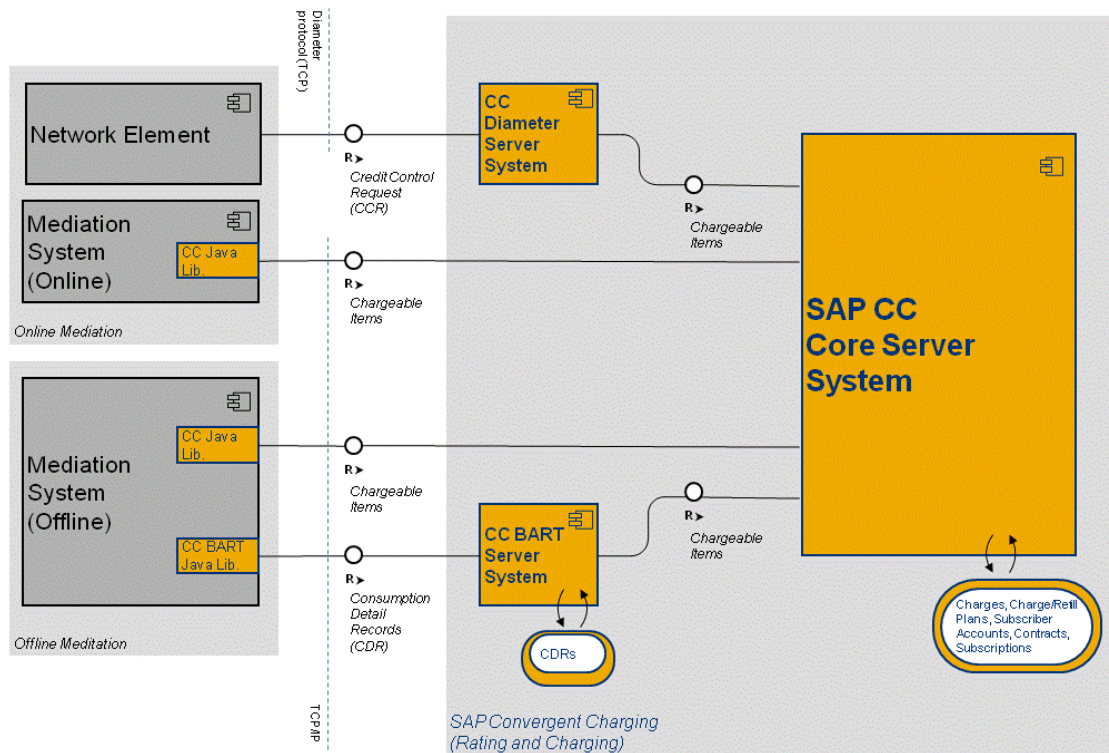
- Only one execution of this scheduler is possible at the same time and the reference date of this execution is recorded in the ALLOWANCES_PURGE_SCHEDULER_LAST_TRIGGER indicator, for information purpose
- For performances purposes, the execution of the scheduler in charge of purging the expired allowances is linked to the scheduler used to perform the activation of provider contracts. When the execution of these two schedulers occurs at the same time, a merged operation is performed to immediately remove expired allowances of each activated provider contract. This merged operation also shares the technical configured resources (threads and throughputs), so it is recommended to decouple the execution of the 2 schedulers if you detect any overload or latency

More Information

Consult the [SAP CC Application Help documentation](#) for more information about the allowances management feature. Refer to the [SAP CC 5.0 System Parameter Reference documentation](#) for more information about the parameters relating to the allowances purge mechanism.

5 Core Server Configuration of the Business Features

This chapter lists the system configurations of the SAP CC 5.0 Core Server system.



Consumption information data flow

Usage Charging

Chargeable Item Charging (Implementation Project)

Use

SAP CC 5.0 receives chargeable items from network elements or service applications for charging the usage of a customer service. These data records must include all the necessary elements for the charging process but also for the invoicing process. Some configuration activities are necessary during the implementation phase and before the installation.



NOTE

When the charging is in mode batch, the BART Server system converts all the incoming CDRs into chargeable items and transmits them to the Core Server system.

Activities

- According to your business requirements, determine the business services and functions of SAP CC that you need for global charging or rating:
 - Online Charging or Offline Charging
 - Event-Based Charging or Session-Based Charging
 - Stateless Rating
- Consider the specific variants:
 - Usage Charging with SAP Convergent Mediation by DigitalRoute
 - Offline Charging with BART
 - Offline Charging with SAP Convergent Invoicing
 - Offline Charging with a customized mediation system
 - Online Charging with Diameter: Session-Based or Event-Based
- Specify the chargeable items (types and contents) that your network elements or the service applications will send to SAP CC depending on the customer services to be charged.
- Make sure that your architecture can manage time zones outside SAP CC 5.0
- Implement the generation and the transmission of chargeable items including information on local time date

- Set up the chargeable item classes in the [Core Tool](#) user interface to model the price plans of charges to be applied on each usage [see [Setting up Chargeable Item Classes](#), page [224]]

Data Customizing: Setting up the Public Holidays

Use

In this *Customization* activity, you configure and maintain the list of public holidays known by SAP CC 5.0 and that are relevant for your business requirements.

- **Data Configuration:** They can be used in the configurations of master data (charge, refill logic, and pricing macro) when modeling decision trees. The public holidays are used in the logic components:
 - Public Holidays Splitter
 - Public Holidays Comparison
- **Runtime:** SAP CC performs the rating, charging, or refill functions by using the configured public holidays

At the installation time, SAP recommends that you verify and configure the public holidays to use in your business environment.

During the project implementation phase or the production operation phase, you maintain the public holidays defined in the SAP CC system regularly.

Consult the [primary help](#) of the Core Tool user interface. You can access to the primary help from the graphical user interface.

Default Settings

By default, a list of predefined public holidays is configured by *SAPinst* when you install the SAP CC Core Server system in your SAP system landscape. The XML file containing the list of holidays installed by default is named `public_holidays.xml`. It is stored in the folder `core_tool/config` of your Core Tool installation.

Prerequisites

You prepared the model and design of the custom public holidays that are expected by your business requirements.

Procedure

- Launch the [SAP CC Core Tool user interface](#) and log on
- In Core Tool, export the current public holidays
- Edit the XML file and add or create your own public holidays. If you are not familiar with the syntax and format, see the next section to prepare this content.
- In Core Tool, import the file to configure the public holidays. It updates the SAP CC Core Server system and the back-end database: **Core Tool** → **Tools** → **Public Holidays** → **Import** .



NOTE

You must restart all the other Core Tool user interfaces to take into account the changes.

Creating Custom Public Holidays in a File

Use

In this *Customization* activity, you design and create an XML file that you can import to the SAP CC Core Server system with the Core Tool user interface (data administration).

Depending on your business requirements, you model and design the public holidays that are required in your SAP system landscape. You can define four types of holidays:

Holiday Category	Description	Example	XML Element
Fixed Day	A holiday with a date which does not vary over years	New Year's Day which always occurs on January 1st	<fixedDay>
Relative Day	A holiday that always occurs the same weekday of a given month	Thanksgiving which occurs the fourth Thursday of November in the United States	<relativeDay>
Easter Relative	A holiday related to Easter (Catholic Church)	Easter Sunday Easter Monday Good Friday	<easterRelative>
Enumerated Day	A holiday occurring at a different date each year, this date being known in advance	Chinese New Year's Day	<enumeratedDay>

See the XML examples available in this section.



TIPS: CUSTOMIZING

You can view and use:

- The current settings configured in the SAP CC Core Server system. In the [Core Tool](#) user interface, export the defined public holidays.
- The delivered public_holidays.xml file

For additional user assistance, consult the [SAP Note 2135160 - Defining public holidays for the charging logic](#).

XML Format

The file format is XML.

The <publicHolidays> Element

The root XML element is <publicHolidays>. It is unique and mandatory. It includes a sequence of <holiday> elements.

The <holiday> Element

The main XML element is <holiday>. It defines a public holiday and contains the `code` XML attribute. Use this element to define several holidays.

It includes a sequence of <description> XML elements, <holiday> elements, and <group> elements.

A public holiday has:

- An identification code that must be unique among the codes of defined public holidays; see the `code` XML attribute.
- Some comprehensive descriptions defined in many different languages; see the <description> element.
- One or several groups if public holidays are grouped, none otherwise; see the <group> element.
- A type selected among the four types; see the relevant XML elements.



EXAMPLE

SAP Convergent Charging defines the *New Year's Day* as follow:

```
<holiday code="NewYearsDay">
  <description lang="en" label="New Year's Day" />
  <description lang="fr" label="Nouvel An" />
  <group code="US" />
  <group code="FR" />
  <group code="DE" />
  <group code="HR" />
  <group code="BE" />
  <group code="LU" />
  <group code="CH" />
  <fixedDay month="January" day="1" />
</holiday>
```

It is a fixed day. The definition includes two descriptions and several groups.

The <description> Element

A text description is mandatory. It contains the `lang` and `label` XML attributes that precise the target language and the label that is visible in SAP Convergent Charging.

The <group> Element

You can define some 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.

For more information about these logic components, refer to the [Logic Component Reference documentation](#) in the primary help of the Core Tool user interface, see page [21].

The <fixedDay> Element

This XML element defines the type of the public holiday.



EXAMPLE

You set up the month and the day corresponding to the date of the holiday. To define New Year's Day which always occurs on January 1st, create an XML file that includes:

```
<holiday code="NewYearsDay">
  <description lang="en" label="New Year's Day" />
  <description lang="fr" label="Nouvel An" />
  <group code="US" />
  <group code="FR" />
  <group code="DE" />
  <group code="HR" />
  <group code="BE" />
  <group code="LU" />
  <group code="CH" />
  <fixedDay month="January" day="1" />
</holiday>
```

The <relativeDay> Element

This XML element defines the type of the public holiday.



EXAMPLE

You set up the weekday, the month of the holiday and the position of the weekday in this month. To define Thanksgiving which occurs the fourth Thursday of November in the United States, create an XML file that includes:

```
<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>
```

The <easterRelative> Element

This XML element defines the type of the public holiday.

**EXAMPLE**

You set up an offset that defines when the holiday occurs relatively to Easter Sunday which is used as a reference date. To define Easter Sunday (offset to zero), Easter Monday which occurs one day after Easter Sunday (offset to one), and Good Friday which occurs two days before Easter Sunday (negative offset to 2), create an XML file that includes:

Easter Sunday:

```
<holiday code="EasterSunday">
  <description lang="en" label="Easter Sunday" />
  <description lang="fr" label="Dimanche de P&#xE2;ques" />
  <group code="FR" />
  <group code="HR" />
  <easterRelativeDay offset="0" />
</holiday>
```

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>
```

Good Friday:

```
<holiday code="GoodFriday">
  <description lang="en" label="Good Friday" />
  <description lang="fr" label="Vendredi Saint" />
  <group code="DE" />
  <easterRelativeDay offset="-2" />
```

```
</holiday>
```

The <enumeratedDay> Element

This XML element defines the type of the public holiday.



EXAMPLE

In the XML file, you specify the list of dates when the holiday is planned. The XML sample below shows how to define Chinese New Year's Day.

```
<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 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" />
    <date value="2019-02-05" />
    <date value="2020-01-25" />
  </enumeratedDay>
</holiday>
```

```
</enumeratedDay>  
</holiday>
```

Activities

You model and design your custom public holidays.

Next

You set up the public holidays in the SAP CC system, see the previous section.

Setting up the Precision and Rounding for Rating and Charging (Implementation Project)

Use

In this *Customizing* activity, you determine and set up the appropriate system configuration of SAP Convergent Charging for the key rating function.

When it is required by your business scenario, you can adapt the precision and rounding mode for the calculations in SAP CC 5.0. Several system parameters are available and can be fine-tuned.

The right values depend on the business (what kind of amounts and currencies will be used) and the potential constraints of the external third party billing system.



NOTE

Consult the configurations for managing currencies in SAP Convergent Charging.

Default Settings

The precision of the rating calculations by SAP Convergent Charging is six digits.

Activities

The technology consultant must perform the following:

- During the implementation phase of your project:

- Determine the appropriate system configuration
- After the initial installation of you development, quality control, or production system:
 - Launch the SAP CC [Admin+](#) user interface
 - Log on as administrator
 - Set up the TRANSACTION_PRECISION and TRANSACTION_ROUNDING_MODE parameters
 - Set up the TRANSACTION_DETAIL_PRECISION and TRANSACTION_DETAIL_ROUNDING_MODE parameters
 - Set up the COUNTER_PRECISION and COUNTER_ROUNDING_MODE parameters
 - Set up the TAX_PRECISION and TAX_ROUNDING_MODE parameters with the same values than for TRANSACTION_PRECISION and TRANSACTION_ROUNDING_MODE

More Information

Consult the [SAP CC Application Help documentation](#) about the charging process; see page [21].

Usage Online Charging

- Online charging of chargeable items: See the section below to know how to customize your system with Java Libraries
- Online charging of Credit Control Requests (CCR) via Diameter protocol: See the Diameter Server configuration (see page [454](#))

Event-Based Online Charging

Configuring the Period Limit (Implementation Project)

Use

In this *Customizing* activity, you implement additional control for the charging and the activation operations in the SAP CC system.

Due to some business requirements, you may plan the charging and the activation operations in the future. With this additional control function, you can limit the execution of the charging and the activation operations to a given period after the current system date.

You set up the parameter `PERIOD_LIMIT_ACTIVATION` with a period (a number of days). If the consumption dates or the activation dates are not in this period, the operations are refused.

Default Settings

This control function is disabled in the SAP CC system.

Activities

- Determine the period that is relevant for your implementation project
- Launch the [SAP CC Admin+ user interface](#) and log on
- Set up the `PERIOD_LIMIT_ACTIVATION` system parameter to the period previously determined in each dispatcher instance of the SAP CC system

More Information

Consult the *SAP CC Application Help* about the charging and activation processes.

See *SAP CC Parameter Reference* for more information on the parameter `PERIOD_LIMIT_ACTIVATION`.

Session-Based Charging

Setting-Up the Reservation Renewal Function

Use

By default, the reservation renewal function is enabled in SAP CC 5.0.

Prerequisites

To address your business requirements:

- You implement the session-based charging services, including the reservation renewal function.

Activities

You can configure the subfunctions that manage the renew reservation notifications in the system:

Subfunction	Business	Technical
Send		Setting-up the communication timeout of the technical acknowledgement
Resend	Enabling the subfunction Setting-up the subfunction	Setting-up the processing threads

Procedure

To set up the communication timeout of the technical acknowledgement:

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server system using the **host** command
- Log on as administrator using the **user** command
- Change the value of the RENEW_RESERVATION_SEND_TIMEOUT system parameter to a value relevant for your business requirements

Results

You can continue the implementation of the subfunction.

Implementation: Enabling the Resend Subfunction of the Reservation Renewal

Use

By default, the resend subfunction of the reservation renewal function is disabled in SAP CC 5.0. You can enable this subfunction in the SAP CC system and implement it in your Java-based client application or system.

Prerequisites

To address your business requirements, you must implement the optional resend subfunction.

Default Settings

The subfunction is disabled in the standard installation of the SAP CC system.

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server system using the **host** command
- Log on as administrator using the **user** command
- According to your business requirements:
 - Change the value of the RENEW_RESERVATION_RESEND_ATTEMPTS system parameter to the appropriate number of attempts, for example 3 attempts
 - Change the value of the RENEW_RESERVATION_RESEND_INTERVAL system parameter

Results

You can continue the implementation of the subfunction.

System Advanced Configuration: Determining the Processing Threads of the Resend Subfunction of the Reservation Renewal

Use

By default, the resend subfunction of the reservation renewal function is performed by a single processing thread in each rater instance of the SAP CC 5.0 system.



NOTE

This processing thread relates also to database connections. The total number of connections to open with an instance of the back-end database system is configured in the SAP CC system. This

number determines a pool of such processing threads that relate to the database. These processing threads are dedicated to different functions and services in the SAP CC system. See the `SQLHELPER_CONNECTION_COUNT` and `RENEW_RESERVATION_SEND_TIMEOUT` system parameters for more information.

During the implementation project phase, you confirm the parameter value during load testing. Set up a test case to verify that all the renew reservation notifications are received on time by the registered client application (or system). If necessary, increase the parameter value by taking into account the system constraints and adapting different parameter values:

- Total number of connections available in the database system
- Total number of connections to open with an instance of the back-end database system as configured in the rater instances of the SAP CC 5.0 system (see `SQLHELPER_CONNECTION_COUNT`)
- Usage of the thread pool between some services in the rater instances of the SAP CC system:

Subfunction	Business	Technical
MULTICAST_SERVER_THREAD_COUNT ■ UDP Discovery		
STATEFUL_SERVICE_THREAD_COUNT ■ Online Charging ● Event-Based ● Session-Based		
STATELESS_SERVICE_THREAD_COUNT ■ Online Charging ● Stateless Rating		
BATCH_SERVICE_THREAD_COUNT ■ Offline Charging ■ Event-Based		
STATEFUL_SERVICE_SQL_UPDATE_POOL_SIZE ■ Online Charging		
Advanced Functions		
CACHE_WARMUP_THREAD_COUNT ■ Data Cache Management		
RENEW_RESERVATION_RESEND_THREAD_COUNT ■ Session-Based Charging		
ACTIVATION_THREAD_COUNT ■ Activation Process		
CLEANUP_THREAD_COUNT ■ Cleanup Process ■ Session-Based Charging		

**NOTE**

Refer to the *SAP CC 5.0 System Parameter Reference* for more information about these constraints.

During the production operation phase, you maintain the SAP CC 5.0 system. You may change the number of processing threads dedicated to resend renew reservation notifications. Apply the procedure below.

Default Settings

One processing thread is dedicated to this subfunction in the SAP CC 5.0 system.

**NOTE**

This default configuration is relevant in a production system landscape.

Procedure

- First try to increase the total number of connections available in the database system
- Then configure the SAP CC 5.0 system:
 - Launch the [SAP CC Admin+ user interface](#)
 - Connect to the Core Server system using the **host** command
 - Log on as administrator using the **user** command
 - Increase the value of the `SQLHELPER_CONNECTION_COUNT` system parameter
 - Increase the value of the `RENEW_RESERVATION_RESEND_THREAD_COUNT` system parameter
- Otherwise, try to set up to zero the thread counts dedicated to services that are not implemented in your system landscape. Check if you can decrease the following parameter values in the rater instances:
 - No stateless rating services (in online charging services):
`STATELESS_SERVICE_THREAD_COUNT`
 - No offline charging services : `BATCH_SERVICE_THREAD_COUNT`
 - No online stateful charging services (event, session):
`STATEFUL_SERVICE_THREAD_COUNT`
 - No session-based charging services: `CLEANUP_THREAD_COUNT`
- Connect to the Core Server system using the **host** command
- Log on as administrator using the **user** command
- Set up to 0 the value of the appropriate system parameter in the rater instances

**NOTE**

Finally, you can decrease the `CACHE_WARMUP_THREAD_COUNT` or the `MULTICAST_SERVER_THREAD_COUNT` parameter values but this will impact the performances of the data cache warm-up function or the multicast services.

Results

Confirm your changes by monitoring the business services in your system landscape.

Customizing: Enable the Computation of Transactions to Cancel

Use

SAP CC 5.0, the computation of transactions to cancel is disabled by default. You can enable this subfunction in the SAP CC system and implement it in your Java-based client application or system.

Prerequisites

To address your business requirements:

- You implement the session-based charging services.
- Because balances are handled by an external system, you need to get the transactions to cancel from SAP CC to update balances in the external system.

Default Settings

The computation of transactions to cancel is disabled by default in the standard installation of the SAP CC system.

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server system using the `host` command
- Log on as administrator using the `user` command
- Set the `TRANSACTIONS_TO_CANCEL_IN_RESULT_ENABLED` system parameter to `true`

Results

The transactions to cancel are returned in the result of the two following session-based charging APIs: `updateRate` and `stopRate`. You can continue the implementation of the subfunction.



NOTE

See SAP CC 5.0 Java API Reference for details on the list `transacSetToCancel` and the attribute `amountToCancel` provided in the result of the session-based charging APIs `updateRate` and `stopRate`.

Online Refilling

Refill Item Collection (Implementation Project)

Use

SAP CC 5.0 can receive refill items from external systems (ERP or billing) for refilling a prepaid account. These refilling services are offered by the service provider in addition to the marketable services. These data records must include all the necessary elements for the refilling process but also for the invoicing and reporting process. Some configuration activities are necessary during the implementation phase and before the installation.

Consult the documentation for the Web Services of SAP Convergent Charging 5.0 in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Technical Interfaces ↩.



NOTES

- You can download the documentation in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 ↩.
- The documentation for the Web Services of SAP CC is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download
- If you have a running SAP CC Core Server system, you can consult the WSDL of a process component of the Web Services by using the following URL:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/refilling?wsdl](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/refilling?wsdl) (ex.: <https://myhostname.corp:9080/refilling?wsdl>)
 You can access to the XSD fragments:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/refilling?xsd=1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/refilling?xsd=1) (ex.: <https://myhostname.corp:9080/refilling?xsd=1>)
- For your developments during the implementation phase, you need to import the necessary WSDL URLs in your development tool by using the URLs detailed above:
 Ex.: <https://myhostname.corp:9080/refilling?wsdl>

Technical Interface: Web Services

Activities

- Depending on your business scenario, determine the refilling services you want to implement in your landscape
- Determine which type of the refill function you need to implement:
 - Direct refill to a known prepaid account
 - Indirect refill based on the knowledge of a User Technical Identifier (UTI)
- Specify the refill items (types and contents) that the external systems will send to SAP CC depending on the refill services to provide for the end customers

- Specify the information elements needed to model the refill logic
- Implement the generation and the transmission of refill items including information on local time date (see the Web Services documentation, page [\[51\]](#))
- Set up the refill item classes in the [SAP CC Core Tool user interface](#) to model the algorithm of the refill logic for each decision tree related to a usage refill (see page [\[248\]](#)).

Spending Status Monitoring

Use

In online environment :

- Design
- Implement the input (Java libraries, cnd.message)
- Configure the system (spending status reporting)
- Configure the data (spending status description, range table, monitoring plan)
- Implement the customer data provisioning

Implementing the Spending Status Report Management

Use

When you implement the spending status monitoring services in your system landscape, you must configure the spending status report management in the SAP CC system:

- Set up the send subfunction
- Set up the resend subfunction

Prerequisites

To address your business requirements:

- You implement the online charging services, including the spending status monitoring services.

Activities

You can configure the subfunctions that manage this function in the system:

Subfunction	Business Settings	Technical Settings
Send		Setting-up the communication timeout of the technical acknowledgement
Resend	■ Enabling the subfunction ■ Setting-up the subfunction (resend attempts, resend intervals)	Advanced: Setting-up the processing threads (initial tuning)



NOTE

This system configuration depends on the integration developed between the SAP CC system. The report acknowledgment and the report resend may not be implemented.

- During the implementation project phase you define and set up the initial values.
- During the production operation phase you may need to change these values.

Setting-Up the Communication Timeout of the Technical Acknowledgement

Use

By default, the spending status reporting function is enabled.

Procedure

To set up the communication timeout of the technical acknowledgement:

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server system using the **host** command
- Log on as administrator using the **user** command
- Change the value of the SPENDING_STATUS_REPORT_SEND_TIMEOUT system parameter to a value relevant for your business requirements

Results

You can continue the implementation of the subfunction.

Enabling the Resend Subfunction of the Spending Status Reporting

Use

By default, the resend subfunction of the spending status reporting function is disabled in SAP CC 5.0. You can enable this subfunction in the SAP CC system and implement it in your Java-based client application or system.

Prerequisites

To address your business requirements, you must implement the optional resend subfunction when developing the integration between your policy system and the SAP CC system.

Default Settings

The subfunction is disabled in the standard installation of the SAP CC system.

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server system using the `host` command
- Log on as administrator using the `user` command
- According to your business requirements:
 - Change the value of the `SPENDING_STATUS_REPORT_RESEND_ATTEMPTS` system parameter to the appropriate number of attempts, for example 3 attempts
 - Change the value of the `SPENDING_STATUS_REPORT_RESEND_INTERVAL` system parameter

Results

You can continue the implementation of the subfunction.

Disabling the Resend Subfunction

Change the value of the `SPENDING_STATUS_REPORT_RESEND_ATTEMPTS` to 0 to deactivate the resend subfunction.

System Advanced Configuration: Determining the Processing Threads of the Resend Subfunction of the Spending Status Reporting

Use

In this *Customizing* activity, you fine tune the initial value of the `SPENDING_STATUS_REPORT_RESEND_TIMEOUT` system parameter that is available in the rater instances of the SAP CC system. By default, the resend subfunction of the spending status reporting function is performed by a single processing thread in each rater instance of the SAP CC 5.0 system.



NOTE

This processing thread relates also to database connections. The total number of connections to open with an instance of the back-end database system is configured in the SAP CC system. This number determines a pool of such processing threads that relate to the database. These processing threads are dedicated to different functions and services in the SAP CC system. See the `SQLHELPER_CONNECTION_COUNT` and `SPENDING_STATUS_REPORT_RESEND_TIMEOUT` system parameters for more information.

During the implementation project phase, you confirm the parameter value during load testing. Set up a test case to verify that all the spending status reports are received on time by the registered monitoring or policy system. If necessary, increase the parameter value by taking into account the system constraints and adapting different parameter values:

- Total number of connections available in the back-end database system dedicated to SAP CC
- Total number of connections to open with an instance of the database system as configured in the rater instances of the SAP CC 5.0 system (see `SQLHELPER_CONNECTION_COUNT`)
- Usage of the thread pool between some services in the rater instances of the SAP CC system:

Subfunction	Business	Technical
MULTICAST_SERVER_THREAD_COUNT		
■ UDP Discovery		
STATEFUL_SERVICE_THREAD_COUNT		
■ Online Charging		
● Event-Based		
● Session-Based		
STATELESS_SERVICE_THREAD_COUNT		
■ Online Charging		
● Stateless Rating		
BATCH_SERVICE_THREAD_COUNT		
■ Offline Charging		
■ Event-Based		
STATEFUL_SERVICE_SQL_UPDATE_POOL_SIZE		
■ Online Charging		
Advanced Functions		
CACHE_WARMUP_THREAD_COUNT		
■ Data Cache Management		
RENEW_RESERVATION_RESEND_THREAD_COUNT		
■ Session-Based Charging		
ACTIVATION_THREAD_COUNT		
■ Activation Process		
CLEANUP_THREAD_COUNT		
■ Cleanup Process		
■ Session-Based Charging		

**NOTE**

Refer to the latest version of the *SAP CC 5.0 System Parameter Reference* for more information about these constraints.

During the production operation phase, you maintain the SAP CC 5.0 system. You may change the number of processing threads dedicated to resend spending status reports. Apply the same procedure below.

Prerequisite

The resend function is enabled.

Default Settings

One processing thread is dedicated to this subfunction in the SAP CC 5.0 system.



NOTE

This default configuration is relevant in a production system landscape.

Procedure

- First try to increase the total number of connections available in the back-end database system
- Then configure the SAP CC 5.0 system:
 - Launch the [SAP CC Admin+ user interface](#)
 - Connect to the Core Server system using the **host** command
 - Log on as administrator using the **user** command
 - Increase the value of the SQLHELPER_CONNECTION_COUNT system parameter
 - Increase the value of the SPENDING_STATUS_REPORT_RESEND_THREAD_COUNT system parameter
- Otherwise, try to set up to zero the thread counts dedicated to services that are not implemented in your system landscape. Check if you can decrease the following parameter values in the rater instances:
 - No stateless rating services (in online charging services): STATELESS_SERVICE_THREAD_COUNT
 - No offline charging services : BATCH_SERVICE_THREAD_COUNT
 - No online stateful charging services (event, session): STATEFUL_SERVICE_THREAD_COUNT
 - No session-based charging services: CLEANUP_THREAD_COUNT
- Connect to the Core Server system using the **host** command
- Log on as administrator using the **user** command
- Set up to 0 the value of the appropriate system parameter in the rater instances



NOTE

Finally, you can decrease the CACHE_WARMUP_THREAD_COUNT or the MULTICAST_SERVER_THREAD_COUNT parameter values but this will impact the performances of the data cache warm-up function or the multicast services.

Results

Confirm your changes by monitoring the business services in your system landscape.

Usage Offline Acquisition and Data Collection

Use

SAP Convergent Charging must receive consumption information data for a marketable service before charging the customer for the usage of this service. SAP CC can manage different sources:

- Offline Acquisition of Consumption Detail Records (CDRs): See the BART Server configuration (see page [\[410\]](#)) to know how to customize your system with Java Libraries
- Offline Acquisition of Chargeable Items



NOTE

SAP CC can manage refill requests for prepaid accounts: See the section below to know how to customize your system with the *Web Services* technical interface.

Implementing the Chargeable Item Acquisition with the Java API (TCP/IP)

Use

SAP CC 5.0 receives chargeable items from network elements or service applications. These chargeable items relate to the usage (consumption) of a customer service. The SAP CC Core Server system stores these items in files.



NOTE

In a *solution scenario* with SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, the SAP CC system convert these items into consumption items and post it to SAP Convergent Invoicing in the SAP ERP/FI-CA system.

You can customize your application with the Java Library provided by SAP Convergent Charging in a Software Development Kit (SDK):

Function	Technical Interface	Software Units	Technical Operation or API
Acquisition of Chargeable Items	Java	Core SDK	■ Java Package: ● <code>com.highdeal.cnd.message</code> ■ Java Classes:

Function	Technical Interface	Software Units	Technical Operation or API
			● BatchServiceClient ● AsynBatchServiceClient ■ Service Operation: ● acquire(..)

For more technical details, consult online the Java API Reference in SAP Help Portal: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API References → Core APIs (Java and XML) → *com.highdeal.cnd.message* ↩.

Activities

As technology consultant, you have to:

- Specify and implement your acquisition process according to the Java API (TCP/IP) Specification of SAP Convergent Charging and by using the [com.highdeal.cnd.message.BatchServiceClient](#) Java class



NOTE

For test and training purpose, you can prefer managing the chargeable item acquisition with an IEC application and dummy files containing chargeable items or CDRs.

Offline Usage Charging with BART Server

This section includes configurations only relevant for a variant of the business process “Processing Charging” related to postpaid business. The BART Server and BART Tool components of SAP CC 5.0 must be installed and configured in your system landscape.

Implementing the Batch Charging By Group Function

Use

SAP Convergent Charging enables to trigger batch charging of CDRs by selecting a rating group. You must customize these groups and to customize the customer data provisioning process to ensure that the relevant provider contracts and subscriptions specify their group.



NOTE

If your business requires that you manually create the customer master data, you must set up the provider contracts and the subscriptions with the relevant batch rating group.

Prerequisites

- The SAP CC BART Server system is installed and configured in your system landscape
- Your system landscape provides offline charging services

Implementation Activities

As technology consultant, you have to:

- Determine if this function is required in your landscape
- Customize the customer data provisioning process when SAP CC is connected to a CRM application or another external provisioning system. You can use the following technical interfaces:
 - Web Services: Implement the creation of contracts
 - HCI: Implement the creation of offline or hybrid subscriptions
- Customize the automated assignment of a batch rating group to a provider contract
- Configure the batch rating groups in SAP CC

Data Customization: Setting up the Batch Rating Groups

Use

If you have installed the BART components, you may need to manage batch rating groups depending on your business needs so that the power users or the external systems (from a CRM) can create their subscriptions.

You must define your groups according to your business. Each group has a numeric identifier, a codename and a description. The code name is used to trigger batch charging session in the BART Tool user interface. Each provider contract or subscription must specify a batch rating group.

SAP recommends that you define the greatest possible number of batch rating groups (the maximum number of groups is 99).



NOTE

If the customer master data stored in SAP CC includes parent contracts and linked contracts to share a pool of counters, they must be part of the same batch rating group to enable offline charging in batch mode. The automated group assignment function ensures that parent and linked contracts have the same batch rating group.

Prerequisites

- It is not possible to remove or modify groups that contain subscriptions. You can always change the descriptions of all the groups.
- You cannot remove the group identified by 0. This is the default group. You can change its code name and its description to suit your needs.

Procedure

- Determine the necessary groups
- Launch [SAP CC Admin+](#)
- Connect to the Core Server using the `host` command
- Log on as administrator using the `user` command
- Use the `group`list, `group`add, `group`mod, and `group`del commands

Implementing the Batch Rating Group Assignment Function

Use

In this *Customizing* activity, you develop a Java class to plug to the SAP CC Core Server system. You customize the function that automatically assigns a batch rating group to a new provider contract that is not linked to a parent contract.

Default Settings

By default, the function dispatches the group assignment between all the batch rating groups and all the provider contracts.

You cannot customize this function to work with provider contracts linked to a parent contract for sharing a pool of counters.

Prerequisites

- Your system landscape provides offline charging services
- The charging services are based on provider contracts

Procedure

- Determine the necessary batch rating groups
- Develop a Java class that implements the Java interface `IContractBatchRatingGroupAssignmentPolicy` available in the SAP CC Java Library.
- Plug this Java class to the SAP CC Core Server system

Result

You can:

- Configure the required batch rating groups
- Test and validate your plugin
- Transport your plugin to the quality control and production systems

Maintaining the Batch Rating Groups

Use

SAP Convergent Charging enables the safe management of batch rating groups. If you have customized the group assignment to provider contracts, the SAP CC system cannot guarantee its behavior when you modify or delete a batch rating group.

Prerequisites

- Identify the batch rating group you want to modify or delete
- Identify if the group assignment function is customized: Check the current value of the system parameter BATCH_RATING_GROUP_ASSIGNMENT_POLICY_CLASS.
- Check the customized development plugged to the system: It must be compliant with your maintenance operation.

Procedure

- Check all the prerequisites
- Use [SAP CC Admin+](#) to manage the batch rating groups

Rerating Function with BART

This section includes implementation activities with configurations only relevant for a postpaid business. The BART Server component of SAP CC 5.0 must be installed and configured on your landscape to support the rerating function.

Determining the Retention Period for Rerating

Use

By default the retention period is set to 40 days (1 month and 10 days). For business, legal, or technical reason you may need to change this function. You can extend this period up to 70 days.



CAUTIONS

- Check that the retention period for rerating is equal to the total keeping days configured for BART Server
- Check that the retention period for rerating is lower than or equal to the retention period used for expired allowances

Changing the Retention Period for Rerating

Use

You can extend this period up to 70 days.



CAUTION

Do not change the retention period for a production system. It must be performed at installation time.

You must change the configuration of SAP CC BART Server.

Prerequisites

- There is no subscription and no provider contract in the SAP CC Core Server system
- You have determined the rerating retention period required for your business

Procedure

- Launch the [Admin+ user interface](#)
- Change the COUNTER_SNAPSHOT_COUNT system parameter according to the required retention period
- Restart the SAP CC system

System Customization: Implementing the Rerating Function with BART

Use

In this *Customizing* activity, you can implement the rerating function with BART.

By default you trigger the rerating from the [SAP CC Core Tool user interface](#). You can optionally develop a client application that communicates with the SAP CC Core Server system and that triggers the rerating operations.

As results of the rerating process, the SAP CC Core Server system generates data files that must be taken into account by the third-party billing system to change the invoices. You must develop an application that loads these files into your billing system.

This implementation is only possible for the following transaction persistency processing modes:

- Charged Item Files
- Data Files



NOTES

- You cannot implement the rerating function if SAP CC 5.0 is configured to generate transaction files.
- In a scenario integrated with SAP Convergent Invoicing (SAP ERP / FI-CA) of the SAP Business Suite, this implementation is provided by default and the rerating function is available.

Prerequisites

- Your *Business Scenario* includes only postpaid accounts in a batch mode environment

- The SAP CC BART Server system must be installed and configured (see the chapter about the BART Server)
- The SAP CC Core Server system is configured to generate charged files or transaction data files

Default Settings

- This function is disabled in the standard system.
- In a scenario integrated with SAP Convergent Invoicing (SAP ERP/FI-CA) of the SAP Business Suite, the rerating function is available and this customization activity is not relevant.

Activities

- Determine the retention period required for your business to provide rerating services
- Using the *SAP CC Application Help* you determine how to transmit and parse the generated files in a third-party billing system. Develop this function.
- Enable the rerating function
- Change the retention period
- Change the keeping days for BART Server
- Option: Use **RerateBulkOp** API operation (from HCI) to trigger the rerating process you're your client application

More Information

Consult the [SAP CC Application Help documentation](#), page [51].

System Advanced Configuration: Enabling the Rerating Function

Use

By default, the rerating function is disabled in SAP CC 5.0 and not available in the [Core Tool](#) user interface.

Prerequisites

The rerating function has been implemented in your landscape by your project team and consultants. The data files generated by the rerating process are transmitted to the external billing system.

Default Settings

- This function is disabled in the standard installation of the system.
- In a scenario integrated with SAP Convergent Invoicing (SAP ERP / FI-CA) of the SAP Business Suite, this function is enabled. See the dedicated chapter in this document.

Procedure

- Launch the [SAP CC Admin+ user interface](#)
- Connect to the Core Server using the **host** command
- Log on as administrator using the **user** command
- Change the value of the RERATING_ENABLED parameter to **true** so that the menu is available from the [Core Tool user interface](#)
- Change the value of the RERATE_PROC_CLASS parameter to **com.highdeal.rif.dbFile.RerateFileProcessor** or **com.highdeal.rif.chargeditem.RerateProcessorShell** according to the transaction persistency processing modes (Data Files, Charged Item, or Refill Record Files)
- Launch the [Setup Tool user interface](#)
- Log on as administrator
- Import a RIF configuration file using the **rif** command



NOTE

A default rif.rater.config.xml.sk file is provided as template. It is located in the configuration folder <DRIVE>:\usr\sap\<SID>\CCD<SAP_INST_NB>\exe\CC_CORE_SERVER\config\<type>, where <type> is 'ci' when integrated with SAP Convergent Invoicing (SAP ERP / FI-CA), or 'files' otherwise.

Refilling Function

SAP Convergent Charging features refilling functions used to provide refilling services to your end customers by implementing the SAP CC Web Services.

Refilling Directly a Prepaid Account (Implementation Project)

Use

SAP CC 5.0 manages refill requests. You need to implement the Web Services provided by SAP CC to manage these requests.

Prerequisites

- You have decided to base the charging services on the provider contracts
- Your system knows or can know the identifiers of the prepaid accounts stored in SAP Convergent Charging
- Consult the *SAP CC Application Help* about the refilling function to determine how to implement this process

Activity

To provide your end-customers with manual or automated refills, you need to implement the *Refill Management* services.

See the technical documentation to implement this function in your landscape.

Refilling a Prepaid Account from a Technical Data (Implementation Project)

Use

SAP CC 5.0 manages refill requests even if the external system does not or cannot know the appropriate prepaid account. You need to implement specifically the Web Services provided by SAP CC to manage these requests. The refill request is based on technical data that can be used by SAP CC to retrieve the appropriate prepaid account.

Prerequisites

- You have decided to base the charging services on the provider contracts

- Your system does not or cannot know the identifiers of the prepaid accounts stored in the SAP CC system
- You have configured the refill plans in SAP Convergent Charging by declaring the appropriate technical data
- The provider contracts created by your CRM application or external provisioning system include a contract item referencing such a refill plan and containing relevant user technical identifiers

Consult the *SAP CC Application Help* about the refilling function to determine how to implement this process.

Activity

To provide your end customers with manual or automated refills, you need to implement the *Refill Management* services with a specific two-step process:

- Identify from a user technical identifier the appropriate prepaid account (see the [prepaidAccountFindFromUserTechnicalIdentifierRequest](#) operation of the SAP CC 5.0 Web Services)
- Send the refill request order to the SAP CC system
- See the technical documentation to implement this function in your landscape.



NOTES

- The service identifier declared in the refill logic customized in a refill plan (see Technical Data) must be the same as the identifier present in the [prepaidAccountFindFromUserTechnicalIdentifierRequest](#) operation used when implementing the Web Services. You can provide several refill services with different IDs (manual refill from ATM, from portal).
- The user technical identifier (UTI) used when initializing the process must be present in the contract item that references this refill plan.

Tax Function

SAP Convergent Charging features tax subfunctions for the rating and charging functions. The following activities are recommended:

System Configuration	Data Customization	Master Data Configuration
Setting up the Tax System <i>Default: VAT</i>	Setting up the Tax Rates <i>Default: Done</i>	Setting up the taxes for the service provider (charge plans and offers) <i>Default: No master data</i>
	Setting up the VAT Rules <i>Default: Done</i>	Setting up the VAT rules for the end customers (subscriber accounts) <i>Default: No master data</i>



NOTE

For more details about the tax function and process, consult the *SAP CC Application Help* documentation.

Quick Configuration

For development or training purposes, you just need to set up the master data of the service provider to configure the tax information for the charging services.

Setting up the Tax Functions

Use

SAP Convergent Charging 5.0 can simultaneously manage taxes for the Value Added Taxes (VAT) standard and for the US Telecommunication based on BillSoft EZTax technology.

This configuration is done at the installation time but can be changed later. You can only add a new tax system to the tax system configured at the initial installation time.



CAUTION

Do never remove a tax system if the master data of the service provider (charge plan and offer) or of the customers (subscriber account) are configured with this tax information related to this tax system.

Default Settings

The default settings depend on the installation options used for *SAPinst*.

Activities

- Enable VAT management functions
- Implement and enable the EZTax management functions



EXAMPLE

Change the TAX_FRAMEWORK parameter to: **VAT;EZTAX**

System Configuration: Enabling the VAT Management Function

Use

If you did not select the option Value Added Taxes (VAT) management at the installation time, you may enable this function later on.



NOTE

You can also customize the data (VAT rates, VAT rules).

Procedure

In this procedure, you use [Setup Tool](#) and [Config Tool](#) provided with the SAP CC Core Server system:

- If you want to customize the VAT rates, perform the procedure detailed in this section
- If you do not want to customize the VAT rates, use Setup Tool and execute the command to import the default rates: `./setup.sh vatax importVATRate /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/vat_rate.txt`
- If you want to customize the VAT rules, perform the procedure detailed in this section
- If you do not want to customize the VAT rules, use Setup Tool and execute the command to import the default rates: `./setup.sh vatax importVATRules /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/vat_rules.txt`
- Execute the command: `./setup.sh vatax importCountryTaxPolicies /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/country_tax_policies.txt`

- Use Config Tool or [Admin+](#) to modify the TAX_FRAMEWORK parameter and change its value to "VAT" or "VAT;EZTAX"
- Restart all the updater and rater instances of the SAP CC system

Result

The SAP CC Core Server system can manage tax information for the charging services.

You can configure the master data related to the service provider (pricing catalog) with tax information. A CRM application or another provisioning system can configure the master data related to the end customers (subscriber accounts, agreements) with tax information.

Data Customization: Setting up the VAT Rates

Use

In this *Customizing* activity, you must maintain the list of rates for the Value Added Taxes.

Prerequisites

- The SAP CC Core Server system is configured for the Value Added Taxes (VAT) system
- The VAT rates are available in the SAP CC Core Server system

Default Settings

A list of rates for VAT rates is installed by *SAPinst* if the VAT tax system was selected.

Procedure

- Use [Setup Tool](#) to export and re-import the changed VAT rates
 - Execute the command: `./setup.sh vatax exportVATRate /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
 - Edit the new file and apply the necessary changes
 - Save it
 - Execute the command: `./setup.sh vatax importVATRate /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
- Restart all the updater and rater instances of the Core Server

Result

The VAT rates are up to date.

Maintaining the VAT Rules

Use

You maintain the list of VAT rules configured in the SAP CC system.

Prerequisites

- The SAP CC Core Server system is configured for the Value Added Taxes (VAT) system
- Some VAT rules are available in the SAP CC Core Server system

Default Settings

A list of EU VAT rules is installed by *SAPinst* if the VAT system was selected.

Some customized VAT rules can be added during the implementation project.

Procedure (EU VAT Rules)

To maintain the EU VAT rules:

- Retrieve the last version of the EU VAT rules. Refer to the *SAP Notes*.
- Consult the `vat_rules.txt` configuration file and check the changes
- Import the new definition of the EU VAT rules with [Setup Tool](#)
 - Execute the command: `./setup.sh vatax importVATRules /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
- In a high-availability environment, refresh the data caches with [Admin+](#)
 - Otherwise restart all the updater and rater instances of the SAP CC system

Procedure (Customized VAT Rules)

To maintain the customized VAT rules:

- Consult the `vat_rules.txt` configuration file provided by default; It details the file format.
- Export the current VAT rules with [Setup Tool](#)
 - Execute the command: `./setup.sh vatax exportVATRules /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
- Edit the new file and apply the necessary changes. You cannot change a rule. You can only add new rules. Refer to the *Customizing* activity and procedures in this document.
- Save the file
- Import the configuration in the SAP CC system with [Setup Tool](#)
 - Execute the command: `./setup.sh vatax importVATRules /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
- In a high-availability environment, refresh the data caches with [Admin+](#)
 - Otherwise restart all the updater and rater instances of the SAP CC system

Result

The VAT rules are up to date.

System Configuration: Implementing and Enabling the EZTax Management Function

Use

If you did not select the option EZTax management at the installation time, you may enable this function later on.



NOTE

You may need to purchase the EZTax software from BillSoft company.

Prerequisites

The EZTax third party software must be installed on your landscape with dedicated hosts and licenses

Procedure

In this procedure, you use the [Setup Tool](#) and the Configuration Tool programs provided with the Core Server software unit:

- Using the Configuration Tool, modify the parameter TAX_FRAMEWORK and change its value to “EZTAX” or “VAT;EZTAX”.
- If the EZTax Management function has never been activated before, follow the procedure described in the section “Prerequisites for US Taxes Computation” of the Installation Guide (download EZTax, install additional library, and create an EZTax root folder)
- Execute the command: `./setup.sh eztax importTSTypes <EZTAX_ROOT_FOLDER>/transervdesc.txt`
- Edit the file /usr/sap/<SID>/SYS/profile/DEFAULT.PFL and do the following:
 - Locate the line `tax.ezTax = false` and replace it with `tax.ezTax = true`
 - Add a line `tax.eztaxRootFolder = <EZTAX_ROOT_FOLDER>`
- Restart the Updater and the Taxer instances of the Core Server system
- Launch SAPinst, choose the option SAP Convergent Charging > Install > Standard System Installation > Core Server - Add Instances, and add Taxer instances to the system.

Result

The SAP CC Core Server system can manage tax information for the rating and charging functions. You can configure the master data for the service provider.

Master Data Configuration: Setting up the Taxes for the Service Provider

Use

The power user can set up the tax information for each charge customized in a charge plan or in an offer.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Charge Plans ◀ and at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Core Tool → About Offers ◀. You can access to the primary help from the graphical user interfaces.

Activities

- With the [SAP CC Core Tool user interface](#), configure manually the charges inserted in the charge plans [page 250] and in the offers [page 254].

Master Data Configuration: Setting up the Taxes for the Customers (Subscriber Accounts)

Use

For test or training purposes, the power user can set up the tax information for each subscriber account.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Subscriber Accounts ◀. You can access to the primary help from the graphical user interfaces.

Activities

- For test or training purposes, you can manually configure the subscriber accounts with the Core Tool user interface.
- For a production platform, the correct implementation must be available and takes into account the tax settings for each subscriber accounts managed in SAP CC [page 255].

Implementation of VAT Rules

Use

In this *Customizing* activity, you manage your SAP CC system landscape to support the EU VAT 2010 and 2015 directives or you adapt the VAT rules to other VAT systems. You adapt the integration and the configuration to support:

- Preconfigured EU VAT 2010 rules and EU VAT 2015 rules
- Customized VAT rules

Prerequisites

- The SAP CC Core Server system is configured for the Value Added Taxes (VAT) system

Activities

- When relevant, adapt the implementation of the customer data provisioning to create subscriber accounts with new tax settings: Customer country and business category (B2B or B2C) must be set by the CRM application or the external provisioning system.
 - Both the *Web Services* and the *HCI* technical interfaces provide the necessary operations. Refer to the SOAP specifications or to the Java specifications of SAP Convergent Charging.
- Migrate the existing subscriber accounts that must support tax settings based on VAT rules



NOTE

In the integrated scenario with SAP CRM and SAP ERP of the SAP Business Suite, all the subscriber accounts support already the VAT rules since SAP CC 3.0.

- When the SAP CC system is not integrated to a CRM application, configure manually the few subscriber accounts with the [Core Tool](#) user interface and change the tax settings.
- Implement some customized VAT rules (See the *Customizing* activity in this document)
- Configure the pricing catalog of the service provider with new charge plans (or new offers) that specify a VAT rule in the tax settings of the customized charges. See [Designing and Setting up a Charge Plan](#) on page [250].

Implementation of Customized VAT Rules

Use

In this *Customizing* activity, you determine and configure in the SAP CC system the new VAT rules necessary for your implementation project. You take into account the business requirements about value added taxes and places of establishment or residence of the service provider and its end customers. You take into account the business category of the customers: B2B (customer is a company) and B2C (customer is a private individual).

You may set up other necessary business data (country tax policies, VAT rates).

Prerequisites

- The SAP CC Core Server system is configured for the Value Added Taxes (VAT) system

Default Settings

A list of VAT rules for EU VAT 2010 and EU VAT 2015 is installed by *SAPinst* if the VAT system was selected as invoicing tax system.

You can clean these rules at initial installation time of an SAP CC system once you have determined the new VAT rules that are relevant for your business.

Procedure

- On the SAP CC development system:
 - Determine the country codes that are necessary to set up the pricing logic and the subscriber accounts
 - Check the country policies and import configuration for missing countries
 - Check the VAT rates and import missing values
 - Model the VAT rules (See the *Customizing* activity in this document)
 - Create the customized VAT rules
 - After creating the VAT rules, check the country codes and VAT rates configured in the SAP CC system
 - Import the customized VAT rules with [Setup Tool](#) and the command: `./setup.sh vatax importVATRules /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/tax/<myfile>`
 - Restart all the updater and rater instances of the SAP CC system
- Test your configuration by identifying all the use cases, by configuring the relevant master data including the pricing logic and the end customer data (subscriber account, provider contracts or subscriptions). Simulate business traffic to trigger the charging services of SAP Convergent Charging
- Transport to the SAP CC production system

Procedure: How to Model a VAT Rule

- Determine the supplier zone that is the reference for the service provider the SAP CC system must calculate the taxes for service consumption
- Determine the business categories (B2B or B2C) that are relevant for your VAT rule
- For each business category, determine the origin of the place of taxation that can be the supplier's place of establishment, the customer's place of establishment (B2B), or the customer's place of residence (B2C)
- For certain business requirements, the place of taxation depends on particular conditions that are not basically the places of establishment or residence. In this case, the place must be dynamically determined at runtime by the SAP CC system according to the configuration of the pricing logic (see charges customized in charge plans or offers).
 - You must configure the pricing logic to configure this place determination.
 - You must set up a price plan that defines a parameter or that computes a property that contains at runtime the appropriate values or you must ensure that the chargeable items received from the mediation system will contain this taxation place information.
- Determine the default sources for the B2B and B2C places of taxation. The VAT 2010 directive defines the following places for the business categories:
 - B2B services: Customer's place of establishment (the holder of the charged account in the subscriber account)

- B2C services: Service provider's place of establishment

**EXAMPLE 1: ARTICLE 59B OF THE EU VAT 2010 DIRECTIVE**

You want to create a customized VAT rule to model the article 59b of the VAT directive: Radio and television broadcasting services and telecommunications services, supplied by suppliers established in a third country to non-taxable customers in the EU, are taxable at the place where the private customer effectively consumes the service. Other general rules apply otherwise.

You model the following rule:

- Reference Supplier Zone: *Third Country*
- Source for the B2B place of taxation: *None*
- Source for the B2C place of taxation: Place dynamically set by SAP Convergent Charging at runtime. It must be the effective place (country) of consumption of the customer service. The price plan must compute an appropriate property or the mediation system must provide this information in the chargeable items related to the service consumption.
- Default source for the B2B place of taxation: *Customer's place of establishment* (the holder of the charged account in the subscriber account)
- Default source for the for the B2C place of taxation: *Service provider's place of establishment*

**EXAMPLE 2: CUSTOM VALUE**

You can create a customized VAT rule that enables you to finely configure the determination of the places of taxation in the pricing logic (in the price plans).

You model the following rule:

- Reference Supplier Zone: *Any Country*
- Source for the B2B place of taxation: *Place dynamically set by SAP Convergent Charging at runtime*. You decide the business scope in the charges customized in a charge plan (or an offer).
- Source for the B2C place of taxation: *Place dynamically set by SAP Convergent Charging at runtime*. You decide the business scope in the charges customized in a charge plan (or an offer).
- Default source for the B2B place of taxation: *Customer's place of establishment* (the holder of the charged account in the subscriber account)
- Default source for the for the B2C place of taxation: *Service provider's place of establishment*

Result

You can set up the pricing logic to use the VAT rules.

Implementation: Creating a Customized VAT Rule

Use

In this *Customizing* activity, you create a new VAT rule in a file.

A VAT rule specifies the behavior of the SAP CC system during the tax calculation process.

Prerequisites

- The SAP CC Core Server system is configured for the Value Added Taxes (VAT) system
- You know the tax concept (tax settings in the pricing catalogs)

Procedure

- Retrieve a configuration file as example
 - If VAT rules are configured in the SAP CC system, export the current VAT rules with [Setup Tool](#)
 - Otherwise get a copy of the vat_rules.txt configuration file provided by default
- Edit the file
- A VAT rule is a row; Remove the unnecessary rows.
- Add a row for each customized VAT rule according to the syntax: <RL_NAME>; <RL_DESCR>; <REF_SUPPLIER_ZONE>; <B2B_PLACE_OF_TAXATION_ORIG>; <B2C_PLACE_OF_TAXATION_ORIG>; <DEFAULT_B2B_PLACE_OF_TAXATION>; <DEFAULT_B2C_PLACE_OF_TAXATION>

	Description	Condition
RL_NAME	This field specifies the name of the VAT rule. The name is also the unique identifier of the VAT rule. This name is visible in the graphical user interface (Core Tool) when the power user configures the tax settings for each charge customized in a charge plan (or in an offer).	Mandatory and unique
RL_DESCR	This field specifies the full text description of the VAT rule. This text is visible in the graphical user interface (Core Tool) when the power user configures the tax settings for each charge customized in a charge plan (or in an offer).	Mandatory
REF_SUPPLIER_ZONE	This field specifies the zone of the service provider.	Mandatory

	During the tax calculation for a service consumption, if the service provider is in the zone assigned to the VAT rule, the SAP CC system considers If the service provider is not in this zone, the SAP CC system considers the default values (DEFAULT_B2B_PLACE_OF_TAXATION or DEFAULT_B2C_PLACE_OF_TAXATION). Possible values are: ■ 0: EU (European Union) ■ 1: TC (Third Country) ■ 2: Any Country	
B2B_PLACE_OF_TAXATION_ORIG	Possible values are: 0: Supplier's place of establishment (the service provider supplying the customer service to charge) 1: Customer's place of residence (the holder of the prepaid or external account that is charged by SAP CC) 2: Place dynamically determined by SAP Convergent Charging according to the configuration of the pricing catalog (see charges customized in charge plans or offers)	Optional
B2C_PLACE_OF_TAXATION_ORIG		Optional
DEFAULT_ORIG_B2B_PLACE_OF_TAXATION		Mandatory
DEFAULT_ORIG_B2C_PLACE_OF_TAXATION		Mandatory

- Save the configuration file
- Import the file with [Setup Tool](#) and the `vatax importVATRules` command.
 - At the initial installation of an SAP CC system (development or production) you can force the cleaning of rules already configured in the system.
- Retrieve a configuration file
- Restart all the updater and rater instances of the Core Server or refresh with instances with Admin+

**EXAMPLE 1: ARTICLE 59B OF THE EU VAT 2010 DIRECTIVE**

You create a new VAT rule identified *ART59b*. You set up the following row in the configuration file to import:

```
ART59b;my text visible in GUI;1;;2;1;0
```



EXAMPLE 2: CUSTOM VALUE

You create a new VAT rule identified *Custom value*. You set up the following row in the configuration file to import:

```
Custom value;my text visible in GUI;2;2;2;1;0
```

Result

Your customized VAT rules are configured in a file.

You can import the VAT rules in an SAP CC system.

Currency Function

SAP Convergent Charging features currency subfunctions for the rating, charging, and refilling functions. The following activities are recommended:

System Configuration	Data Customization	Master Data Configuration	
		Service Provider	Customer
None	Setting up the ISO Currencies <i>Default: Done</i>	Setting up the currency information for a charge and for the refill logic <i>Default: No master data</i>	Setting up the currency for the customers (subscriber accounts) <i>Default: No master data</i>
	Setting up the SAP Currencies <i>Default: Done</i>	Setting up the currency information for the charge/refill plans and for the offers <i>Default: No master data</i>	

Quick Configuration

For development or training purposes, you just need to set up the master data of the service provider to select the currency.

Data Customization: Setting up the ISO Currencies

Use

You must maintain the list of ISO currencies known by the system to configure the master data of the service provider.

Default Settings

A default list of ISO currencies is configured by *SAPInst*.

Procedure

- Launch the [SAP CC Core Tool user interface](#) and log on
- Export to a file the current list of currencies
- Edit the save
- Import the changes in Core Tool

Consult the primary help of the Core Tool user interface in SAP Help Portal at: 

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Tools → Currencies → Importing Currencies .

Data Customization: Setting up the SAP Currencies

Use

See the chapter related to the integrated scenario with SAP ERP/FI-CA component of the SAP Business Suite (see page [\[344\]](#)).

Master Data Configuration: Setting up the Currencies for the Service Provider

Use

The power user can set up the currency information for [Master Data for the Pricing of](#) the Customer Service (see page [\[52\]](#)). This includes:

- Charge and refill logic
- Charge plan, refill plan, and offer



NOTES

- You can also set up the reusable charges and the refill logic with the multicurrency option. The final currency is then set up in the charge plans or offers. A unique charge can be modeled and used in different charge plans with different currencies.
- In the charge plans, you can set up the currency information for each charge customized in the plan. A specific parameter *currency* is automatically added by the Core Tool user interface. You can set up this parameter to:
 - Redefine it with a new default value
 - Link it with an internal parameter defined in the charge plan
 - Link it with a parameter defined in the charge plan and that will be set up for each provider contract (in a CRM application or external provisioning system)
- You cannot set up the currency in a refill plan. The final currency that will be used is the currency of the prepaid account to be refilled.

Consult the primary help of the Core Tool user interface in SAP Help Portal at:

- ▶ <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Charges → Working With Charges → Setting up the up the Tabs of a Charge ◀
- ▶ <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Refill Logic → Working With the Refill Logic → Setting up the up the Tabs of the Refill Logic ◀
- ▶ <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Charge Plans → Working With Charge Plan → Setting up the up the Tabs of a Charge ◀
- ▶ <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Working with Offers and Subscriptions → Offers → Working With Charges in an Offer → Setting up the up the Tabs of a Charge in an Offer ◀

You can access to the primary help from the graphical user interfaces.

Activities

With the [SAP CC Core Tool user interface](#), configure manually:

- The reusable charges [page 247]
- The reusable refill logic [page 248]
- The charges customized in a charge plan (see page [250]) and in an offer (see page [254])
- The refill logic customized in a refill plan [page 251]

Master Data Configuration: Setting up the Currency for the Customers (Subscriber Accounts)

Use

For test or training purposes, the power user can set up the currency information for each subscriber account.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ▶

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Subscriber Accounts ◀. You can access to the primary help from the graphical user interfaces.

Activities

- For test or training purposes, you can manually configure the subscriber accounts with the Core Tool user interface.
- For a production platform, the correct implementation must be available and takes into account the currency settings for each subscriber accounts managed in SAP CC [page 255].

Managing a Currency Reform (Implementation Project)

Use

A currency reform is a change of some characteristics of a currency or a replacement of a currency by another one. The calculated prices must be converted by applying a certain exchange rate.

SAP CC 5.0 can manage several currencies simultaneously. This is possible only when the different currencies are used in different price plans and charged on different accounts.

There is no native support for a currency reform that would enable to switch from one currency to another without switching the pricing implementation (master data of the service provider) and the end customer data (subscriber accounts, subscriptions, and provider contracts) to new data.

- During the initial implementation phase of SAP CC 5.0, if a currency reform is already known and planned, the master data configuration of the service provider can be also designed in a way to prepare and facilitate this future currency reform (see the recommendation below).
- During the maintenance phase of SAP CC 5.0, each case of currency reform must be managed as a new independent implementation project which depends on the way SAP CC 5.0 is used and integrated with other software products.

You must check or take several points into account when starting an implementation project for a currency reform.

RECOMMENDATION

If possible, design the pricing logic independently from the currency by:

- Designing multicurrency charges, offers and charge plans
- Using reusable business objects such as translations tables and pricing macros. Two charges, in two different currencies, can then be defined using the same pricing logic defined in a single table and macro but just differing on the final computed amount and currency.

Activities

- If the currency reform has an impact on the third-party invoicing system:
 - It may have consequences on the dates or time frames for the currency switch (alignment with the production of invoices, for example).
 - It may have consequences on the definition of External Accounts to be used in the SAP CC 5.0 (modification of the existing External Accounts to use the new currency or creation of new External Accounts for the new currency).
- Does the switch occur progressively or at the same time for all the subscribers? What downtime is acceptable for the switching?
 - It may have consequences on the sequence of needed modifications (activate the charges with the new currency of the subscription, modify the charging mapping or the creation of prepaid accounts or external accounts, and so on). Depending on the constraints, you must consider if the batch or the migration on the fly fit better to your needs.

Output Result Data and Persistency

Charged Item Management

Use

By default, SAP CC 5.0 generates charged items resulting from the rating and charging process functions. Some configuration activities are necessary when installing the system.

Activities

- System configuration
 - Set up the transaction persistency processing mode [page [255](#)]
 - Set up the charged item file processor
- Master data configuration
 - Create the charged item classes (master data) [page [Error! Bookmark not defined.](#)]
 - Create the charges in charge plans or offers for configuring the contents of fields of charged items that will be generated by SAP CC [page [246](#)]
- Customization
 - Implement the load of the charged item files produced by SAP CC 5.0 to your external third-party billing system



NOTE

The charged items include data related to dates belonging to the local time zones. The billing system converts the data relating to the right time zone when it is required by your business.

Refill Record Management

Use

By default, SAP CC 5.0 generates refill records resulting from the refilling process. Some configuration activities are necessary when installing the system.

Activities

- Set up the transaction persistency processing mode (see page [255](#))
- Set up the refill record file processor
- Create the refill record classes (master data) [page [Error! Bookmark not defined.](#)]

- Create the charges in offers for configuring the contents of fields of refill records that will be generated by SAP CC (see page [\[246\]](#))
- Implement the load of the refill record files produced by SAP CC 5.0 to your external third-party billing system

**NOTE**

The refill records include data about the local time zones. The billing system converts the data relating to the right time zone when it is required by your business.

Charged Transaction Management

Use

The versions of SAP Convergent Charging previous to version 2.0 generate charged transactions in files. For backwards compatibility purposes, SAP CC 5.0 can generate charged transactions if necessary. However, we recommend that you upgrade your platform.

To generate charged transactions, some configuration activities are necessary when installing the SAP CC system.

**CAUTION**

Only for versions previous to SAP CC 2.0.

You cannot create and configure new offers to generate charged transactions. You can only set up new offers to generate charged items. Therefore, we recommend that you upgrade your system landscape and that you migrate the old offers to SAP CC 5.0 and that you use the charged item file output. To test this upgrade and migration, you can configure SAP CC to generate both types of data.

Activities

- Set up the transaction persistency processing mode, page [\[255\]](#)
- Set up the transaction file processor or the data file processor

Advanced System Configurations

Advanced System Configuration: Setting up the Transaction Persistency Processing Mode (TIF)

Use

By default, SAP CC 5.0 generates charged items and refill record files resulting from the rating, charging, and refilling functions.

For upgrade purposes, SAP CC 5.0 can also be configured to generate transaction files or data files. The system configuration is available at the *Transaction Integration Framework (TIF)* level. Your master data (charges and charges in offers) must be compliant with these old modes.

The TRANSAC_PROC_CLASS parameter can have the following values:

Output Processing Mode	Parameter Value	Rating Function Can be Implemented
Charged Items or Refill Record Files	<code>com.highdeal.tif.chargeditem.TransactionProcessorShell</code>	Yes
Transaction Files	<code>com.highdeal.tif.tfp.TransactionFileProcessor</code>	No
Data Files	<code>com.highdeal.tif.dbFile.TransactionFileProcessor</code>	Yes
Customized	Consult your solution consultant or your technology consultant.	



NOTE

Consult the *SAP CC Application Help* about the advantages and limitations of these modes for managing the charged transaction persistency.

Prerequisites

You are upgrading a previous version of SAP CC that was configured to generate transaction files or data files.

Procedure

- Change the value of the TRANSAC_PROC_CLASS parameter and apply the necessary settings for the selected function

Advanced System Configuration: Generating Files with Charged Transactions and Charged Items

Use

For upgrade purposes, you can configure SAP CC 5.0 so that it simultaneously generates charged item files and data in a previous file format (transaction files or data files). This advanced and temporary system configuration is available at CIF level. Once configured, SAP CC will use the configurations of the charges in offers for generating the appropriate record (charged item or charged transaction) and storing it into files.



NOTES

- The power users can only create offers that are compliant with the generation of charged items and refill records. We recommend that you upgrade your SAP system regarding the charged item and refill record mechanism. You can configure SAP CC 2.0 so that it generates data files, charged item files, and refill records according to the configuration of the offers used in the system.
- This function is not available if you have configured charge plans for the service provider.

Prerequisites

- You are upgrading a previous version of SAP CC that was configured to generate transaction files or data files.
- There is no charge plan configured in the system. You do not plan to create charge plans in the catalogs of the service provider.

Procedure

- Export the current configuration:
`./setup.sh cif export -login=<LGN> -password=<PWD> <myfilename> rater`
- Enclose the CIF configuration of the rater instances:

```
<dispatchTransactionProcessor>
  <transactionProcessorWrapper
class="com.highdeal.tif.dbFile.TransactionFileProcessor" />
  <chargedItemTransactionProcessor>
    ...
  </chargedItemTransactionProcessor>
</dispatchTransactionProcessor>
```
- Import the new configuration of the CIF:
`./setup.sh cif import -login=<LGN> -password=<PWD> <myfilename> rater`
- Restart all the rater instances of the Core Server



NOTE

You can also configure SAP CC so that it generates transaction files by using `com.highdeal.tif.tfp.TransactionFileProcessor` as the class name in the above procedure.

Advanced System Configuration: Setting up the Transaction File Processor

Use

For compatibility purposes, you can configure SAP CC 5.0 so that it generates transaction files as described in the *SAP CC Application Help*.

The configuration is available at the *Transaction Integration Framework (TIF)* level.



NOTES

- The power users cannot easily maintain the offers created with SAP CC 1.0. We recommend that you upgrade your system to use the charged item mechanism. You can configure SAP CC 2.0 so that it generates transaction files and charged item files according to the configuration of the offers used in the SAP system.
- This function is not available if you have configured charge plans for the service provider.

Prerequisites

- There is no charge plan configured in the system.
- You do not plan to create charge plans in the catalogs of the service provider.

Activities

- Set up the parameters for the Core Server according to your previous version of SAP CC: TFP_TRANSAC_DETAILS, TFP_TRANSAC_FILTERS and TFP_TRANSAC_xxx

Advanced system Configuration: Setting up the Data File Processor

Use

For backward compatibility purposes, you can configure SAP CC 5.0 so that it generates data files including prepaid and postpaid transactions as described in the *SAP CC Application Help*.

The configuration is available at the *Transaction Integration Framework (TIF)* level.

**NOTES**

- The power users cannot easily maintain the offers created with SAP CC 1.0. We recommend that you upgrade your SAP CC system to generated charged items and refill records. You can configure SAP CC so that it generates transaction files and charged item files according to the configuration of the offers used in the SAP CC system.
- This function is not available if you have configured charge plans for the service provider.

Prerequisites

- There is no charge plan configured in the system.
- You do not plan to create charge plans in the pricing catalog(s) of the service provider.

Activities

- Set up the parameters for the Core Server system according to your previous version of SAP CC:
POSTPAID_DB_FILE_PROCESSOR_TRANSAC_FORMAT,
POSTPAID_DB_FILE_PROCESSOR_TRANSAC_DETAIL_FORMAT and similar parameters.

Charged Items Persistency Functions

System Configuration: Setting up the Charged Item and Refill Record File Processor (CIF)

Use

By default, SAP CC 5.0 generates charged item or refill record files. You can configure this file management (path, multithreading, rollover policy, and so on) at the postinstallation time and during the production phase. The configuration is available at the *Charging output Integration Framework (CIF)* level.

Output Data	Function	Settings	Default
Postpaid Charged Item	Writing in bulk	Root Path	SAPCC_CIT/POSTPAID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	false
Prepaid Charged Item	Writing in bulk	Root Path	SAPCC_CIT/PREPAID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	false

Procedure

- Consult the template file
(/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/<TPYE>/cif.rater.config.xml.sk, where <TYPE> is 'sapci' when integrated with SAP Convergent Invoicing in SAP ERP, and 'standalone' otherwise) about these settings
- Export your current configuration from SAP CC:
`./setup.sh cif export -login=<LGN> -password=<PWD> <myfilename> rater`
- Change the parameters
- Import the new configuration of the CIF:
`./setup.sh cif import -login=<LGN> -password=<PWD> <myfilename> rater`
- Restart the server system

Enabling the Sequencing of File Names for Data Files Generated by Rater Instances

Use

The version 2 of data files generated by the rater instances has been enhanced to give the possibility to add a sequence number to the names of the files. Consult the [SAP CC Application Help documentation](#) for more information about this enhancement; see page [21].

Procedure

To enable the sequencing of file names for data files generated by the rater instances, use the following procedure:

- Get the current value of the SQLHELPER_CONNECTION_COUNT parameter for the rater instances
 - Execute the following command in the [Admin+](#) user interface:
`get SQLHELPER_CONNECTION_COUNT persistent rater`
- Increase the value of the SQLHELPER_CONNECTION_COUNT parameter by 1
 - Execute the following command in [Admin+](#) where <increased_value> is the current value of the parameter plus one:
`set SQLHELPER_CONNECTION_COUNT <increased_value> persistent rater`
- Enable the sequencing of file names by setting the value of the ITEM_FILE_SEQUENCE_ENABLED parameter to "true"
 - Execute the following command in [Admin+](#):
`set ITEM_FILE_SEQUENCE_ENABLED true persistent rater`
- Export the CIF configuration of the rater instances
 - Execute the following command in [Setup Tool](#):
`setup cif export rater rater.cif.xml`
 - Check that the rater.cif.xml file has been successfully created
- Set or change the version of the data files and the sequencing of the file names
 - Open the rater.cif.xml file with a text editor
 - For each "bulkWriter" XML element located under the "[chargedItemTransactionProcessor](#)" XML element:

- Set or update the `fileVersion` attribute to `"2"`
- Set or update the `fileSequenceId` attribute to `"CHARGED_ITEM"`
- For each `bulkWriter` XML element located under the `chargeableItemTransactionProcessor` XML element:
 - Set or update the `fileVersion` attribute to `"2"`
 - Set or update the `fileSequenceId` attribute to `"CHARGEABLE_ITEM"`
- Save the file
- Import the CIF configuration of the rater instances
 - Execute the following command of the [Setup Tool](#) user interface:
`setup cif import rater rater.cif.xml`
 - Check into the console that the configuration has been successfully imported
- Restart the rater instances to take your modifications into account

Enabling Line Numbering of File Records for Data Files Generated by Rater Instances

Use

The version 2 of data files generated by rater instances has been enhanced to give the possibility to add the line number as the first field of each element of these data files. Consult the [SAP CC Application Help documentation](#) for more information about this enhancement; see page [21].

Procedure

To enable the line numbering of file records for data files generated by the rater instances, use the following procedure:

- Export the CIF configuration of the rater instances
 - Execute the following inline command of the [Setup Tool](#) user interface:
`setup cif export rater rater.cif.xml`
 - Check that the `rater.cif.xml` file has been successfully created
- Enable the numbering of file records
 - Open the `rater.cif.xml` file with a text editor
 - For each `bulkWriter` XML element, set or update the `lineNumbering` attribute to `"true"`
 - Save the file
- Import the CIF configuration of the rater instances
 - Execute the following inline command of [Setup Tool](#):
`setup cif import rater rater.cif.xml`
 - Check into the console that the configuration has been successfully imported
- Restart the rater instances to take your modifications into account

Enabling the Cleaning of Archived Files for Data Files Generated by Rater Instances

Use

SAP Convergent Charging gives the possibility to activate an automatic cleaning mechanism in order to remove:

- The uncommitted items from data files
- The associated control file

Consult the [SAP CC Application Help documentation](#) for more information about this enhancement; see page [21].

Procedure

To enable the cleaning of archived files for data files generated by the rater instances, use the following procedure:

- Export the CIF configuration of the rater instances
 - Execute the following inline command of the [Setup Tool](#) user interface:
`setup cif export rater rater.cif.xml`
 - Check that the rater.cif.xml file has been successfully created
- Enable the cleaning of archived files
 - Open the rater.cif.xml file with a text editor
 - For each `bulkWriter` XML element, set or update the `cleanArchivedFile` attribute to `"true"`
 - Save the file
- Import the CIF configuration of the rater instances
 - Execute the following inline command of [Setup Tool](#):
`setup cif import rater rater.cif.xml`
 - Check into the console that the configuration has been successfully imported
- Restart the rater instances to take your modifications into account

Modifying the Policy Relating to the Pre-Creation of Data Files

Use

As of SP 1, SAP Convergent Charging gives the possibility to change the policy relating to the pre-creation of data files, modifying the `preCreate` configuration parameter of the CIF.

For more information, refer to the description of the "XXX_PRE_CREATE_FILE (BulkWriter)" parameter available in the [SAP Convergent Charging System Parameters Reference documentation](#); see page [21].

Procedure

To modify the policy relating to the pre-creation of data files generated by the rater instances, use the following procedure:

- Export the CIF configuration of the rater instances
 - Execute the following command in the [Setup Tool](#) user interface:
`setup cif export rater rater.cif.xml`
 - Check that the rater.cif.xml file has been successfully created
- Modify the policy relating to the pre-creation of data files
 - Open the rater.cif.xml file with a text editor
 - For each bulkWriter element, set the preCreate attribute to the adequate value
 - Save the file
- Import the CIF configuration of the rater instances
 - Execute the following command in the [Setup Tool](#) user interface:
`setup cif import rater rater.cif.xml`
 - Check into the console that the modification has been successfully imported
- Restart the rater instances to take your modifications into account

6 Master Data for the Pricing of the Customer Service

This chapter lists the master data configurations in the SAP CC 5.0 Core Server system. SAP Convergent Charging provides a dedicated graphical user interface ([Core Tool](#)) that is used for creating all the necessary pricing elements to commercialize the digital service of a service provider. Some external systems may also manage the master data. The service provider is the owner of the master data. It defines the pricing catalog for the marketable service.

Business Objects

Two Data Models

SAP Convergent Charging 5.0 provides two data models for the master data:

- A new model based on provider contracts is available for facilitating the integration with a Customer Relationship Management (CRM) system. The commercial product is configured in the CRM system by using charging units available from SAP CC: Charge plans. This model includes also some new objects (refill logic and refill tree) to configure the refilling function.
- The previous model based on subscriptions is still supported in upgraded systems with old master data.

Master Data

The service provider is the owner of the master data. In SAP Convergent Charging 5.0, you must configure two key categories of master data:

- Master data dedicated to the pricing and charging information related to the customer services of a service provider; This information is grouped in a pricing catalog.
- Master data dedicated to the end customers of these services

You must configure the following master data objects:

New Model (Contract-Based)	Old Model (Subscription-Based)
Service Level: The pricing catalog related to a customer service includes the following business objects: ■ Reusable Charge (**) ■ Refill Logic ■ Charge Plan ■ Refill Plan The following objects are available to facilitate the pricing modeling: ■ Pricing Macro	Service Level: The pricing catalog related to a customer service includes the following business objects: ■ Reusable Charge ■ Offer The following objects are available to facilitate the pricing modeling: ■ Pricing Macro ■ Translation Table ■ Tier Table

New Model (Contract-Based)	Old Model (Subscription-Based)
■ Mapping Table ■ Range Table ■ Translation Table (*) ■ Tier Table (*) ■ Billable Item Mapping	
Customer Level: ■ Subscriber Account (**) ● Prepaid Account ● External (Postpaid) Account ■ Provider Contract ● Contract Item ■ Access	Customer Level: ■ Subscriber Account ● Prepaid Account ● Credit Limit ● External (Postpaid) Account ■ Subscription ■ Access

Consult the *SAP CC Application Help* in SAP Help Portal at the following location: ►

<https://help.sap.com/cc50> → *Application Help* ◀ or ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Plan* ◀.



(**) NOTES

- The subscriber account does not include any credit limit balance; The credit limit balance management function is not available in the new data model based on contracts.
- The reusable charge must include a dictionary of internal charging references. These references must have a type (postpaid or prepaid).

Data Settings for the Service Provider and its Pricing Catalogs

Setting up Chargeable Item Classes

Use

SAP CC 5.0 receives chargeable items for charging the usage of a customer service. The network elements or the service applications send the chargeable items to deliver these marketable services.

SAP CC 5.0 can transmit different classes of chargeable items. Each chargeable item class is defined by a set of properties. The charging process uses these properties when executing the price plan of the charges that apply to a chargeable item class.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Chargeable Item Class → About Chargeable Item Classes ◀. You can access to the primary help from the graphical user interfaces.

Activities

The technology consultant must:

- Determine the relevant chargeable item classes
- Determine the necessary properties for each class. A class must not include all the properties transmitted within a chargeable item.
- Implement the transmission of those data (see page [255] about Usage Acquisition)
- Configure the chargeable item classes in SAP CC so that the power users can design charges including price plans that will use these properties for the rating calculation: ► Core Tool → File → New → Chargeable Item Class ◀.



NOTE

Some of these properties can be used by the billing and invoicing processes in a third-party billing system.

Prerequisites

- Your implementation has specified the data which are sent to SAP CC for being rated and charged

- A pricing catalog must exist in SAP CC for the service provider

Procedure

- Launch the [SAP CC Core Tool user interface](#) and log on
- Create chargeable item class(es) for a service provider
- Save the chargeable item class(es) in the back-end database

Setting up Refill Item Classes

Use

SAP CC 5.0 receives refill items of different classes to refill a prepaid account. Each refill item class is defined by a set of properties. These properties are used by the refilling process when executing the refill logic.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Refill Item Class → About Refill Item Classes ◀. You can access to the primary help from the graphical user interfaces

Activities

The consultant must:

- Determine the relevant refill item classes depending on how SAP CC is integrated with an external system (ERP or billing)
- Determine the necessary properties for each class. A class must not include all the properties transmitted within a refill item
- Implement the transmission of these data
- Configure the refill item classes in SAP CC so that the power users can design the refill logic including the algorithms that will use these properties for the refilling calculation: ► *Core Tool → File → New → Refill Item Package* ◀.



NOTE

Some of these properties can be used by the billing and invoicing processes in a third party billing system.

Prerequisites

- Your implementation has specified the data which are sent to SAP CC for being refilled
- A catalog must exist in SAP CC for the service provider

Procedure

- Launch the Core Tool user interface and log on
- Create a refill item class for a service provider
- Save the refill item class(s) in the database

Setting up Charged Item Classes

Use

By default, SAP CC 5.0 outputs charged items resulting from the rating and charging processes. Some classes can be configured and reused during the configuration of charge plans or offers.

For each class, you can configure its structure (list of fields) and the generation method of each field.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Charged Item Class ◀. You can access to the primary help from the graphical user interfaces

Activities

The solution consultant and the power user must:

- Determine the classes of charged items that SAP CC must output for the invoicing process
- Determine the contents of these classes and the method for generating each field of a class: SAP CC computes these fields when executing price plans in charges
- List the fields that need to be generated by a price plan because they are not calculated by default by SAP CC or because they are not present in the incoming chargeable item

Procedure

- Launch the Core Tool user interface and log on
- Create the new charged item classes and save them in the database: ► Core Tool → File → New → Charged Item Class.

Recommendations for the Configuration of Charged Item Classes

This table lists the data that can be generated by the SAP CC system and stored in the charged items. Use this table when configuring:

- A charged item class
- A charge customized in a charge plan (or in an offer): Refer to the configuration of the generation of charged items
- An allowance logic customized in an allowance plan

The table defines each field, the syntax and the possible output values.



NOTE

You can use this table to set up the generation of charged transactions in offer master data stored in the SAP CC system.

Field	Description
Account Type Code <i>Number</i> <i>Tech. Key: accountTypeCode</i>	A numerical code that represents the type of the account (of a subscriber account) that is charged by the SAP CC system for the use of a customer service (consumption, periodic, one-off). Possible values: ■ 0: Prepaid account ■ 1: External (postpaid) account See also: Account Type Name
Account Type is Prepaid <i>Boolean</i> <i>Tech. Key: isPrepaid</i>	This field indicates that the account charged with this transaction is a prepaid account (of a subscriber account) See also: ■ Charged Transaction is a Prepaid Refill ■ Charged Transaction is a Prepaid Debit
Account Type Name <i>String</i> <i>Tech. Key: accountTypeName</i>	A text label that represents the type of the account (of a subscriber account) that is charged by the SAP CC system for a customer service use (consumption, periodic, one-off). Possible output values: ■ "prepaid" ■ "external" See also: Account Type Code

Field	Description
Allowance Event Class Name <i>String</i> <i>Tech. Key: allowanceEventClassName</i>	The name of the allowance event class which was sent to the allowance. The value of this field is empty for one-shot triggers and recurring triggers.
Allowance Share Identifier <i>String</i> <i>Tech. Key: allowanceShareId</i>	The unique identifier to group and access shared allowances.
Allowance Unique Identifier <i>String</i> <i>Tech. Key: allowanceUniqueld</i>	The unique identifier of the allowance.
Allowance Validity Start Date <i>Date</i> <i>Tech. Key: allowanceStartDate</i>	The start date of the validity period of the allowance.
Allowance Validity End Date <i>Date</i> <i>Tech. Key: allowanceEndDate</i>	The end date of the validity period of the allowance.
Amount (Excluding Tax) <i>Number</i> <i>Tech. Key: amount</i>	The amount of the charged transaction and of the charged item generated by the SAP CC system during the charging process. This amount does never include tax. Note: The amount excluding tax is equal to the base amount when the charge customized in a charge plan (or in an offer) is configured to net. See also: ■ Base Amount ■ Currency ■ Total Amount (Incl. Tax)

Field	Description
Base Amount <i>Number</i> <i>Tech. Key: baseAmount</i>	The reference amount of the charged transaction that is considered by the SAP CC system to adjust the tax amount and generate the final amounts (amount excluding tax, total amount including tax). This amount can be net or gross depending on the configuration of the charge customized in a charge plan (or in an offer) that has been triggered during the charging process. Consider the <i>VAT Transaction Gross Price Flag</i> and the <i>Tax Is Included</i> fields to be able to manage tax in an external system.  NOTE When the EZTax tax system is selected, the SAP CC system considers the net.  EXAMPLE When there was no overrun during the charging process, the base amount is equal to the <i>Rated Amount</i>. See also: ■ VAT Transaction Gross Price Flag ■ Tax Is Included ■ Amount (Excl. Tax) ■ Total Amount (Incl. Tax) ■ Rated Amount Consult the <i>SAP CC Application Help</i> for more information about the charge plan master data, the charging process, and the tax calculation process.
Base Rated Amount <i>Tech. Key: ratedBaseAmount</i>	The reference amount used by the SAP CC system when it executes the price plan of a dependent charge. The SAP CC system computes previously this amount by executing the price plan of the master charge the dependent charge relates to. Availability: This field is only present in the charged items or transactions when the rated transaction relates to the execution of the price plan of a dependent charge. See also: ■ Rated Amount

Field	Description
Chargeable Items Are Exported <i>Boolean</i> <i>Tech. Key: isChargeableItemExported</i>	Specifies if the operation which generated the charged item was also configured to generate chargeable items.
Charge Activation Cancellation Date	The cancellation date of the subscription Available only for cancellation of a one-shot rate in a charge
Charge Activation Code	The identifier (code) of the activated charge in a provider contract or of a subscription  NOTE This identifier can also be the identifier of the refill logic in a provider contract
Charge Activation Effective Date	The creation date of the subscription Available only for one-shot rates with an activation event
Charge Component Name	The type name of the activated rate component in the price plan: ■ Usage Rates ■ Recurring Rates ■ One-Shot Rates
Charge Date	The date of the charged event (usage, recurring, or one-shot) or refill event
Charge Reference	When the charging process was based on an external reference, it is the identifier (code) of this reference.
Charge Reference Name	When the charging process was based on an external reference, it is the identifier (name) of this reference that has been set in the charging plan of the activated charge.
Charge Type Code <i>Number</i> <i>Tech. Key: chargeTypeCode</i>	A numerical code that specifies the charge Possible values: ■ 0: Closing ■ 1: Refill Charge ■ 2: Internal charge ■ 3: External charge ■ 4: Not Charged Consult the <i>Charge Type Name</i> field for more information.

Field	Description
Charge Type Name String <i>Tech. Key: chargeTypeName</i>	A text label that specifies the charge. Possible values: ■ "closing": ■ "refillCharge": ■ "internalCharge": ■ "externalCharge": ■ "notCharged ":
Chargeable Item Class Name String <i>Tech. Key: chargeableItemClassName</i>	The text identifier (name) of the chargeable item class of the chargeable item which was charged Note: Only available for usage charging
Charged Amount is a Credit Boolean <i>Tech. Key: isCredit</i>	This field is related to the type of operation in the charge customized in a charge plan (or in an offer) Possible values: ■ {true} if the charging process generates a credit ■ {false} otherwise See also: ■ Charged Amount is a Debit
Charged Amount is a Debit Boolean <i>Tech. Key: isDebit</i>	This field includes information about the type (credit or debit) of the charged transaction (charged item) resulting from the charging process. This type results from the configuration of a charge customized in a charge plan (or in an offer). Consider also the <i>Charged Amount is a Credit</i> field. Possible values: ■ {true} if the charging process generates a debit ■ {false} otherwise See also: ■ Charged Amount is a Credit
Charged Item or Refill Record Set identifier	The identifier of a set of charged items or of a set of refill records generated by the system Note: A charged item set consists of a charged item coming from a master charge and possibly from charged items coming from dependent charges
Charged Item Set Identifier	The identifier of a set of charged items as a number This set contains a charged item coming from a master charge and possibly charged items coming from dependent charges and allowances

Field	Description
Charged Tax Amount <i>Tech. Key: chargedTaxAmount</i>	The tax amount of the charged transaction Consider: Tax Amount <i>This field is an alias of taxAmount</i>
Charged Tax Code	The tax code of the charged transaction Consider: Tax Code <i>This field is an alias of taxCode</i>
Charged Tax Detail	
Charged Tax Status Code ■ Depreciated	Deprecated: Consider the Tax Status Code The code of the tax status for the charged transaction This status results from the tax computations. The SAP CC system can set the following values: ■ "tsNoTax": Indicates that status no tax was applied ■ "tsForInfo": Indicates that the computed tax information is given for information ■ "tsApplied": Indicates that the tax was applied ■ "tsTaxExempted": Indicates a tax exemption ■ "tsBuyerSubjectToPay": Indicates that the buyer is in charge to reverse the tax to the tax authority Deprecated values: ■ "tsTaxMissedForInfo": Indicates that the information is missing for the data related to the tax ■ "tsTaxMissedForApply": Indicates that the tax information was missing to apply the tax ■ "tsUnknown": Indicates that the tax status is unknown <i>This field is an alias of taxStatusCode (see Tax Status Code)</i>

Field	Description
Charged Tax Status Identifier	Deprecated: Consider the Tax Status Identifier The numerical code of the tax status for the charged transaction: ■ "0": Indicates that status no tax was applied ■ "1": Indicates that the computed tax information is given for information ■ "2": Indicates that the tax was applied ■ "3": Indicates a tax exemption ■ "4": Indicates that the buyer is in charge to reverse the tax to the tax authority Deprecated values: ■ "-1": Tx status for indicating that the information is missing for the data related to the tax ■ "-2": Indicates that the tax information was missing to apply the tax ■ "-3": Indicates that the tax status is unknown <i>This field is an alias of taxStatusId (see Tax Status Identifier)</i>
Charged Total Amount (Incl. Tax) ■ Deprecated <i>Tech. Key: chargedTotalAmount</i>	Deprecated: Consider the <i>Total Amount</i> field The total amount of the charged transaction including tax <i>This field equals totalAmount</i>
Charged Transaction is a Prepaid Debit <i>Boolean</i> <i>Tech. Key: isPrepaidUsage</i>	This field indicates that the charged transaction results from the charging process with a selected prepaid account. This business transaction relates to the use of a customer service (usage, recurring, or one-shot). The charged account is a prepaid account of the subscriber account.  NOTE The SAP CC system converts this charged transaction to a charged item. Availability: This field is only relevant to the configuration of the generation of charged items. See also: ■ Charged Transaction is a Prepaid Refill ■ Account Type is Prepaid

Field	Description
Charged Transaction is a Prepaid Refill <i>Boolean</i> <i>Tech. Key: isPrepaidRefill</i>	This field indicates that the charged transaction results from the refilling process. This business transaction is a refill on a prepaid account.  NOTE The SAP CC system converts this charged transaction to a refill record. Availability: This field is only relevant to the configuration of the generation of refill records. See also: ■ Charged Transaction is a Prepaid Refill ■ Account Type is Prepaid
Charging Component Name	
Charging Detail Field	taxDetail
Contract Identifier <i>String</i> <i>Tech. Key: contractId</i>	The identifier of the provider contract. The value depends on the context: ■ In a charge plan, it is the identifier of the provider contract which generated the charged item ■ In an allowance plan, it is the identifier of the provider contract owning the allowance which generated the charged item See also: ■ Triggering Contract Identifier
Contract Item External Identifier <i>String</i> <i>Tech. Key: contractItemExternalId</i>	The external identifier set by an external system or by SAP CRM in case of integrated scenario. This field is retrieved from the external code set in a contract item stored in SAP CC.
Contract Item Identifier <i>String</i> <i>Tech. Key: contractItemId</i>	The identifier set by an external system or by SAP CRM in case of integrated scenario. This field is retrieved from the name (or code) set in a contract item stored in SAP CC.
Contract Type <i>String</i> <i>Tech. Key: contractType</i>	The type of data which generated the charged item. Possible values are: ■ 'P' for provider contracts ■ 'S' for subscriptions
Currency	The ISO 4217 three-letter currency code of the charged transaction
End of Rating Recurring Period	The end date of the period related to a recurring rate This period may be different from the "End of Rating Reference Recurring Period" used when the recurring charge is prorated.

Field	Description
End of Rating Reference Recurring Period	The end date of the reference period related to a recurring rate
Event Date	The date of the rated event This field equals the consumption date related to a usage rate or the triggering date related to recurring rates or one-shot rates.
Event Processing Date <i>Date</i> <i>Tech. Key: eventProcessingDate</i>	The date when the event which generated the charged item was processed by the SAP CC Core Server system.
Excluded Last Day of the Rating Recurring Period	
External Account Code	Code of the postpaid account to be charged when a postpaid service is processed. The code is set in the external account of a subscriber account.
External System Code	Code of the external system to be charged when a postpaid service is processed. The code is set in the external account of a subscriber account.
First Dispatch Code	The dispatch code # 1 which is the name of the property chosen as the first criteria when filtering External Account transactions
Name of Rate Component Used	Transaction label = rate component name
Offer Code <i>String</i> <i>Tech. Key: offerCode</i>	The identifier (code) of the activated offer identified and triggered during the charging process of a customer service use (consumption, periodic, one-off) This code is the name of the offer configured in the pricing catalog of the service provider.
Overrun From <i>String</i> <i>Tech. Key: overrunFrom</i>	The identifier of the prepaid account which has called the overrun. It is empty for the first overrun. Note: It is only available in the context related to the prepaid account overrun.
Overrun To <i>String</i> <i>Tech. Key: overrunTo</i>	The identifier of the prepaid account from which the overrun is called. It is empty for the last overrun. Note: It is only available in the context related to the prepaid account overrun.
Prepaid Balance Amount <i>Tech. Key: prepaidBalanceAmount</i>	The current amount of the balance of the prepaid account selected during the charging process

Field	Description
Prepaid or External Account Code <i>String</i> <i>Tech. Key: accountCode</i>	The identifier (code) of the account in a subscriber account (prepaid or external postpaid) that is charged
Prerating Reservation Identifier	Deprecated The identifier of the reservation for the prerating process Note: The prerating function is deprecated.
Price Plan Name	The identifier (name) of the processed price plan of a charge in a provider contract or in a subscription
Produced by a Master Charge Component <i>Number</i> <i>Tech. Key: isMaster</i>	The type of the charge customized in a charge plan (or in an offer) that includes the price plan triggered during the charging process. Possible values: ■ 1: Master charge ■ 0: Dependent charge
Produced by an Allowance <i>Boolean</i> <i>Tech. Key: isAllowance</i>	Specifies if the charged item was generated by an allowance.
Rated Amount <i>Tech. Key: ratedAmount</i>	The amount of the rated transaction before tax computation. This raw amount is calculated by the SAP CC system by executing the price plan of a charge customized in a charge plan (or in an offer). Do not use this field to set up the generation of charged transactions nor charged items. Test price plan, and dependent charges and overrun Configure a Pure rating engine We recommend that you use base amount Consider the field Currency to know the currency that applies to this amount to determine the price. Note: This field equals Base Amount when there is no overrun. See also: Currency Base Amount
Rated Amount is Prorated <i>Boolean</i> <i>Tech. Key: isProrated</i>	{true} if "prorated"
Rated Amount is Refunded	{true} if "refunded"
Rated Boolean	

Field	Description
Rated Date	
Rated Number	
Rated String	
Rated Tax Amount ■ Depreciated	Deprecated: Consider the <i>Base Amount</i> field to set up the generation of charged items. The amount of the computed tax (net price plans) computed during the execution of the price plan. This data is available in the rated transaction. Do not use this field when the price plan is gross. Do not use this field to set up the generation of charged transactions nor charged items.
Rated Tax Code	The code of the tax
Rated Tax Status Code ■ Depreciated	Deprecated: Consider the <i>Tax Status Code</i> field
Rated Tax Status Identifier ■ Depreciated	Deprecated: Consider the <i>Tax Status Identifier</i> field
Rated Total Amount ■ Depreciated	Deprecated: Consider the <i>Rated Amount</i> field to set up the generation of charged items. The total amount including tax (net price plans) to be charged to an account. Do not use this field when the price plan is gross. Do not use this field to set up the generation of charged transactions nor charged items.
Rating Activation Date	The date when the recurring charge is triggered during a recurring charging process
Rating Consumption Date	The consumption date of the chargeable item related to a usage charging process
Rating Event Origin <i>String</i> <i>Tech. Key: origin</i>	The origin of the event that is charged. It relates to the customer service use (consumption, periodic, one-off). Possible values: ■ "U" (Usage): The service consumption is the original event. It is configured by using usage rates (and refills) in the pricing logic. ■ "R" (Recurring): A periodic fee is the original event. Periodic fees are configured by using recurring rates (or refills) in the pricing logic. ■ "O" (One-shot): A one-off fee is the original event. One-off fees are configured by using one-shot rates (or refills) in the pricing logic.

Field	Description
Refill Amount	
Refill Currency	
Refill Date	
Refill ISO Currency	
Sender Job Identifier <i>Number</i> <i>Tech. Key: senderJobId</i>	Job identifier of the sender that sends a job of charging operations to SAP CC (for example, the job identifiers are used in the case of mass charging when SAP Convergent Invoicing sends one or more jobs of charging operations to SAP CC)
Second Dispatch Code	The dispatch code # 2 which is the name of the property chosen as the second criteria when filtering External Account transactions
Service Identifier	The service identifier of the chargeable item related to the usage of a customer service and provided by a service provider Available only for usage charging
Service Provider Name	The identifier of the service provider of the subscriber account Note: This identifier is the name of the catalog of the service provider.
Service Provider Country Code	The country code ISO3166 of the service supplier according to the tax settings of the charge customized in a charge plan (or in an offer) executed at runtime
Session Rating Reservation Identifier	The identifier of the session Available only for session-based charging
Start of Rating Recurring Period	The period start related to a recurring rate The period may be different from the "Start of Rating Reference Recurring Period" used when a recurring charge is prorated
Start of Rating Reference Recurring Period	The reference period start date related to a recurring rate
Subscriber Account Code <i>String</i> <i>Tech. Key: subscriberAccountCode</i>	The subscriber account identifier (code)
Subscriber Account Reference <i>String</i> <i>Tech. Key: subscriberAccountReference</i>	The subscriber account reference

Field	Description
Subscriber Consumes Service (Client) <i>Boolean</i> <i>Tech. Key: isClient</i>	This field includes information about the relationship between the subscriber and the customer service. The SAP CC system can set the following values: ■ {true} if the business transaction relates to a client relationship: The subscriber of a charge plan (or an offer) consumes the service related to the charge resulting in the generation of the charged transaction ■ {false} otherwise
Subscriber Provides Service (Partner) <i>Boolean</i> <i>Tech. Key: isPartner</i>	This field includes information about the relationship between the subscriber and the customer service. The SAP CC system can set the following values: ■ {true} if the business transaction relates to a partner relationship: The subscriber of a charge plan (or an offer) is a partner of the service provider and provides the service related to the charge resulting in the generation of the charged transaction ■ {false} otherwise
Subscription Code	The identifier (code) related to the subscription that has been triggered
Subscription Commitment Expiration Date	The commitment date of the subscription
Subscription Resumption Date	The resumption date of the subscription
Subscription Suspension Date	The suspension date of the subscription
Tax Amount <i>Number</i> <i>Tech. Key: taxAmount</i>	The amount of tax applied and adjusted to a charged transaction Consider the <i>Currency</i> field to know the currency related to this amount. Consult the <i>SAP CC Application Help</i> about the tax calculation process for more information on tax computation and tax applying. See also: ■ Base Amount ■ Currency ■ Total Amount (Incl. Tax) <i>This field replaces the deprecated field: Charged Tax Amount</i>

Field	Description
Tax Code <i>String</i> <i>Tech. Key: taxCode</i>	The tax code of a charged transaction (or charged item) assigned to a prepaid account or external postpaid account The string format depends on the invoking tax system used to calculate the tax data. The SAP CC system can set the following values: ■ Value Added Tax (VAT) System Syntax: / <Country_Code> / <VAT_Rate_Level> # <Timestamp> <Country_Code>: ISO 3166 country code (2-digit) <VAT_Rate_Level>: "0" to "5" <Timestamp>: Number of days between January 1st, 1970 and the validity start date of the tax rate value. Example: The rate value for the normal tax rate level vaults 0.196 since 01/05/01. A charged item can include the following tax code: /FR/0#11443 ■ Flat Tax System Syntax: /RAW/ <Rate_Identifier> <Rate_Identifier>: The identifier of the flat tax rate set in the charge customized in a charge plan (or in an offer) ■ Special Syntax: NO_TAX There are several reasons that explain this output value. Refer to the <i>SAP CC Application Help</i>. Example: No tax can be set in VAT rate level of the charge customized in a charge plan No tax can be set in the charge customized in a charge plan No tax can be set in the subscriber account No tax can be set by the SAP CC system when a configuration is erroneous: The charge plans and subscriber accounts are not compliant with. ■ EZTax System Syntax: EZTAXED Note: You can use the tax code to determine the invoicing tax system used by the SAP CC system to compute the tax data. <i>This field replaces the deprecated field: Charged Tax Code</i>

Field	Description
Tax Determination Type <i>String</i> <i>Tech. Key: taxDetType</i>	To help the determination of the tax that must be computed by an external billing system The SAP CC system can set the following values: ■ "00" (default): ● When the tax status is APPLIED and must not be finally calculated by the billing system ● When the tax status is BUYER_SUBJECT_TO_PAY, TAX_EXEMPTED, or NO_TAX ■ When the tax status is FOR_INFO: ● "01": When the invoicing tax system was VAT or Flat Tax ● "04": When the tax system was EZTax Note: For other deprecated tax statuses, the SAP CC system sets this output field to "00".
Tax is Included in Total Amount <i>Boolean</i> <i>Tech. Key: isTaxIncluded</i>	The SAP CC system can set the following values: ■ {true} if the tax status is APPLIED or FOR_INFO ■ {false} otherwise <i>See also the definition of Tax Status Code.</i>

Field	Description
Tax Status Code <i>String</i> <i>Tech. Key: taxStatusCode</i>	The string code of the tax status. The tax status is the final execution status of the tax calculation process. The SAP CC system can set the following values: ■ "tsNoTax": Indicates that no tax was applied ■ "tsForInfo": Indicates that the computed tax data is given for information ■ "tsApplied": Indicates that the tax was applied ■ "tsTaxExempted": Indicates a tax exemption ■ "tsBuyerSubjectToPay": Indicates that the buyer is in charge to reverse the tax to the tax authority  NOTES ■ See also the numerical values of this code: Tax Status Identifier. ■ Consult the <i>SAP CC Application Help</i> about the tax calculation process and the tax status. Deprecated values: ■ "tsTaxMissedForInfo": Indicates that the information is missing for the data related to the tax ■ "tsTaxMissedForApply": Indicates that the tax information was missing to apply the tax ■ "tsUnknown": Indicates that the tax status is unknown <i>This field replaces both deprecated fields: Charged Tax Status Code and Rated Tax Status Code.</i>
Tax Status Identifier <i>Number</i> <i>Tech. Key: taxStatusId</i>	The numerical code of the tax status resulting from the tax computations. The SAP CC system can set the following values: ■ 0: Indicates that no tax was applied ■ 1: Indicates that the computed tax data is given for information ■ 2: Indicates that the tax was applied ■ 3: Indicates a tax exemption ■ 4: Indicates that the buyer is in charge to reverse the tax to the tax authority Deprecated values: ■ (-1): Tax status for indicating that the information is missing for the data related to the tax ■ (-2): Indicates that the tax information was missing to apply the tax ■ (-3): Indicates that the tax status is unknown <i>This field replaces both deprecated fields: Charged Tax Status Identifier and Rated Tax Status Identifier.</i>

Field	Description
Third Dispatch Code	The dispatch code # 3 which is the name of the property chosen as the third criteria when filtering External Account transactions
Total Amount (Including Tax) <i>Number</i> <i>Tech. Key: totalAmount</i>	The total amount of the charged transaction, tax included. The SAP CC system debits the balance of the selected prepaid account with this amount or charges this amount to the selected external postpaid account. Note: The total amount vaults the base amount when the charge customized in a charge plan (or in an offer) is configured to gross. See also: ■ Base Amount ■ Currency ■ Amount (Excl. Tax) <i>This field replaces the deprecated field: Charged Total Amount</i>
Triggering Contract Identifier <i>String</i> <i>Tech. Key: triggeringContractId</i>	The identifier of the provider contract which triggered the generation of the charged item by an allowance. The value depends on the type of trigger: ■ For a one-shot trigger or a recurring trigger, it is the identifier of the provider contract which owns the allowance ■ For an event-based trigger, it is the identifier of the provider contract which sent an event to the allowance See also: ■ Contract Identifier
Triggering Contract Item External Identifier <i>String</i> <i>Tech. Key: triggeringContractItemExternalId</i>	The external identifier of the provider contract item that sends an event to the allowance generating the billable items through an Event-Based Trigger component. Otherwise, the Triggering Contract Item External Identifier contains the external identifier of the parent provider contract item of the allowance. See also: ■ Contract Item External Identifier
Unrounded Rated Amount <i>Number</i> <i>Tech. Key: ratedUnroundedAmount</i>	The amount computed by the charges having up to 6 decimal places before being rounded according to the TRANSACTION_PRECISION parameter. This field is required for the tax framework but may not be used in the charged item mapping.
US Transaction Business Class	
US Transaction Call Duration	
US Transaction County Exempt	
US Transaction County Exempt	

Field	Description
US Transaction Customer Type	
US Transaction Facilities-Based Flag	
US Transaction Federal Exempt	
US Transaction Franchise Flag	
US Transaction Incorporated Code	
US Transaction Lifeline Flag	
US Transaction Line Count	
US Transaction Location Count	
US Transaction Origin	
US Transaction Origin Flag	
US Transaction Regulated Flag	
US Transaction Resale Flag	
US Transaction Service Address	
US Transaction Service Address Flag	
US Transaction Service Class	
US Transaction Service Type	
US Transaction State Exempt	
US Transaction Tax Data	
US Transaction Taxation Date	
US Transaction Telecom Type	
US Transaction Termination	
US Transaction Termination Flag	
US Transaction Type	
User Service Identifier	The identifier of the end customer related to the usage of a service that was charged
VAT Business Entity	The information about the business category (B2B or B2C) configured in the subscriber account relating to the charged prepaid or external (postpaid) account Possible values: ■ {true}: If the business category is B2B in the subscriber account ■ {false}: If the business category is B2C

Field	Description
VAT Place of Taxation	
VAT Transaction Gross Price Flag <i>Boolean</i> <i>Tech. Key: taxVatGrossPriceFlag</i>	The information if prices calculated by executing a price plan are net or gross Possible values: ■ "true": If the prices defined in the price plan of the charge (customized in a charge plan or an offer) gross ■ {false}: If the prices defined in the price plan are net See also: ■ Base Amount ■ Tax Is Included ■ Price Plan Name
VAT Transaction Rate Code <i>String</i> <i>Tech. Key: taxVatRateCode</i>	The code of the tax rate level (VAT system) configured in the charge customized in a charge plan (or in an offer) when the invoicing tax system is EU VAT. Possible tax rate levels are: ■ "0": Normal ■ "1": Intermediary ■ "2": Reduced ■ "3": Super Reduced ■ "4": Zero ■ "5": Special ■ "-1": No Tax
VAT Transaction Raw Rate <i>Number</i> <i>Tech. Key: taxVatRawRate</i>	The flat tax rate configured in the charge customized in a charge plan (or in an offer) Note: Only available when the customized charge is configured for the Flat Tax system.
VAT Transaction Raw Rate ID <i>String</i> <i>Tech. Key: taxVatRawRateId</i>	The identifier of the flat tax rate as it is set in the charge customized in a charge plan or in an offer Note: Only available when the customized charge is configured for the Flat Tax system.

**NOTE**

Some fields can be used both in charge plans and allowance plans, while other fields can only be used in charge plans or in allowance plans.

The following fields can only be used in allowance plans:

- Allowance Event Class Name
- Allowance Unique Identifier
- Allowance Validity Start Date
- Allowance Validity End Date
- Triggering Contract Identifier

The following fields can be used in both charge plans and allowance plans:

- Account Type Code
- Account Type Name
- Account Type is Prepaid
- Chargeable Item Unique Identifier
- Chargeable Item Unique Identifier Type
- Charged Item or Refill Record Set Identifier
- Charged Item or Refill Record Set Identifier Type
- Charged Item or Refill Record Set identifier
- Contract Identifier
- Contract Type
- Currency
- End of Rating Recurring Period
- Event Date
- Event Processing Date
- External Account Code
- External Account Name
- ISO Currency
- Prepaid Account Name
- Prepaid or External Account Code
- Produced by an Allowance
- Sender Job Identifier
- Session Rating reservation Identifier
- Start of Rating Recurring Period
- Subscriber Account Code

The remaining fields can only be used in charge plans.

Setting up Refill Record Classes

Use

By default, SAP CC 5.0 outputs refill records resulting from the refilling process. Some classes can be configured and reused in different refill plans.

For each class, you can configure its structure (list of fields) and the generation method of each field.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: 

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Refill Record Class . You can access to the primary help from the graphical user interfaces.

Activities

The solution consultant and the power user must:

- Determine the classes of the refill records that SAP CC must output for the invoicing process
- Determine the contents of these classes and the method for generating each field of a class
SAP CC computes these fields when executing price plans in charges
- List the fields that need to be generated by a price plan because they are not calculated by default by SAP CC or because they are not present in the incoming refill item

Procedure

- Launch the Core Tool user interface and log on.
- Create the new refill record classes and save them in the database: ► *Core Tool* → *File* → *New* → *Refill Record Class*.

Setting up a Reusable Charge

Use

SAP CC 5.0 use charges for managing fees related to the use of a customer service. The charges apply to certain chargeable item classes. You can design commercial offers by reusing charges. A charge includes a price plan and a charging plan that must be configured for being executed by the rating process and the charging process.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation* - *Core Tool* → *Charges* → *About Charges* ◀. You can access to the primary help from the graphical user interfaces

Prerequisites

You have configured all the necessary chargeable item classes to design price plans.

Activities

The solution consultant and the power user must:

- Determine the relevant fees and list the charges to be created.
- Configure the charges in SAP CC so that the power users can design commercial offers. Each charge includes a price plan and a default charging plan.
- Maintain these charges.

Procedure

- Launch the Core Tool user interface and log on.
- Create the new charges and save them in the database: ► *Core Tool* → *File* → *New* → *Charge*.

Setting up the Refill Logic

Use

The refill logic is used by SAP CC 5.0 for managing refills related to the use of a customer service. The usage refills apply to certain refill item classes. You can design commercial offers that feature refill services by reusing refill logic objects from the catalog of the service provider.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Refill Logic → About Refill Logic ◀. You can access to the primary help from the graphical user interfaces.

Prerequisites

You have configured all the necessary refill item classes to design the calculation algorithm for usage refills.

Activities

The solution consultant and the power user must:

- Determine the relevant fees and list the charges to be created.
- Configure the charges in SAP CC so that the power users can design commercial offers. Each charge includes a price plan and a default charging plan.
- Maintain these charges.

Procedure

- Launch the Core Tool user interface and log on
- Create the new refill logic objects and save them in the database: ► Core Tool → File → New → Refill Logic

Setting up the Counter Name Dictionary

Use

A counter name dictionary is a list of counter names and descriptions that are used by all the SAP users when modeling charge plans or refill plans that show counters to an external CRM or provisioning system. A counter name is a business data defined in the complete SAP CC system.



NOTE

The counter name dictionary and its counter names is a business data defined in the complete SAP CC system. It is not part of the pricing catalog of a service provider. Maintenance and transport operations are dedicated.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Tools → Counter Dictionary. You can access to the primary help from the graphical user interfaces.

Prerequisites

You have a convergent charging scenario variant based on charge plans and provider contracts.

When modeling your pricing catalog, you have identified that a counter declared in a charge plan or in a refill plan must be visible and initialized in an external CRM or a provisioning system.

Activities

The power user must:

- Create and maintain a list of counter names that can be used in a charge plan and in a refill plan

Procedure

- Launch the Core Tool user interface and log on
- Create the new counters and save them in the back-end database: Core Tool → Tool → Counter Dictionary... → Add

Setting up the Spending Status Description

Use

A spending status description is a list of named labels defined in the SAP that are used by all the SAP users when modeling charge plans or refill plans that show counters to an external CRM or provisioning system.



NOTE

A spending status description is a business data defined in the complete SAP CC system. It is not part of the pricing catalog of a service provider. Maintenance and transport operations are dedicated.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation -

Core Tool → *Tools* → *Counter Dictionary* . You can access to the primary help from the graphical user interfaces.

Prerequisites

You have a charging scenario variant based on charge plans and provider contracts.

When modeling your catalog, you have identified that a counter must be visible and monitored in a policy or monitoring system as form of a spending status. You configure the possible labels of this spending status in a spending status description stored in SAP CC and jointly known by the policy system.

Activities

The power user must:

- Create and maintain a list of spending status descriptions that can be used in a monitoring plan and associated charge plan or refill plan

Procedure

- Launch the Core Tool user interface and log on
- Create the new spending status descriptions and save them in the back-end database: 
Core Tool → *New* → *Spending Status Description*

Designing and Setting up a Charge Plan

Use

Charge plans are used by SAP CC 5.0 for managing the conditions of pricing agreements related to the usage of a customer service when SAP Convergent Charging is integrated with an external CRM or a provisioning system. The service use relates to the service consumption (see usage rate), periodic fees (see recurring rate), and one-off fees (see one-shot rate).

Consult the primary help of the Core Tool user interface in SAP Help Portal at: 

<https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation* - *Core Tool* → *About Charge Plans* . You can access to the primary help from the graphical user interfaces.

Prerequisites

You have configured all the necessary charged item classes.

You have configured all the necessary charges with charging plans that use internal charging references assigned to an account type (prepaid or postpaid).

Activities

The power user must:

- Determine the relevant charge plans to be configured
 - When a counter is shared between several provider contracts, you need to design a charge plan for the parent contract to reset or credit the shared counter and to design another charge plan for the linked contracts.
- Determine the complete list of reusable charges to be customized in these charge plans
- Configure and release the charge plans in SAP CC so that the power users can design charges including price plans that will use these properties for the rating function.

Procedure

- Launch the Core Tool user interface and log on
- Create the charge plans and save them in the database: ► *Core Tool* → *File* → *New* → *Charge plan*

Designing and Setting up a Refill Plan

Use

Refill plans are used by SAP CC 5.0 for managing the conditions of pricing agreements related to the usage of a customer service when SAP Convergent Charging is integrated with an external CRM or a provisioning system.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *About Refill Plans* ◀. You can access to the primary help from the graphical user interfaces.

Prerequisites

- You have configured all the necessary refill record classes.
- You have configured all the necessary charges with refill plans that use internal charging references assigned to an account type (prepaid or postpaid).

Activities

The power user must:

- Determine the relevant refill plans to be configured
- Determine the complete list of charges to be inserted in these refill plans
- Configure and release the refill plans in SAP CC so that the power users can design charges including price plans that will use these properties for the rating function.

Procedure

- Launch the Core Tool user interface and log on.
- Create the new refill plans and save them in the database: ► *Core Tool* → *File* → *New* → *Refill plan*.

Designing and Setting up a Monitoring Plan

Use

Monitoring plans are used by SAP CC 5.0 for managing the generation of spending statuses related to the usage of a customer service when SAP Convergent Charging is integrated with a policy or monitoring system.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *About Monitoring Plans* ◀. You can access to the primary help from the graphical user interfaces.

Prerequisites

Refer to the primary help.

Activities

The power user must:

- Determine the relevant monitoring plans to be configured in SAP CC
 - In case of bundled services, you want to monitor only certain activities: data services and not the voice service.
- Determine how an end customer is identified regarding to the spending status monitoring:
 - The identification is the same than the identification available for the charging services
 - The identification is different but both the policy system and the CRM/provisioning system must share this identification because this ID must be set in the contract items by the CRM/provisioning system and this ID is used by the policy/monitoring system to start a spending status monitoring session.
- Determine the complete list of spending statuses that must be monitored by the policy or monitoring system
- Configure and release the monitoring plans in SAP CC so that they can be associated and combined to commercial products in a CRM system and finally subscribed to in a provider contract.

Procedure

- Launch the Core Tool user interface and log on
- Create the new monitoring plans and save them in the database: ► *Core Tool* → *File* → *New* → *Monitoring plan*

Recommendations for the Initialization of Counters Shared In Provider Contracts

Use

If you want to share a counter between several items in a provider contract, you may need to set up some specific configurations in the catalog of the service provider. By default such a shared counter is initialized with the zero value. If you want to design other initial values, you must create the logic that will initialize the counter with the value of a parameter redefined in each provider contract.

They are four possible configurations:

Possible Configurations	Data	Cycle
Create and set up a new charge plan with a customized charge that includes a recurring rate component charged at the start of the period	Dedicated charge plan	Periodic
Create and set up a new charge plan with a customized charge that includes a one-shot rate component based on the <i>Activation</i> event (creation of the related contract item)	Dedicated charge plan	One-Off
Configure the refill logic of an existing refill plan with a customized charge that includes a recurring refill	Existing refill plan	Periodic
Configure the refill logic of an existing refill plan with a customized charge that includes a one-shot refill component based on the <i>Activation</i> event (creation of the contract item referring to this refill plan)	Existing refill plan	One-Off



IMPORTANT NOTE

Do not mix these configurations inside a provider contract or check that they will not introduce a wrong behavior of SAP CC regarding to the initialization of the counter shared in the provider contract. Check also the periodical resets of this counter.

Consult the primary help of the SAP CC Core Tool user interface in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Provider Contracts → [Sharing counters among provider contract items](#). You can access to the primary help from the graphical user interfaces.

Prerequisites

- The counter sharing function is implemented in the CRM application

**EXAMPLE**

SAP CRM creates provider contracts that include counters shared between the items of each contract. Refillable units are implemented by using shared counters. See the [Configuration with the Integrated Scenarios C2C and O2C](#) on page [277].

Setting up an Offer

Use

An offer defines the conditions of pricing agreements related to the use of a commercial service by an end customer. You customize reusable charges and combine suboffers to implement the pricing logic related to the customer service. Usage (service consumption), one-off, and periodic fees can be charged to an end customer.

An offer is part of the pricing catalog (master data) of the service provider.

**NOTES**

- This business object is part of the old data model based on subscriptions. For new implementation projects, consider the new data model based on charge plans and provider contracts.
- If your SAP CC system is interconnected with a CRM system, use charge plans and refill plans (see page [250]).

Consult the primary help of the SAP CC Core Tool user interface in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Getting Started → Getting Help → Help Resources → Access the primary help for an upgraded platform → Core Tool with all Data Models → About Offers . You can access to the primary help from the graphical user interfaces of SAP Convergent Charging.

Prerequisites

- You model your business with subscriptions.
- Your SAP CC system is configured to manage offers and subscriptions. This function may not be present in your system landscape.
- You have configured all the necessary reusable charges, pricing macros, business data tables (tier table, translation table).

Activities

The power user must:

- Determine the relevant offers and suboffers to be created

- Determine the complete list of charges to be inserted in these offers
- Configure the offers in SAP CC

Procedure

- Launch the SAP CC Core Tool user interface and log on
- Create the new offers and suboffers and save them in the back-end database: ► *Core Tool* → *File* → *New* → *Offer*



NOTE

SAP CC Core Tool supports all the business objects. Change the preferences of the user interface to select the data model displayed to the power users.

Catalog Transport

SAP Convergent Charging gives the possibility to transport data of a given catalog from an SAP CC system to one or several other SAP CC system(s). The data to be transported is included in a dedicated “Change List” master data, which is sent to a list of defined transport destinations using specific transport requests.

For further information, refer to the ‘System Settings for Catalog Transport’ section above.

Implementation Tasks

Assigning a Charge/Refill Plan to a Commercial Product

Use

SAP CC 5.0 manages charge plans and refill plans that must be combined and bundled in a CRM application. You need to implement the Web Services provided by SAP CC to manage properly these data.



NOTES

- You can download the documentation in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 ◀.
- The documentation for the Web Services of SAP CC is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download
- If the SAP CC Core Server system is running, you can consult the WSDL of this process component of the Web Services by using the following URL:
`http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/catalog?wsdl` (ex.:
`https://myhostname.corp:9080/catalog?wsdl`)
You can access to the XSD fragments:
`http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/catalog?xsd=1` (ex.:
`https://myhostname.corp:9080/refilling?xsd=1`)
- For your developments during the implementation phase, you need to import the relevant WSDL into your development tool by using the URL detailed above.
Ex.: `https://myhostname.corp:9080/catalog?wsdl`

Prerequisites

You have decided to base the convergent charging services on the provider contracts.

Consult the *SAP CC Application Help* about the provisioning function to determine how to implement this process.

Activity

You need to use the *Cross Catalog Management* process component of the Web Services.

Use the technical documentation to implement this function in your landscape.

Migration



7 Master Data for the End Customers

In a production or a quality assurance system, the master data related to end customers of the service provider are created and maintained by a CRM application or an external provisioning system. You need to integrate SAP Convergent Charging 5.0 with this system. SAP CC provides different technical interfaces for this integration. Orchestration, replication, distribution, or synchronization processes may exist between these systems and SAP CC. Consult the [SAP CC Application Help documentation](#) for more details about the provisioning processes and process orchestration; see [21].

The service provider is the owner of the customer master data.

RECOMMENDATION

You can manually create some master data related to the end customers to:

- Test the pricing elements (master data for of the service provider). In addition you need to simulate chargeable items to charge.
- Test or simulate the future result of the provisioning processes that you must implement between you CRM application (or another external provisioning system) and SAP CC. You can validate the design of this implementation.

NOTE

SAP provides you with an *SAP solution* scenario with SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite. Some synchronization and replication mechanisms are available between these components and are managed by SAP CRM.

Manual Configurations

In a development and test system, you can manage the master data related to an end customer of the service provider. This is useful to test the pricing modeling. With the SAP CC [Core Tool](#) user interface you can create:

- A subscriber account including prepaid accounts and external postpaid accounts
- A subscriber mapping table or a subscriber range table
- A provider contract
- A subscription based on an offer in the pricing catalog of the service provider



CAUTION

Do never perform these configurations in a quality assurance or production system of SAP Convergent Charging when the SAP CC system is integrated with a CRM application or a provisioning system.

Setting up a Subscriber Account for Testing

Use

SAP CC 5.0 uses subscriber accounts to store balance information and account information for end customers. You can manually and temporarily create a subscriber account for test, training, or demo purposes:

For a quality assurance or production system, the provisioning functions must be implemented between your CRM application and SAP CC to manage these data. See this implementation activity detailed in the next sections.

Prerequisites

You work with a development and test system

Procedure

To manually create a subscriber account for development, test, training, or demo purposes:

- Launch the SAP CC [Core Tool](#) user interface and log on
- Create and set up the new subscriber account and save it in the back-end database: ► *Core Tool* → *File* → *New* → *Subscriber Account*

**NOTE**

For a detailed procedure, consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Subscriber Accounts ◀.

Setting up a Subscriber Mapping Table

Use

In SAP CC 5.0, you can manually and temporarily create a subscriber mapping table to use in a provider contract item via a dedicated parameter.

For a quality assurance or production system, the provisioning functions must be implemented between your CRM application and SAP CC to manage these data. See this implementation activity detailed in the next sections.

Prerequisites

- You work with a development and test system
- You have a pricing catalog for the service provider with the necessary mapping table class

Procedure

To manually create a subscriber mapping table for development, test, training, or demo purposes:

- Launch the SAP CC [Core Tool](#) user interface and log on
- Create and set up the new subscriber mapping table and save it in the database: ► *Core Tool* → *File* → *New* → *Subscriber Mapping Table*

**NOTE**

For a detailed procedure, consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Subscriber Mapping Table ◀.

Setting up a Subscriber Range Table

Use

In SAP CC 5.0, you can manually and temporarily create a subscriber range table to use in a provider contract item via a dedicated parameter.

For a quality assurance or production system, the provisioning functions must be implemented between your CRM application and SAP CC to manage these data. See this implementation activity detailed in the next sections.

Prerequisites

- You work with a development and test system
- You have a pricing catalog for the service provider with the necessary range table class

Procedure

To manually create a subscriber mapping table for development, test, training, or demo purposes:

- Launch the SAP CC [Core Tool](#) user interface and log on
- Create and set up the new subscriber range table and save it in the database: ► *Core Tool* → *File* → *New* → *Subscriber Range Table*



NOTE

For a detailed procedure, consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *About Subscriber Range Table* ◀.

Setting up a Provider Contract

Use

In SAP CC 5.0, you can manually and temporarily create a provider contract to simulate the creation processed by a CRM application or an external provisioning system. You can set up manually a provider contract and add the relevant contract items and other elements (counters, parameters).

Provisioning functions must be implemented between your CRM or provisioning system and SAP CC in order to manage these data.



RECOMMENDATION

You can manually create a provider contract for training purpose if your landscape does not include a CRM application or an external provisioning system already interfaced with the SAP CC Core Server.

**NOTE**

Necessary accesses are automatically created and maintained by SAP CC in background.

Prerequisites

- You work with a development and test system
- Master data for the service provider includes the charge plan(s) and the refill(s) plan you want to activate in the items of the contract
- Master data related to the end customers are available: Subscriber account, subscriber mapping table, subscriber range table
- You have solid knowledge of provider contract in SAP CC
- You have solid knowledge of provisioning process of provider contracts in SAP CC by using the *Web Services* interface

Procedure

- Launch the SAP CC [Core Tool](#) user interface and log on
- Model and define the expected content for a provider contract. You must simulate the work performed by a CRM application. You must identify:
 - The counters
 - The relevant contract items
 - The parameters
 - The account assignments
- Create manually the new provider contract and save it in the database: ► *Core Tool* → *File* → *New* → *Provider Contract*

**NOTE**

For a detailed procedure, consult primary help of the Core Tool user interface in SAP Help Portal at:
► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *Provider Contracts* → *About Provider Contracts* ◀.

Setting up a Subscription and Accesses for Testing

Use

SAP CC 5.0 uses subscriptions for storing balance information and account information. You can manually and temporarily create a subscriber account for test or training purposes. Provisioning functions must be implemented between your CRM or provisioning system and SAP CC to manage these data.

Prerequisites

- You work with a development and test system
- Master data for the service provider includes an offer you can subscribe to

Procedure

- Launch the SAP CC [Core Tool](#) user interface and log on
- Manually create the new subscription and save it in the back-end database: ► *Core Tool* → *File* → *New* → *Subscription*
- Add the necessary accesses for this subscription: ► *Core Tool* → *File* → *New* → *Access*



NOTE

For a detailed procedure, consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *Subscriptions* → *About Subscriptions* ◀.

Implementation Tasks

This section provides an overview of the development activities necessary to implement the customer data provisioning processes in your landscape:

- Initial mass provisioning
- Migration of data

RECOMMENDATION

If you require high level performance for the charging services, you can use the `start_cache_command` of Admin+ to force the update the complete SAP CC system after the creation of master data related to the end customers.

SAP CC provides several technical interfaces:

- Web Services (for provider contracts)
- HTTP Communication Interface (HCI) (for subscriptions)

Customer Master Data	Web Services	HCI
Subscriber Accounts	Yes ■ Prepaid accounts ■ External (postpaid) accounts	Yes ■ Prepaid accounts ■ External (postpaid) accounts ■ Credit limit balances
Subscriber Mapping Tables	Yes	No
Subscriber Range Tables	Yes	No
Provider Contracts	Yes ■ Charging contracts  NOTE Automated creation of accesses	No
Subscriptions	N/A	Yes
Accesses	Not available The SAP CC system manages all the accesses in background	Yes

Setting up the Subscriber Accounts (Implementation Project)

Use

SAP CC 5.0 uses subscriber accounts for storing balance management and account information for each customer of a service provider. Provisioning functions must be implemented between your CRM application and SAP CC to manage these data.



NOTE

For development, test, or training purposes, you can manually and temporarily create a subscriber account with the Core Tool user interface. Consult the sections above.

Prerequisites

- You have decided to base the charging services on the provider contracts or the subscriptions.
- Consult the *SAP CC Application Help* about the provisioning processes to determine how to implement these functions.

Activity

- Determine the technical interface you will use to create the subscriber accounts.

SAP CC 5.0 Technical Interface	Charging based on provider contracts	Charging based on subscriptions
Web Services (WS) – SOAP	X	
Http Communication Interface (HCI) – Java APIs or XML		X

- Determine how you can implement subscriber accounts, prepaid accounts and external postpaid accounts. Identify their lifecycles.
- Determine if you need to implement the management of business data tables (subscriber mapping tables or subscriber range tables)
- Use the technical documentation to implement this function in your landscape (see page [51]).



NOTES

- You can download the documentation in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 ↩.

- The documentation for the *Web Services* of SAP CC is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download
- If the SAP CC Core Server system is running, you can consult the WSDL related to this process component of the *Web Services* by using the following URL:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/suacProvisioning?wsdl](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/suacProvisioning?wsdl)
 You can access to the XSD fragments:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/suacProvisioning?xsd=1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/suacProvisioning?xsd=1)
- For your developments during the implementation phase, you need to import the relevant WSDL into your development tool by using the URL detailed above.

**EXAMPLE**

If the SAP CC Core Server system is running and the updater instance is installed on the host machine `updaterhostname`, you can access to the:

- WSDL at: `https://updaterhostname.corp:9080/suacProvisioning?wsdl`
- XSD fragments at:
`https://updaterhostname.corp:9080/suacProvisioning?xsd=1`

Setting up the Subscriber Mapping Tables (Implementation Project)

Use

In this *Customization activity*, you determine how you implement the subscriber mapping tables and you develop the integration between SAP CC and your CRM application (or another external provisioning system).

SAP CC 5.0 uses subscriber mapping tables assigned to a subscriber account for storing information necessary to perform the charging or the refilling process when using the settings of a provider contract.

A provider contract item can link several subscriber mapping tables.

The same subscriber mapping table can be link by several contract items in different provider contracts. You can use a subscriber mapping table for a group of provider contracts.

**EXAMPLE**

By default, SAP CRM shares a subscriber mapping table with several provider contracts.

Prerequisites

- You have decided to base the charging services on the provider contracts

- Consult the *SAP CC Application Help* about the provisioning processes to determine how to implement these functions

Activities

- Determine if you want to create a unique subscriber mapping table that can be shared by several provider contracts. Determine if you want to create few tables and shared a table to a group of provider contracts.
 - If yes, design the implementation of the subscriber account provisioning process to create and maintain subscriber mapping tables in SAP CC.
- Determine if you want to create a subscriber mapping table for each provider contract assigned to a subscriber account.
 - If yes, design the implementation of the provider contract provisioning process to create and maintain subscriber mapping tables in SAP CC.



NOTE

Both use cases can be simultaneously implemented.

- Develop the integration by using the *Web Services* technical interface provided by SAP CC. You must use the process component: *Management of Subscriber Mapping Tables*.



NOTES

- For more information, consult the *SOAP API Specifications* for the *Web Services* in SAP Help Portal at the location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → SOAP ◀.
- You can download the documentation in SAP Help Portal at: ► <https://help.sap.com/cc50> ◀.
- The documentation for the *Web Services* of SAP Convergent Charging is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download.
- If the SAP CC Core Server system is running, you can consult the WSDL related to this process component of the *Web Services* by using the following URL:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberMappingTableManagement?wsdl](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberMappingTableManagement?wsdl)
 You can access to the XSD fragments:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberMappingTableManagement?xsd=1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberMappingTableManagement?xsd=1)
- For your developments during the implementation phase, you need to import the relevant WSDL into your development tool by using the URL detailed above.

**EXAMPLE**

If the SAP CC Core Server system is running and the updater instance is installed on the host machine `updaterhostname`, you can access to the:

- WSDL at:
`https://updaterhostname.corp:9080/subscriberMappingTableManagement?wsdl`
- XSD fragments at:
`https://updaterhostname.corp:9080/subscriberMappingTableManagement?xsd=1`

Use the technical documentation to implement this function in your landscape (see page [\[51\]](#)).

Setting up the Subscriber Range Tables (Implementation Project)

Use

In this *Customization activity*, you determine how you implement the subscriber range tables and you develop the integration between SAP CC and your CRM application (or another external provisioning system).

SAP CC 5.0 uses subscriber range tables assigned to a subscriber account for storing information necessary to perform the charging or the refilling process when using the settings of a provider contract.

A provider contract item can link several subscriber range tables.

The same subscriber range table can be link by several contract items in different provider contracts. You can use a subscriber range table for a group of provider contracts.

**EXAMPLE**

By default, SAP CRM shares a subscriber range table with several provider contracts.

Prerequisites

- You have decided to base the charging services on the provider contracts
- Consult the *SAP CC Application Help* about the provisioning processes to determine how to implement these functions

Activities

- Determine if you want to create a unique subscriber range table that can be shared by several provider contracts. Determine if you want to create few tables and shared a table to a group of provider contracts.
 - If yes, design the implementation of the subscriber account provisioning process to create and maintain subscriber range tables in SAP CC.
- Determine if you want to create a subscriber range table for each provider contract assigned to a subscriber account.
 - If yes, design the implementation of the provider contract provisioning process to create and maintain subscriber range tables in SAP CC.

**NOTE**

Both use cases can be simultaneously implemented.

- Develop the integration by using the *Web Services* technical interface provided by SAP CC. You must use the process component: *Management of Subscriber Range Tables*.

**NOTES**

- For more information, consult the *SOAP API Specifications* for the *Web Services* in SAP Help Portal at the location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → SOAP ◀.
- You can download the documentation in SAP Help Portal at: ► <https://help.sap.com/cc50> ◀.
- The documentation for the *Web Services* of SAP Convergent Charging is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download.
- If the SAP CC Core Server system is running, you can consult the WSDL related to this process component of the *Web Services* by using the following URL:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberRangeTableManagement?wsdl](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberRangeTableManagement?wsdl)
 You can access to the XSD fragments:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberRangeTableManagement?xsd=1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/subscriberRangeTableManagement?xsd=1)
- For your developments during the implementation phase, you need to import the relevant WSDL into your development tool by using the URL detailed above.

**EXAMPLE**

If the SAP CC Core Server system is running and the updater instance is installed on the host machine `updaterhostname`, you can access to the:

- WSDL at:
`https://updaterhostname.corp:9080/subscriberRangeTableManagement?wsdl`
- XSD fragments at:
`https://updaterhostname.corp:9080/subscriberRangeTableManagement?xsd=1`

Use the technical documentation to implement this function in your landscape (see page [\[51\]](#)).

Setting up the Provider Contracts and Accesses (Implementation Project)

Use

SAP CC 5.0 uses provider contracts for storing balance management and account information. Provisioning functions must be implemented between your CRM application and SAP CC to manage these data.



NOTE

For development, test, or training purposes, you cannot manually create a provider contract via the Core Tool user interface.



EXAMPLE

In a *solution scenario* with the SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, these master data objects are managed and synchronized with all the components (SAP CRM, SAP ERP).

For more information, see the *Configuration Guide for SAP CRM 7.0 Enhancement Package 4 (for the Telecommunications business scenario Sales and Order Management)*.

Prerequisites

- You have decided to base the charging services on the provider contracts or the subscriptions
- Consult the *SAP CC Application Help* about the provisioning processes to determine how to implement these functions

Activity

- Determine if you want to create a subscriber mapping table for each provider contract assigned to a subscriber account. Identify their lifecycles.

Use the technical documentation to implement this function in your landscape (see page [51]).



NOTES

- You can [download the documentation](#), see page [21].
- The documentation for the *Web Services* of SAP CC is also included in the Software Development Kit (SDK) of the SAP CC Core Server and is available with the software DVD for download
- If the SAP CC Core Server system is running, you can consult the WSDL related to this process component of the Web Services by using the following URL:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/contractProvisioning?wsdl1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/contractProvisioning?wsdl1)
 You can access to the XSD fragments:
[http\(s\)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/contractProvisioning?xsd=1](http(s)://<UPDATER_INSTANCE_HOST>:<PORT_NB>/contractProvisioning?xsd=1)
- For your developments during the implementation phase, you need to import the relevant WSDL into your development tool by using the URL detailed above.



EXAMPLE

If the SAP CC Core Server system is running and the updater instance is installed on the host machine `updaterhostname`, you can access to the:

- WSDL at: `https://updaterhostname.corp:9080/contractProvisioning?wsdl`
- XSD fragments at:
`https://updaterhostname.corp:9080/contractProvisioning?xsd=1`

Customizing the Batch Rating Group Assignment Policy

Use

In this *Customizing* activity, you develop a Java class that implements the batch rating group assignment function depending on your business requirements with batch charging operations based on batch rating groups. The SAP CC Core Server system uses this function when creating provider contracts dedicated to offline charging operations with BART.

You need to use the Java Libraries provided with SAP CC 5.0 and its `com.highdeal.notification` Java package to implement the handling of notifications in your application system. A Software Development Kit (SDK) includes these libraries and the relevant documentation.

Function	Integration Technology	Software Units	Technical Operation or API
Batch Rating Group Assignment Policy	Java	Core SDK	■ Java Package: ● com.highdeal.batchgroup.contract ■ Java Interface: ● IContractBatchRatingGroupAssignmentPolicy

**NOTE**

For more details, consult the *SAP CC 5.0 Java API References* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API Reference (Core) or in the *Core Server SDK* software unit, see page [51].

Prerequisites

- BART Server is in the system landscape
- You want to manage the batch charging operations by using some batch rating groups

Default Settings

The default assignment function balances the provider contracts on the batch rating groups configured in the SAP CC Core Server system.

Procedure

You develop a Java class and compile a jar file to plug to the SAP CC Core Server system:

- Develop a specific java class which implements the `IContractBatchRatingGroupAssignmentPolicy` interface and overrides the `getBatchRatingGroupAssignment(...)` method.
- Create a JAR file containing this single class.
- On the global host of the SAP CC system, copy this JAR file to the folder `/usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/CC_CORE_SERVER/jars` folder.
 - This folder contains the JAR files which must be copied to the instance local folder at startup.
- In the SAP CC system, change the value of the `BATCH_RATING_GROUP_ASSIGNMENT_POLICY_CLASS` parameter to use your own implementation:
 - Set up this system parameter with the name of your Java class:
`<package_name>.<class_name>`
 - Change the value for all the installed updater instances of the SAP CC system.

**NOTE**

Use Admin+ or Config Tool to update the system configuration and thus take into account this new assignment policy.

- Change the startup configuration file (jstart.config) of all the updater instances of the SAP CC system:
 - Add the created JAR file to the classpath (see the `.classpath` entry).
- Restart the SAP CC system.
- Test this function by triggering the creation of a provider contract from the CRM application or by using SAP CC Core Tool.
- Transport the *Customizing* to the quality acceptance and production system landscapes.

Migrating Subscriber Accounts and Provider Contracts (Implementation Project)

Use

SAP CC 5.0 uses subscriber accounts and provider contracts for storing customer related data. You want to migrate customer related data from a former system (Highdeal Transactive for instance) to SAP Convergent Charging 5.0.

**EXAMPLE**

In a scenario integrated with the SAP CRM and SAP ERP/FI-CA components of the SAP Business Suite, these master data objects are imported in SAP CC by the SAP ERP/FI-CA component.

For more information, see the *Configuration Guide for SAP CRM 7.0 Enhancement Package 2 (for the Telecommunications business scenario Sales and Order Management)*.

Prerequisites

- Identify all customer related data in your former system.
- Install SAP CC 5.0 in your system landscape.
- Consult the *SAP CC Application Help* and the documentation for the Web Services to be familiar with the following data models of SAP CC 5.0:
 - Subscriber accounts
 - Prepaid accounts
 - External accounts
 - Provider contracts

Activity

Use the technical documentation to implement this migration in your landscape (see page [51]).

Plan the migration procedure. See below the main steps to be performed with the Web Services technical interface provided by SAP CC 5.0:

- Create the subscriber accounts, the prepaid accounts and the external accounts in bulk
- Create the provider contracts in bulk
- Create the necessary data tables (subscriber mapping table, subscriber range table)
- Update in bulk the initial state of the prepaid accounts and the provider contracts



CAUTION

Do not launch the charging or the rerating process while creating or updating objects in bulk.

Do not launch the charging or the rerating process before you ended the migration.

Make sure no activation process can corrupt your data been migrated.



NOTES

- As an SAP customer or SAP partner, you can download the product documentation in SAP Help Portal at: ► <https://help.sap.com/cc50> → Reference → Download the Public User Assistance of SAP CC 5.0 ◀.
- The documentation for the Web Services of SAP CC is also included in the Software Development Kit (SDK) of SAP CC Core Server and is available with the software DVD for download

Setting up a Subscription and Accesses (Implementation Project)

Use

SAP CC 5.0 uses subscriptions for storing balance management and account information. Provisioning functions must be implemented between your CRM or provisioning system and SAP CC to manage these data.



NOTE

For development, test, or training purposes, you can manually and temporarily create a subscription and its accesses via the Core Tool user interface. Consult the sections above.

Prerequisites

You have decided to base the charging services on the provider contracts or the subscriptions.

Consult the *SAP CC Application Help* about the provisioning function to determine how to implement this process.

Activity

Use the technical documentation to implement this function in your landscape (see page [\[51\]](#)).

8 Configuration with the Integrated Scenarios C2C and O2C

Overview

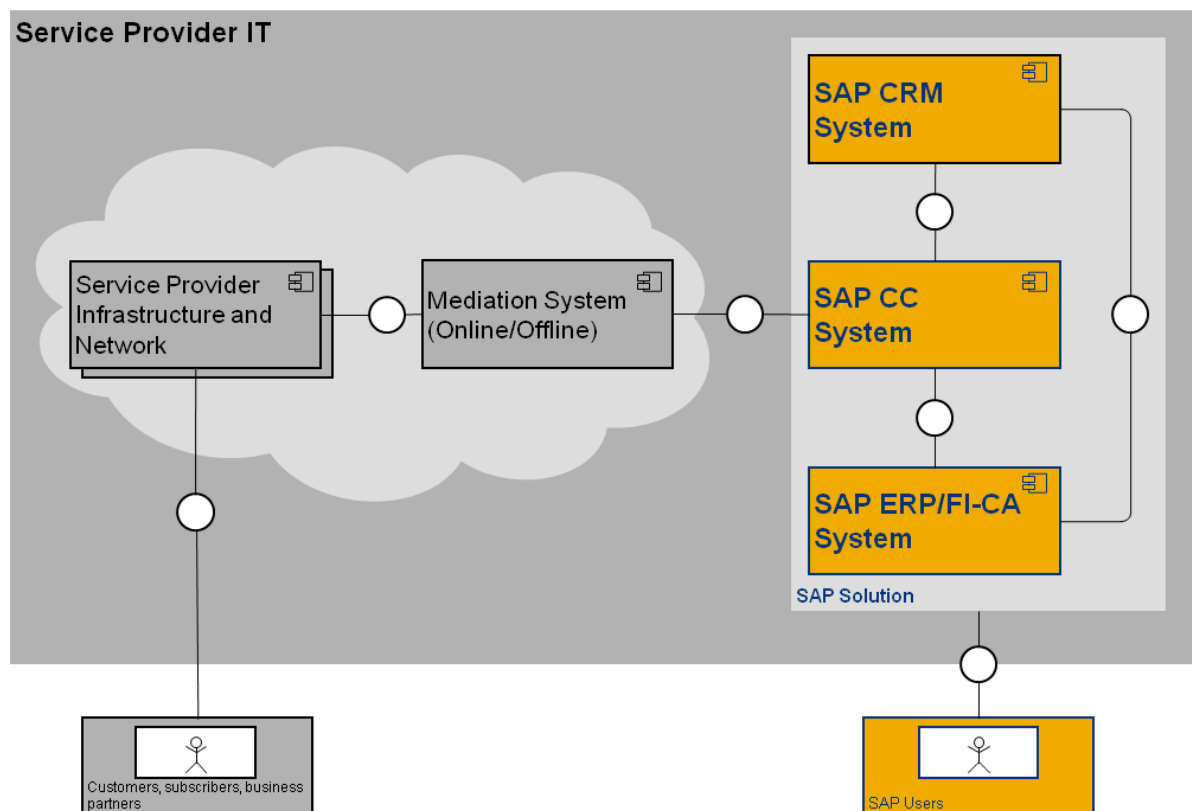
SAP Convergent Charging 5.0 can be integrated with the *Consume-To-Cash in High-Volume Business* value scenario and the *Offer-To-Cash* end-to-end scenario. This cross-industry scenario aggregates both the *Convergent Charging* and the *Convergent Invoicing* business scenarios.

This value scenario integrates the scenarios *Consume-To-Cash in High-Volume Business* and *Sales and Order Management in Call Center*.

This new integrated scenario interfaces the SAP CC 5.0 software component with the SAP CRM and the SAP ERP/FI-CA components of the SAP Business Suite:

- SAP Convergent Charging
- Contract Accounts Receivable and Payable (FI-CA) including SAP Convergent Invoicing as part of SAP ERP
- Sales and Order Management, Financials Customer Care based on Contract Accounts Receivable and Payable (FI-CA) as part of SAP CRM

The SAP CC 5.0 system models the charging data, the calculations (rating, charging, and refilling functions), the acquisition of usage items, and the generation of billable items in bulk in the SAP ERP/FI-CA system.



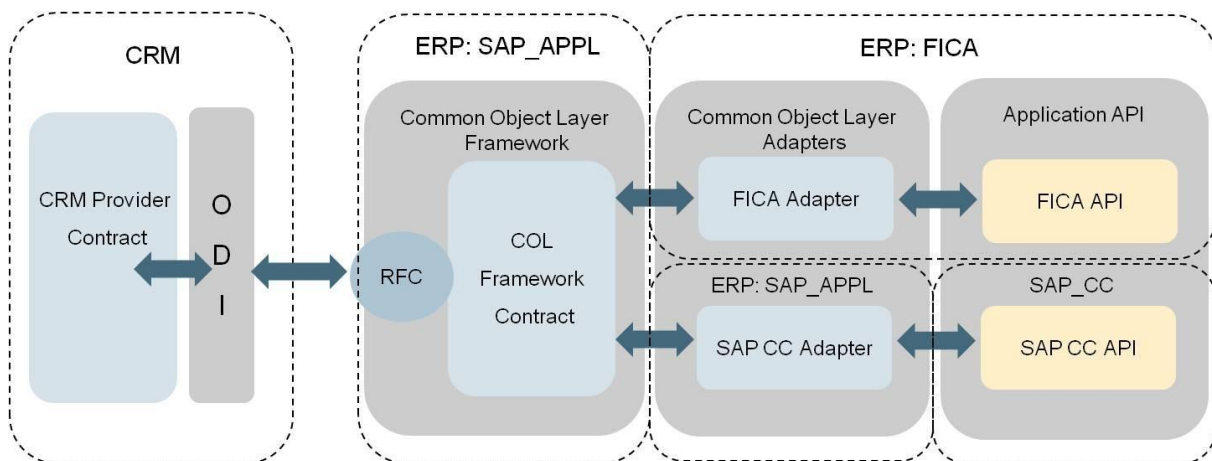
Overall Prerequisites

You can use this section as a checklist. All these elements are managed by the configuration documentation provided for these SAP software components:

- The three systems (SAP CRM, SAP CC, and SAP ERP) of the SAP Business Suite are up and running
- You have the necessary configuration documents listed in this chapter
- The relevant business functions (BFs) are active in the SAP CRM and SAP ERP Systems
- The relevant *Web Services* provided by the SAP CC Core Server system are activated in the SAP CRM and SAP ERP systems with the appropriate settings (proxy, logical port, and WSDL access) by using the transaction SOAMANAGER from both systems.

RECOMMENDATION

First consult the *Integration Guide for the Order-to-Cash End-to-End Process* and the configuration documentation for SAP CRM and SAP ERP which is the complete reference. The document is the central starting point for this integrated solution scenario. You can find the latest version of the guide on SAP Service Marketplace (SMP) at: <https://service.sap.com/BRIM> → Resources . This replaces the former SAP Note [1647059](#).



Main Interfaces Dedicated to the Configuration of Master Data

SAP CRM Configurations and Customizing

Customizing

- The relevant Business Functions (BF) are active for this integrated scenario:
 - CRM_TEL_1: Financial Customer Care for Telecommunications
 - CRM_TEL_SOM_1: Sales & Order Management for Telecommunications

- CRM_PROVORDERINT_1: Integration of SAP CC and SAP CI with the Provider Order
- CRM_FCA_1: FCC and Dispute Management for Contract AR/AP
- The COL Framework is configured for this integrated scenario
- The relevant *Web Services* provided by SAP CC are activated in SAP CRM:
 - CO_CRM_ISX_CC_CATALOG_SERVICES
 - CO_CRM_ISX_CC_RATING_SERVICES



NOTES

Consult the latest versions of these documents:

- For more information about the necessary configurations of the COL Framework for SAP CRM, see the *Customizing* chapter in the configuration guide *Common Object Layer for SAP Business Suite*.
- For more information about the activation of the Web Services in SAP CRM, see the relevant chapter in the *Integration Guide for the Order-to-Cash End-to-End Process*.
- For more information about the relevant configurations for SAP CRM, consult the *Configuration Guide for SAP CRM 7.0 EHP3* available for the *SAP for Telecommunications* business scenario *Sales and Order Management*.

This documentation is available in SAP Solution Manager: ► *Solutions/Applications* → *SAP For Telecommunications* → *Scenarios* → *Sales and Order Management in Call Center* → *Configuration* ◀.

SAP ERP/FI-CA Configurations and Customizing

Customizing

- The relevant Business Functions (BF) are active for this integrated scenario:
 - CONVERGENT_INVOICING: Telco: Invoicing to Contract Accounts Receivable and Payable
 - RM-CA: Telco: Revenue Management - Contract Accounting
 - TEL_BI_INV_1: Telco, Enhanced Billing&Invoicing
 - TEL_CA_1: Telco, Enhanced Revenue Mgmt
 - TEL_CA_2: Telco, Enhanced Revenue Mgmt
 - TEL_CA_3: Telco, Contract Accounts A/R and A/P 3
 - TEL_CA_4: Telco, Contract Accounts A/R and A/P 4
 - TEL_CONV_INV_1: Telco, Enhanced Invoicing
 - TEL_EDR_BILLING: Telecommunications, Billing
 - TEL_INV_1: Telco, Convergent Invoicing
 - TEL_INV_PP_1: Telco, Invoicing in Contract Accounts Receivable and Payable
 - TEL_INV_PP_2: Telco, Billing in Contract Accounts Receivable and Payable 2
 - Z_TEL_INV_PP_1: Billable Item Mgmt (Downport from EHP05 activated for Postal)
- The relevant *Web Services* provided by SAP CC are activated in SAP ERP:
 - CO_FKKCC_RATING_SERVICES

- CO_FKKCC_REFILLING
- CO_FKKCC_SUBSCRIBER_ACCOUNT
- CO_ISX_CC_CTR_PROV_SERVICES (for the provider contract provisioning services)

Configurations

To send billable items to the SAP ERP/FI-CA system, the following configurations are expected FI-CA:

- An appropriate billable item class is configured in Billing (in Contract Accounts Receivable and Payable) and the interface component *SAP Convergent Charging* has been activated for the class
- This billable item class is activated
- Transfer rules exist for the billable item class
- Interfaces and objects for the class are generated
- The basic settings for the reversal of billable items are configured
- A user dedicated to *SAP Convergent Charging* exists with a type set to *Communication Data* and authorizations for the authorization objects F_KKBIXBIT, F_KKBIXCON, S_TABU_DIS, and S_RFC



NOTES

Consult the latest versions of these documents:

- For more information about the relevant configurations for SAP ERP/FI-CA, consult the configuration documentation for the *Convergent Billing* business process of the *Convergent Invoicing* business scenario:
 - [Integration of Convergent Charging business scenario with Convergent Invoicing business scenario](#)
 - Required Business Functions
- For more information about the activation of the Web Services in SAP ERP, see the relevant chapter in the *Integration Guide for the Order-to-Cash End-to-End Process*.
- For more information about the integration of SAP Convergent Charging 5.0 and SAP ERP/FI-CA, see the *SAP Library* for the SAP ERP Enhancement Packages:
 - Consult the SAP Help Portal at the following location: ► <http://help.sap.com> → SAP ERP → SAP ERP Central Component → SAP ERP Enhancement Packages → ERP Central Component Enhancement Package 6 → Industries in SAP ERP → SAP Telecommunications → Contract Accts. Rec./Payable for Telecommunications (SAP RM-CA) → SAP Convergent Invoicing → Billing in Contract Accounts Receivable and Payable → Integration of Billing in Other Applications → [Integration with SAP Convergent Charging](#) ↩.
 - You can also consult the Configuration of Billable Item Classes

Typical Configurations

Sequence ID	Configuration Type	Description	Condition		
			Development landscape	Test landscape	Production landscape
1 (*)	Technical Customizing: System Settings	Technical Features of the Core Server	Recommended	Mandatory	Mandatory
2 (*)	Business Customizing		Not relevant <i>The default settings are enough</i>	Mandatory	Mandatory
3 (*)	Technical Customizing: Implementation	Usage Data Acquisition (online or offline rating and charging)	Not mandatory for managing master data	Mandatory	Mandatory
4 (*)	Master Data Configuration	Charging Data for the Service Provider	Mandatory	Mandatory	Mandatory

(*) The sequence order can be changed and scheduled according to a project planning.

Technical Customizing

System Settings

	System Settings	Procedure	Default Settings	Development Landscape	Quality Assurance or Production Landscape
1 (*)	License Management	69	A temporary or permanent license is installed	Recommended	Mandatory
2	User Management	92	Consult the Security Guide documentation for details	Recommended	Mandatory
3	Logging and Tracing	102	Default configuration activated	Not relevant <i>The default settings are enough</i>	Recommendation: Check the default configuration
	Communications	84	Default configuration activated		
	System Landscape Directory	117	Function not activated	Not relevant <i>The default settings are enough</i>	Recommended
	Basic System Settings for the JCo Communications	285	Default configuration activated		Mandatory
	System Settings for Secured JCo Communications	292	A default configuration is activated if the option was selected at the installation time		Recommended
	System Settings for Communications via the Web Services	302			
	Notifications via JCo			Not relevant	Mandatory

System Settings		Procedure	Default Settings	Development Landscape	Quality Assurance or Production Landscape
				<i>The default settings are enough</i>	
	System Settings for Customer Management Area	303	Default configuration activated	Not relevant	
	System Settings for SAP ERP Reference System	312	Default configuration activated	Not relevant	

System Settings for JCo Communication

SAP Convergent Charging 5.0 uses the SAP Java Connector (JCo) technology to communicate with SAP CRM and SAP ERP/FI-CA by using the SAP Remote Function Call (RFC). The SAP RFC is an SAP interface protocol, which simplifies the programming of communication processes between SAP systems or third-party compatible systems.

Before changing these system settings, consult the [Security Guide documentation](#) to check your IT security policy.

SAP Convergent Charging 5.0 can manage one or more SAP ERP systems and one or more SAP CRM systems in the system landscape.



NOTE

This configuration is performed by *SAPinst*. You do not need to change these system settings at the initial installation time.

Activities

Refer to the following subsections:

- [Basic System Settings for the JCo Communications](#), page [286]
- [Setting up a JCo Destination Used to Connect to an SAP CRM or ERP/FI-CA System](#), page [288]
- [System Settings for Secured JCo Communications](#), page [292]



NOTE

When setting up a new JCo destination, consider the following complete procedures:

- [Enabling a New ERP System and a New Customer Management Area](#), page [304]
- [Enabling a New CRM System and a New Customer Management Area](#), page [307]

See Also

- [System Settings for Tracing the JCo Communications](#), page [334]

Basic System Settings for the JCo Communications

Use

SAP CC 5.0 calls RFCs of the SAP CRM and SAP ERP/FI-CA systems by using the SAP Java Connector (JCo) technology.

The below table summarizes the necessary configuration parameters for the JCo technology. You set up these parameters when [configuring a JCo destination](#) in SAP CC:

Configuration Parameter	Default	Description
JCo server application parameters		
jco.client.ashost	N/A	The host of the SAP application server host (or Gateway host) (The name or IP address)
jco.client.sysnr	N/A	SAP System Number used for determining the Gateway service
JCo client application parameters		
jco.client.client	N/A	The name of the SAP logon client
jco.client.user	N/A	The user name to use for SAP authentication (A service user that relates to a communication channel between an SAP CC system and another SAP system (ERP, CRM) in the system landscape)
jco.client.passwd	N/A	The password to use for SAP authentication
jco.client.lang	en	The SAP login language
Tuning parameters		
jco.destination.peak_limit	10	The maximum number of active connections that can be created for a destination simultaneously
jco.destination.pool_capacity	3	The maximum number of idle connections kept open by the destination; The value of 0 means that there is no connection pooling



NOTES

- Some other parameters are available with secured network communications (SNC). See the next sections in [System Settings for Secured JCo Communications](#), page [292].
- Consult the [Security Guide documentation](#) for more security information.
- Consult the [SAP JCo documentation](#) on SAP Service Marketplace for more detailed information about the other settings.

**CAUTION**

Take particular care when tuning or configuring other configuration parameters for a JCo destination that are not in the list above. The SAP CC system may become unusable or unstable. A configuration change may reduce performance significantly. Contact your SAP Support Team.

Default Settings

- These system configurations are set at the installation time by *SAPInst*; Refer to the table above for detailed default settings.
- In case of an upgrade from the previous main release of SAP CC, these settings are not configured

**NOTE**

SAP CC 5.0 provides a template of configuration file (jco.destination.sk) that includes the relevant system configuration parameters. This file is located in the central repository or in the folder of a dispatcher instance: /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/.

Prerequisites

The RFC destination has been created with the procedure relevant in your system landscape when installing the SAP CRM system or the SAP ERP/FI-CA system in case of an integrated *SAP Solution* scenario with these components of SAP Business Suite.

Maintenance

During the project implementation phase, you may maintain these communication settings depending on the changes in the development or test system landscape.

During the production operation phase, you maintain these communication settings when a new SAP ERP/FI-CA or SAP CRM system is deployed in the system landscape.

Next

- In a secured environment, consider the [System Settings for Secured JCo Communications](#) section, page [292]
- Define the SAP ERP reference system; See [System Settings for SAP ERP Reference System](#) page [312]
- Configure the necessary customer management areas; See [System Settings for Customer Management Area](#), page [303]

Setting up a JCo Destination Used to Connect to an SAP CRM or ERP/FI-CA System

Use

SAP CC 5.0 calls RFCs of the SAP ERP/FI-CA systems and SAP CRM systems by using the SAP JCo technology. These configurations are set at the installation time by *SAPInst*. You have to maintain these communication settings.



NOTE

This task is partial. First consider the following complete procedures:

- [Enabling a New ERP System and a New Customer Management Area](#), page [304]
- [Enabling a New CRM System and a New Customer Management Area](#), page [307]
- [System Settings for SAP ERP Reference System](#), page [312]

SAP Convergent Charging 5.0 can manage one or more SAP ERP systems in the system landscape. Each JCo destination is specialized and dedicated to a specific *SAP Application*: ERP or CRM.

Prerequisites

- The RFC destination has been created with the procedure relevant for your system landscape when installing the SAP ERP/FI-CA system for the *Convergent Invoicing* business scenario.

Procedure



NOTE

To be effective, you must apply your changes by restarting specific instances in the SAP CC system. The stop and restart sequence is defined in .

To add the JCo destination related to a new SAP ERP/FI-CA system or SAP CRM system:

- Check the JCo destinations currently defined. Use the [Setup Tool user interface](#) with the following `jcodestination list` command:

```
./setup.sh jcodestination list -login=<LGN> -password=<PWD>
```

- Prepare the configuration information relating to the new JCo destination. You can export an existing JCo destination to a text file and change the communication parameters related to your system landscape.

**EXAMPLE**

SAP CC 5.0 provides you with a template of configuration file (jco.destination.sk) that includes the relevant system configuration parameters. This file is located in the central repository or in the folder of a dispatcher instance:

/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/.

```
jco.client.lang=en
jco.destination.peak_limit=10
jco.client.client=205
jco.client.passwd=f23d525bbfa5861d1285177b7fd41cdb
jco.client.user=sapsyscctestusr
jco.client.sysnr=27
jco.destination.pool_capacity=3
jco.client.ashost=dnsname.mycompany.corp
```

- Import the new configuration from file:

```
./setup.sh jcodestination import ERP <JCO_DESTINATION_NAME>
<FROM_FILE_PATH> -login=<LGN> -password=<PWD>
```

- To apply the system configuration change:
 - Stop and restart all the bulkloader instances in the SAP CC system
 - Check for errors or warnings in the recorded logs
 - Determine the resolution and the corrective actions needed to be performed by referring to the *SAP CC Log Message Reference* documentation
- Successively stop and restart each rater instance in the SAP CC system. Wait for the complete restart before stopping another rater instance. Do never stop all the rater instances at the same time so the convergent charging services are always available.
- Check for errors or warnings in the recorded logs
- Determine the resolution and the corrective actions needed to be performed by referring to the *SAP CC Log Message Reference* documentation

Next

You can use this new JCo destination to complete the following tasks:

- [Enabling a New ERP System and a New Customer Management Area](#), page [304]
- [Enabling a New CRM System and a New Customer Management Area](#), page [307]
- [System Settings for SAP ERP Reference System](#), page [312]

Setting up the ERP Reference System Information

Use

SAP CC 5.0 communicates with a particular SAP ERP system in the SAP system landscape to synchronize some business data or technical data (currencies, billable item (BIT) classes, and consumption item classes). This configuration is set at the installation time by *SAPinst*. You may have to maintain this configuration.



NOTE

As of SAP CC 4.0 SP05, the following commands of the Setup Tool user interface are deprecated:

- `sapci importConfiguration`
- `sapci exportConfiguration`

They are replaced by the commands:

- `erpreferencesystem setJCoDestination`
- `erpreferencesystem getJCoDestination`



NOTE

Refer to the *O2C Integration Guide* documentation for more information about data replication and synchronization mechanisms between SAP CC and SAP ERP/FI-CA in an integrated *SAP Solution* scenario.

Prerequisites

- You know the SAP ERP reference system
- The relevant JCo destination is defined in SAP CC

Procedure

To change the JCo configuration related to SAP ERP/FI-CA:

- From the SAP CC Core Server system, check out the JCo destinations already defined. Use the Setup Tool user interface with the command:
`./setup.sh jcodestination list -login=<LGN> -password=<PWD>`
- Determine the relevant JCo destination from the list by considering the destinations dedicated to the following *SAP Application*: ERP
- Get the detailed configuration with the command:
`./setup.sh jcodestination export <JCO_DESTINATION_NAME>
<TO_FILE_PATH> -login=<LGN> -password=<PWD>`
- Specify the JCo destination dedicated to the ERP reference system. Use the command:
`./setup.sh erpreferencesystem setJCoDestination <JCO_DESTINATION> -
login=<LGN> -password=<PWD>`

- Restart the Core Server system

System Settings for Secured JCo Communications

Consult first the [Security Guide documentation](#) to define the appropriate IT security policy for the system landscape including SAP Convergent Charging.



NOTE

This configuration is performed by *SAPinst*. You do not need to change these system settings at initial installation time.

Implementing Secured JCo Communications

Use

SAP CC 5.0 uses SAP JCo to communicate with the application server and JCo. It is possible to encrypt the RFC communications using the *SAP Cryptographic Library* technology. The Core Server system of SAP CC 5.0 can securely communicate with:

- The SAP CRM systems and
- The SAP ERP/FI-CA systems



NOTE

Consult the [Security Guide documentation](#) for the security policy information.

Prerequisites

The following prerequisites apply for SAP CC 5.0:

- A security policy concept is defined by IT for the SAP CC system landscape.
- If the option “*Install SAP Cryptographic Library*” has not been checked at the installation time, some technical preparations are necessary.

Activities

The following sequence of activities is necessary for this implementation:

Sequence ID	Description	Condition	Note
1	Installing the SAP Cryptographic Library	Mandatory (*)	A pre-configuration can be performed at the

			initial installation by <i>SAPInst</i> if the “Install SAP Cryptographic Library” option was checked.
2	Setting up a Personal Security Environment (PSE) for SNC	Mandatory	
3	Creating Credentials	Mandatory	
4	Exchanging Public-Key Certificates	Mandatory	
5	Setting up the JCo configurations in SAP CC Core Server	Mandatory	
6	Maintaining the System ACL on the Application Server	Mandatory	
7	Maintaining the Extended User ACL on the Application Server	Mandatory	

The different steps are detailed in this section.



NOTE (*)

In case of an upgrade from SAP CC 3.0 or in case of a late activation of this security function, the first step of the sequence must be performed manually by a system administrator.

Installing the SAP Cryptographic Library

Use

If you want to encrypt the RFC communications, install and configure the *SAP Cryptographic Library* in your SAP CC Core Server system.

If the cryptographic library has not been installed at the initial installation, you need to install it in the Core Server system manually.

SAP CC 5.0 supports different versions of SAP Cryptographic Library. Refer to our central note [2471232](#) for SAP Convergent Charging.

- If you want to implement the version 5.5.5 of SAP Cryptographic Library, see: [SAP Note 2471208 - Installing the SAP Cryptographic Library 5.5.5 in SAP CC](#).
- If you want to implement the version 8 of SAP Cryptographic Library, see [SAP Note 2471233 - Installing the SAP Cryptographic Library 8 in SAP CC](#).

- For other versions, refer to the central note or contact your SAP Support Team.

Next

You can set up a Personal Security Environment (PSE) for SNC.

Setting up a Personal Security Environment (PSE) for SNC

Use

When using the SAP Cryptographic Library as the security product for SNC, SAP CC 5.0 must possess a Personal Security Environment (PSE). This PSE contains information related to the SAP CC public-key, which includes its private key, its public-key certificate, and the list of public-key certificates that it trusts.

To create the SNC PSE for SAP Convergent Charging, use the `sapgenpse4cc` launch script for executing the `sapgenpse` command-line tool from the SAP Cryptographic Library as detailed below.

Prerequisites

- SAP Cryptographic Library is installed on SAP CC 5.0 landscape (see previous procedure)

Procedure

To create a PSE in the security folder of SAP Convergent Charging, use the following command line:
`sapgenpse4cc get_pse -p <PSE_Name> -x <PIN> <Distinguished_Name>`

Where `<Distinguished_Name>` is made up with the following elements:

- CN = <Common_Name>
- OU = <Organizational_Unit>
- O = <Organization>
- C = <Country>



EXAMPLE

The following command line creates an `SAP_CC.pse` file that is protected with a PIN code ("ccpin"):

```
sapgenpse4cc get_pse -p SAP_CC.pse -x ccpin CN=SAPCC,O=MyCompany,C=US
```

When using this PSE, SAP Convergent Charging has the following **Distinguished Name**: CN=SAPCC, O=MyCompany, C=US.

Creating Credentials

Use

SAP CC 5.0 must have active credentials at run-time to be able to access its Personal Security Environment (PSE). The credentials are located in the cred_v2 file in the security folder of SAP Convergent Charging.



CAUTION

Make sure that only the user under which SAP CC Core Server runs has access to the cred_v2 file (including read access) in the security folder: /usr/sap/<SID>/sys/profile/sec/.

Prerequisites

- The SAP Cryptographic Library is installed for SAP Convergent Charging
- A personal security environment (PSE) is set up in the security folder of SAP CC

Procedure

- Use the following command line to create credentials:

OS	Command
Windows	<code>sapgenpse4cc seclogin -p <PSE_Name> -x <PIN> -O [<NT_Domain>\]<user_ID></code>
UNIX	<code>sapgenpse4cc seclogin -p <PSE_Name> -x <PIN> -O <user_ID></code>

- Protect the access of the cred_v2 file



EXAMPLE

The following command line creates credentials for the user SAPService<SID> so that it can access the SAP_CC.pse file. Note that the PIN code that protects the PSE is "ccpin" in this example:

OS	Command
Windows	<code>sapgenpse4cc seclogin -p SAP_CC.pse -x ccpin -O SAPService<SID></code>
UNIX	<code>sapgenpse4cc seclogin -p SAP_CC.pse -x ccpin -O <SID>adm</code>

Result

The credentials file (cred_v2) of the user specified with the -O option is created in the security folder of SAP CC.

Exchanging Public-Key Certificates

Use

To be able to communicate using SNC, the SAP system application server must be able to identify SAP CC Core Server and vice versa. This identification process takes place using the information stored in the server's PSE. You must exchange the servers' public-key certificates so that they can identify each other. This must be done for each SAP system application server that SAP CC is connected to (for example SAP ERP/FI-CA and SAP CRM).

For more information, see the SAP Library:

- Exporting the Server's Certificate Using SAPGENPSE
- Maintaining the Server's Certificate List Using SAPGENPSE
- Using the Trust Manager

Prerequisites

- The SAP Cryptographic Library is installed on SAP CC 5.0 landscape (see previous procedure)
- A personal security environment (PSE) is set up in the security folder of SAP CC
- Credentials are credited
- The SAP NetWeaver system possesses a PSE to use for Secured Network Communication (SNC)

Procedure

- Export the SAP CC public-key certificate
 - You can use the `export_own_cert` option of the `sapgenpse4cc` tool:
`sapgenpse4cc export_own_cert -o <output_file> -p <PSE_Name> -x <PIN>`
- Import the SAP CC public-key certificate into the SAP NetWeaver application server's SNC PSE:
 - If the application server is an SAP Web Application Server with Release 6.20 or later, then you can use the trust manager ("STRUST" transaction) to import the certificate.
 - Otherwise, use the `maintain_pk` command of the `sapgenpse`:
`sapgenpse4cc maintain_pk -a <cert_file> -p <PSE_Name> -x <PIN>`
- Export the application server's public-key certificate
 - If the application server is an SAP Web Application Server with Release 6.20 or later, then you can use the trust manager
 - Otherwise, use the `export_own_cert` command of the `sapgenpse` tool installed on the Application Server
- Import the application server's public-key certificate into the SNC PSE of SAP CC
 - Use the `maintain_pk` command of the `sapgenpse4cc` tool



EXAMPLE

- On SAP CC Core Server system, enter the following command line to export its public-key certificate:
`sapgenpse4cc export_own_cert -o SAP_CC.crt -p SAP_CC.pse -x ccpin`
- On the application server system, enter the following command line to import this certificate into the application server's SNC PSE:
`sapgenpse maintain_pk -a SAP_CC.crt -p SAPSNC.pse -x sappin`
- On the application server, enter the following command line to export its public-key certificate:
`sapgenpse export_own_cert -o SAPSNC.crt -p SAPSNC.pse -x sappin`

On SAP CC Core Server system, enter the following command line to import this certificate into the SNC PSE of SAP CC:

```
sapgenpse4cc maintain_pk -a SAPSNC.crt -p SAP_CC.pse -x ccpin
```

Result

The two servers can identify each other using SNC.

Setting up the Secured JCo Configurations in SAP CC Core Server

Use

You can use the information from the table below to configure and use Secured Network Communications (SNC) for these connections:

- SNC mode
- SNC library path
- Level of protection
- Identifiers of the interconnected applications

Configuration Parameter	Description	Comment
jco.client.snc_mode	Flag for activating Secured Network Communications (SNC) Possible values: ■ 0 (not activated) ■ 1 (activated)	Required
jco.client.snc_lib	Path and file name of the external library. Use a fullpath such as: ■ <code>/usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/<FILE_NAME></code> (Linux and similar) ■ or <code>C:\usr\sap\<SID>\SYS\exe\uc\nt-x86_64\sapcrypto.dll</code> (MS Windows)	Required

Configuration Parameter	Description	Comment
	Where: ■ <SID> is the SAP System ID of the Core Server system that uses SNC ■ <FILE_NAME> is libsapcrypto.so or libsapcrypto.o  NOTE Relative path may not work.  EXAMPLES Depending on the OS, the possible values are: ■ MS Windows: C:\usr\sap\<SID>\SYS\exe\uc\nt-x86_64\sapcrypto.dll ■ Linux: /usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/libsapcrypto.so ■ HP-UX: /usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/libsapcrypto.so ■ Solaris: /usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/libsapcrypto.so ■ AIX: /usr/sap/<SID>/SYS/exe/uc/<OS_PLATFORM>/libsapcrypto.o	
jco.client.snc_qop	Level of protection to use for the connection Possible values are: ■ 1: Authentication only ■ 2: Integrity protection ■ 3: Privacy protection (default) ■ 8: Use the value from <code>snc/data_protection/use</code> on the application server	Optional

Configuration Parameter	Description	Comment
	■ 9: Use the value from <code>snc/data_protection/max</code> on the application server Default: 3	
<code>jco.client.snc_myname</code>	SNC name for SAP Convergent Charging application: <code>p:CN=SAPCC, O=<MyCompany>, C=US</code>	Optional, recommended Although this parameter is optional, we do recommend setting this value to make sure that the correct SNC name is used for the connection.
<code>jco.client.snc_partnername</code>	Example: <code>p:CN=ABC, O=<MyCompany>, C=US</code>	Required You can find the application server's SNC name in the profile parameter <code>snc/identity/as</code>.

Legend: The SNC name does not correspond to the Distinguished Name you used when creating the PSE. The SNC name has the following syntax: `p:<Distinguished_Name>`.

Prerequisites

- The RFC destination has been created with the procedure relevant for your system landscape when installing the SAP CRM or SAP ERP / FI-CA systems for the *Convergent Invoicing* business scenario and the *Consume To Cash* value scenario.
- A security policy is defined for the landscape including the SAP CC Core Server system
- The public-key certificates have been exchanged (see the previous procedure)

Procedure

- Prepare the jco parameters
- To change the JCo configuration related to SAP ERP / FI-CA:
 - From SAP CC Core Server, export to a file the SNC parameters using the [Setup Tool](#) user interface:
`./setup.sh sapci exportConfiguration -login=<LGN> -password=<PWD> <myfilename>`
 - Edit this file and change the values of the parameters for Secured Network Communication

- Import these parameters using the command: `setup sapci importConfiguration -login=<LGN> -password=<PWD> <MYFILENAME>`
- To change the JCo configuration related to SAP CRM:
 - From SAP CC Core Server, export to a file the SNC parameters using the [Setup Tool](#) user interface: `./setup.sh jcodestination export crm <MYFILENAME>`
 - Edit this file and change the values of the parameters for Secured Network Communication
 - Import these parameters using the command: `./setup.sh jcodestination import crm <myfilename>`
- Restart all the dispatcher and bulkloader instances using the command: `sapcontrol -nr <instance_number> -host <host> -function start`
- Check the logs for these instances of the Core Server system

Result

The SAP CC Core Server system is up and running and can communicate with the SAP CRM and SAP ERP / FI-CA systems.

Maintaining the System ACL on SAP NetWeaver

Use

In addition to being able to identify its communication partner using the SNC layer, SAP NetWeaver uses a system Access Control List (ACL) to make sure that it is communicating with the correct components.

Procedure

To maintain the SNC system access control list (table SNCSYSACL, view VSNCSYSACL, type=E):

- Use the table maintenance transaction SM30
 - Enter SNC name for SAP Convergent Charging in the *SNC name* field. Make sure you enter the server's SNC name and not the Distinguished Name. The server's SNC name is the Distinguished Name prefixed with "p:"
 - The *System ID* field is optional
 - The option *Activate Entry for RFC* must be checked
 - The other entries are optional
- Save the data

Maintaining the Extended User ACL on SAP NetWeaver

Use

If users are logged on to the ABAP Engine using the secured JCo connection, then you must also maintain an entry in the extended user ACL (table USRACLEXT).

Procedure

To maintain the extended user ACL (table USRACLEXT):

- Use the table maintenance transaction SM30
 - Enter an asterisk (*) as a wildcard in the *User* field
 - Use the sequence number if you have multiple entries with the same user
 - Enter SAP Convergent Charging's SNC name in the SNC name field. Make sure you enter the server's SNC name and not the Distinguished Name. The server's SNC name is the Distinguished Name prefixed with "p:"
- Confirm the warning
- Save the data

System Settings for Communications via the Web Services

SAP Convergent Charging 5.0 provides a *Web Services* technical interface based on SOAP and HTTP standards.

Consult the procedure for [Setting up the Communications via the Web Services](#), see page [88].

In this integrated *SAP Solution* scenario, SAP CRM and SAP ERP/FI-CA act as consumers of these Web services provided by the SAP CC Core Server system. A proxy is delivered within SAP CRM for each service.

Consult the configuration documentation for SAP CRM and SAP ERP components:

- If you change the URL or the port number settings of the SAP CC Core Server system, change the configurations of the activation of the Web Services in SAP CRM and SAP ERP with SOAMANAGER transaction
- If you enable HTTP Secured (HTTPS) connections, check that the public certificate(s) of SAP Convergent Charging 5.0 are in the secure store of ERP/CRM in SAP Netweaver



NOTES

- Details of communication as destination server, transport protocol, access credentials have to be setup according to the concrete system landscape. This setup is done using transaction SOAMANAGER.
- SOAMANAGER enables to create several *logical ports* with different configurations for each service. Use the logical port marked as default for communication between the systems. Refer to the SOAMANAGER documentation for more details.
- To maintain logical ports for the SAP CC Web Services in SOAMANAGER select the link *Web Service Configuration* from tab *Service Administration* and search the services by 'Consumer Proxy' and using either the external or internal name as search pattern. Refer to the SOAMANAGER documentation for more details.

System Settings for Customer Management Area

SAP Convergent Charging 5.0 defines logical system pairs that include an SAP ERP/FI-CA system and an SAP CRM system. A pair identifies the SAP systems connected to SAP CC that are involved in the following business processes:

Processes	SAP ERP/FI-CA	SAP CRM
Transactional data about service usage (billable items, consumption items)		
■ Convergent charging and refilling	Yes	No
■ ABM notifications about prepaid accounts (amount alerts, expiration alerts)	Yes	Yes (Primary)
Master data provisioning and maintenance in SAP Convergent Charging		
■ Subscriber accounts in customer master data	Yes	No SAP CRM is not responsible for creating and maintaining master data in SAP CC



NOTE

When your system landscape includes only one SAP ERP/FI-CA system, this configuration is performed by *SAPinst*. You do not need to change these system settings after the initial installation.

Activities

- [Enabling a New ERP System and a New Customer Management Area](#), page [304]
- [Enabling a New CRM System and a New Customer Management Area](#), page [307]
- [System Settings for SAP ERP Reference System](#), page [312]

See Also

- [Basic System Settings for the JCo Communications](#), page [286]
- [System Settings for Secured JCo Communications](#), page [292]

Enabling a New ERP System and a New Customer Management Area

Use

SAP CC 5.0 communicates with one or more SAP ERP/FI-CA systems in the system landscape to maintain master data and to manage transactional data for business (billable items, consumption items). This configuration is set at the installation time by *SAPInst*. You may have to maintain this configuration.

Quick Procedure

- Set up a new JCo destination with Setup Tool
- Set up a new customer management area with Core Tool
- Successively stop and restart each dispatcher instance in the SAP CC Core Server system when the BART Server system is available in the system landscape
- Shut down all the bulkloader instances in the SAP CC system
- Successively stop and restart each rater instance in the SAP CC system
- Restart all the bulkloader instances in the SAP CC system
- Check the error and warning entries in the logs



NOTE

Refer to the *O2C Integration Guide* for more information about data replication and synchronization mechanisms between SAP CC and SAP ERP/FI-CA in an integrated *SAP Solution* scenario with these components of SAP Business Suite.

Prerequisites

- The RFC destination has been created with the procedure relevant for your system landscape when installing the SAP ERP/FI-CA system for the *Convergent Invoicing* business scenario.
- You know the configuration details that are relevant for the new JCo destination; See:
 - [Basic System Settings for the JCo Communications](#), page [286]
 - [System Settings for Secured JCo Communications](#), page [292]
- During the procedure, the SAP CC Core Server system does not load any billable item to SAP Convergent Invoicing (SAP CI) in SAP ERP/FI-CA and does not transmit any ABM notification alerts (expiration, balance amount) relating to prepaid accounts in customer master data. The SAP CC system processes the billable items, the consumption items, and the business notifications after the restart.

Procedure

To take into account a new SAP system in a new customer management area:

- Step 1: Set up a new JCo destination
 - Check the JCo destinations currently defined in SAP CC. Use the [Setup Tool user interface](#) with the following `setup jcodestination` command:

```
./setup.sh jcodestination list -login=<LGN> -password=<PWD>
```

- Prepare the information relating to the new JCo destination. You can export an existing JCo destination to a text file and change the communication parameters related to your system landscape.

**EXAMPLE**

SAP CC 5.0 provides a template of configuration file (jco.destination.sk) that includes the relevant system configuration parameters. This file is located in the central repository or in the folder of a dispatcher instance: /usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/.

```
jco.client.lang=en
jco.destination.peak_limit=10
jco.client.client=205
jco.client.passwd=f236525bbfa586111285177b7f441cdb
jco.client.user=erpctestuser
jco.client.sysnr=27
jco.destination.pool_capacity=3
jco.client.ashost=hostdnsname.mycompany.corp
```

- Import the new configuration from file or continue with the next step:

```
./setup.sh jcodestination import ERP <JCO_DESTINATION_NAME>
<FROM_FILE_PATH> -login=<LGN> -password=<PWD>
```

**NOTE**

When your new customer management area defines both an SAP ERP/FI-CA system and an SAP CRM system, you must have a JCo destination dedicated to this SAP CRM system. Refer to the procedure [Enabling a New CRM System and a New Customer Management Area](#), see page [307].

- Step 2: Configure a new customer management area
 - Set up a new customer management area (CMA) that is based on this new JCo destination. Use the [Core Tool user interface](#).
- Step 3: Prepare the shutdown of some instances of the SAP CC system
 - Check that the system records all the possible logs.
 - Write down the current settings to be able to restore this configuration after the execution of this procedure.
 - Use the [Admin+ user interface](#) to retrieve the current settings with the `get` command:

```
get LS_APP_SEVERITY ALL ALL
```

- When relevant change the system settings by using the `set` command:
`set LS_APP_SEVERITY INFO ALL`
- Perform the same task with the `LS_SYS_SEVERITY` parameter and its values in the system.

Apply the system configuration changes.

- Step 4 [BART Server available]:
 - Successively stop and restart each dispatcher instance in the SAP CC Core Server system when the BART Server system is available in the system landscape
 - Wait for the complete restart before stopping another rater instance. Use the Admin+ user interface with the `list` command or view the recorded logs to know when an instance is restarted.
 - Do never stop all the dispatcher instances at the same time so the convergent charging services are always available.
- Step 5: Shut down all the bulkloader instances of the SAP CC system
 - Check there is no unprocessed output data file
 - Check there in no error file
 - Stop all the bulkloader instances in the running SAP CC Core Server system
 - Wait for the complete stop; Use [Admin+](#) with the `list` command to know if an instance is down.
- Step 6: Successively stop and restart each rater instance in the SAP CC system.
 - Wait for the complete restart before stopping another rater instance. Use the Admin+ user interface with the `list` command or view the recorded logs to know when an instance is restarted.
 - Do never stop all the rater instances at the same time so the convergent charging services are always available.
- Step 7:
 - Restart all the bulkloader instances in the SAP CC system
- Step 8:
 - Check the error and warning entries recorded in the logs
 - Determine the resolution by referring to the *SAP CC Log Message Reference* documentation
 - Setup the necessary corrective or preventive action plans
- Step 9:
 - Optionally check the availability of the new folders dedicated to the management of business data persistency (charging and refilling processes). With the Admin+ user interface and the `get` command, determine the location of these folders. The relevant data folders are available in the working directory shared by each pair of rater and bulkloader instances.

■ POSTPAID_CIT_WRITER_ROOT_PATH ■ PREPAID_CIT_WRITER_ROOT_PATH	■ POSTPAID_CIT_READER_ROOT_PATH ■ PREPAID_CIT_READER_ROOT_PATH	Always
■ ACQUIRED_CI_WRITER_ROOT_PATH ■ CHARGED_CI_WRITER_ROOT_PATH	■ ACQUIRED_CI_READER_ROOT_PATH ■ CHARGED_CI_READER_ROOT_PATH	Check the corresponding data folders when SAP Convergent Invoicing in SAP ERP manages the consumption items
■ AMOUNT_ALERT_NOTIF_WRITER_ROOT_PATH ■ EXPIRATION_ALERT_NOTIF_WRITER_ROOT_PATH	■ AMOUNT_ALERT_NOTIF_READER_ROOT_PATH ■ EXPIRATION_ALERT_NOTIF_READER_ROOT_PATH	Check the corresponding customer management area does not include any SAP CRM system

- Step 10:
 - When relevant, change back the system settings for the logging function.

Next

The provisioning process of subscriber accounts assigned to this SAP ERP/FI-CA system can start as part of the business partner management function. Once the relevant subscriber accounts are created in SAP CC with the relevant customer management area information, the charging and refilling services are available for these accounts.

Enabling a New CRM System and a New Customer Management Area

Use

SAP CC 5.0 communicates with one or more SAP CRM systems in the system landscape to transmit the ABM notifications (prepaid account alerts about expiration or balance amount). This configuration is set at the installation time by *SAPInst*. You may have to maintain this configuration.

- Define a JCo destination with Setup Tool
- Define a customer management area with Core Tool
- Restart some instances



NOTES

- Refer to the *O2C Integration Guide* for more information about the business notifications in an integrated SAP Solution scenario.
- There is no data replication and synchronization mechanisms between SAP CC and SAP CRM. SAP ERP/FI-CA in an integrated *SAP Solution* scenario with these components of SAP Business Suite.

Quick Procedure

- Set up a new JCo destination with Setup Tool
- Set up a new customer management area with Core Tool
- Successively stop and restart each dispatcher instance in the SAP CC Core Server system when the BART Server system is available in the system landscape
- Shut down all the bulkloader instances in the SAP CC system
- Successively stop and restart each rater instance in the SAP CC system
- Restart all the bulkloader instances in the SAP CC system
- Check the error and warning entries in the logs

Prerequisites

- The RFC destination has been created with the procedure relevant for your system landscape when installing the SAP CRM system for the *Convergent Invoicing* business scenario.
- You know the configuration details that are relevant for the new JCo destination; see [Basic System Settings for the JCo Communications](#), page [286]
- During the procedure, the SAP CC Core Server system does not load any billable item to SAP Convergent Invoicing and does not transmit any ABM notification.

Procedure

To take into account a new SAP CRM system in a new customer management area:

- Step 1: Set up a new JCo destination
 - Check the JCo destinations currently defined in SAP CC. Use the [Setup Tool user interface](#) with the following `setup jcodestination` command:


```
setup jcodestination list -login=<LGN> -password=<PWD>
```
 - Prepare the information relating to the new JCo destination. You can export an existing JCo destination to a text file and change the connection parameters related to your system landscape.



EXAMPLE

SAP CC 5.0 provides a template of configuration file (`jco.destination.sk`) that includes the relevant system configuration parameters. This file is located in the central repository or in the folder of a dispatcher instance: `/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/`.

```
jco.client.lang=en
jco.destination.peak_limit=10
jco.client.client=205
jco.client.passwd=f236525bbfa586111285177b7f441cdb
jco.client.user=crmcctestuser
jco.client.sysnr=27
jco.destination.pool_capacity=3
jco.client.ashost=hostdnsname.mycompany.corp
```

- Import the new configuration from file or continue with the next step:

```
./setup.sh jcodestination import CRM <JCO_DESTINATION_NAME>
<FROM_FILE_PATH> -login=<LGN> -password=<PWD>
```

**NOTE**

When your new customer management area defines both an SAP ERP/FI-CA system and an SAP CRM system, you must have a JCo destination dedicated to this SAP ERP system. Refer to the procedure [Enabling a New ERP System and a New Customer Management Area](#), see page [304].

- Step 2: Configure a new customer management area
 - Set up a new customer management area (CMA) that is based on this new JCo destination and on an existing JCo destination for the SAP CRM system. Use the [Core Tool user interface](#).
- Step 3: Prepare the shutdown of some instances of the SAP CC system
 - Check that the system records all the possible logs.
 - Write down the current settings to be able to restore this configuration after the execution of this procedure.
 - Use the [Admin+ user interface](#) to retrieve the current settings with the `get` command:
`get LS_APP_SEVERITY ALL ALL`
 - When relevant change the system settings by using the `set` command:
`set LS_APP_SEVERITY INFO ALL`
 - Perform the same task with the `LS_SYS_SEVERITY` parameter and its values in the system.

Apply the system configuration changes.

- Step 4 [BART Server available]:
 - Successively stop and restart each dispatcher instance in the SAP CC Core Server system when the BART Server system is available in the system landscape
 - Wait for the complete restart before stopping another dispatcher instance. Use the Admin+ user interface with the `list` command or view the recorded logs to know when an instance is restarted.

- Do never stop all the dispatcher instances at the same time so the convergent charging services are always available.
- Step 5: Shut down all the bulkloader instances of the SAP CC system
 - Check there is no unprocessed output data file
 - Check there is no error files
 - Stop all the bulkloader instances in the running SAP CC Core Server system
 - Wait for the complete stop; Use [Admin+](#) with the `list` command.
- Step 5: Apply the system configuration changes
 - Successively stop and restart each rater instance in the SAP CC system.
 - Wait for the complete restart before stopping another rater instance. Use [Admin+](#) with the `list` command.
 - View the recorded logs to know when an instance is restarted.
 - Do never stop all the rater instances at the same time so the convergent charging services are always available.
- Step 6:
 - Restart all the bulkloader instances in the SAP CC system
- Step 7:
 - Check the error and warning entries recorded in the log files
 - Determine the resolution and the necessary corrective or preventive action plans to setup by referring to the *SAP CC Log Message Reference* documentation
- Step 8:
 - Check that the relevant data folders are available in the working directory shared by each pair of rater and bulkloader instances
 - Use Admin+ and the `get` command to locate these folders in the host machine or in a shared directory:


```
get AMOUNT_ALERT_NOTIF_WRITER_ROOT_PATH
get EXPIRATION_ALERT_NOTIF_WRITER_ROOT_PATH
```

**EXAMPLE**

By default, the SAP CC Core Server system creates the following folders:

- <WD>/SAPCC_NOTIF/AMOUNT/Instance#<INSTANCE_ID>/<JCO_DEST_NAME>/
- <WD>/SAPCC_NOTIF/EXPIRATION/Instance#<INSTANCE_ID>/<JCO_DEST_NAME>/
- <WD>/SAPCC_NOTIF/ERROR/Instance#<INSTANCE_ID>/<JCO_DEST_NAME>/

With:

- <WD> is the *Working Directory* that is shared by each pair of rater/bulkloader instances in the SAP CC system
- <INSTANCE_ID> is a numerical identifier of the instance (1, 2, ..)

Next

The provisioning process of subscriber accounts assigned to this SAP ERP/FI-CA system can start as part of the business partner management function. Once the relevant subscriber accounts are created in SAP CC with the relevant customer management area (CMA) information, the charging and refilling services are available for these accounts.

Setting up a Customer Management Area

Use

You want to configure a new customer management area by using an existing JCo destination.

Prerequisites

A JCo destination exists and is already assigned to a customer management area.

Procedure

Apply the above procedure without restarting the dispatcher instances.

System Settings for SAP ERP Reference System

SAP Convergent Charging 5.0 defines an ERP reference system in the system landscape. This is the system of reference that SAP CC communicates with to synchronize some important data (currency, BIT classes, and consumption item classes).

- In a system landscape with one unique ERP system, it is the reference system.
- In a system landscape with several ERP systems, the reference system is the master ERP system.



NOTE

This configuration is performed by *SAPinst*. You do not need to change these system settings after an initial installation.

See Also

- [Basic System Settings for the JCo Communications](#), page [286]
- [System Settings for Secured JCo Communications](#), page [292]

Changing the ERP Reference System Information

Use



CAUTION

In a running production system, do not change the SAP CC system settings regarding to the ERP reference system. SAP recommends that you change the configuration directly in the gateway.

Prerequisite

- The RFC destination has been created with the procedure relevant for your system landscape when installing the SAP ERP/FI-CA system for the *Convergent Invoicing* business scenario.
- You know the configuration details that are relevant for the new JCo destination; See:
 - [Basic System Settings for the JCo Communications](#), page [286]
 - [System Settings for Secured JCo Communications](#), page [292]

Procedure

In a development or test system landscape, you can change the SAP ERP reference system information.

- With the [Setup Tool user interface](#)
 - Set up a new JCo destination by using the `setup jcodestination import ERP` command.



NOTE

Consult the detailed procedure available in the [Apply the procedure detailed in the Enabling a New ERP System and a New Customer Management Area](#) section, page [304] for more information about the definition of a new JCo destination in the SAP CC system.

- Define the JCo destination dedicated to the ERP reference system. Use the command:
`./setup.sh erpreferencesystem setJCoDestination <JCO_DESTINATION>
-login=<LGN> -password=<PWD>`
- Stop and restart the complete SAP CC system to apply the configuration changes
- Check the error and warning entries in the logs to setup action plans



NOTE

Consult the *SAP CC Log Message Reference* documentation to determine the resolution and the preventive or corrective actions to plan.

Basic System Settings for Generating Both BITs and Consumption Items



NOTE

SAPinst performs this configuration with appropriate default values; Therefore, make changes to this configuration only if it is necessary for your business requirements.

You can consult some configuration template files in the <profile>\config\ sapci\cit_ci\ folder.

Billable Item and Consumption Item Management

Use

Some configuration activities are necessary at installation time or later so that SAP CC 5.0 can post billable items (BITs) and service consumption items (for deferred charging and rerating purposes) to SAP Convergent Invoicing (SAP CI) in SAP ERP/FI-CA.

Prerequisites

The configuration for managing chargeable items is available.

Activities

- Set up the CIF for the rater instances of the Core Server system on page [\[277\]](#)
- Set up the CIF for the bulkloader instances of the Core Server system

Result

- The SAP CC Core Server system is configured
- You can configure master data for the service provider and:
 - Create the billable item mapping with SAP CC Core Tool (the necessary charged item classes or refill record classes are automatically created) [page [383](#)]
 - Use the billable item mapping to customize a charge in a charge plan or in an offer or to customize the refill logic in a refill plan [page [246](#)]

- You can configure master data for the service provider and create the consumption item mapping with SAP CC Core Tool on page [\[383\]](#)

Setting up the Rater Instances (CIF)

Use

SAP CC 5.0 generates output data files temporarily:

- chargeable item files
- charged item files and refill record files

You can configure the file management for these functions (path, multithreading, rollover policy, and pre-creation policy).

Output Data	Function	Settings	Default
Postpaid Charged Item	Event Date Shifting	There is no configuration parameter. The <code>eventDateShifter</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Billable Item Validation	There is no configuration parameter. The <code>billableItemValidator</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Writing in bulk	Root Path	SAPCC_CIT/POSTPAID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	true

Output Data	Function	Settings	Default
		Pre-Creation Policy	<Empty value>
Prepaid Charged Item	Event Date Shifting	There is no configuration parameter. The <code>eventDateShifter</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Billable Item Validation	There is no configuration parameter. The <code>billableItemValidator</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Writing in bulk	Root Path	SAPCC_CIT/PREPAID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	false
		Pre-Creation Policy	<Empty value>
Chargeable Item Only Acquired	Consumption Item Validation	There is no configuration parameter. The <code>consumptionItemValidator</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Writing in bulk	Root Path	SAPCC_CI/ACQUIRED/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true

Output Data	Function	Settings	Default
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	true
		Pre-Creation Policy	<Empty value>
Chargeable Item Already Charged	Consumption Item Validation	There is no configuration parameter. The <code>consumptionItemValidator</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Writing in bulk	Root Path	SAPCC_CI/CHARGED/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	true
		Pre-Creation Policy	<Empty value>

For monitoring and managing errors, consult the [Operations Guide documentation](#), page [21].



CAUTION

Before being saved to files, SAP Convergent Charging validates the charged items and the refill records to make sure that they will be correctly converted into billable items. SAP Convergent Charging validates also the chargeable items to make sure that they will be correctly converted into consumption items.

Default Settings

SAPinst configures the system automatically with default values available in the configuration template (skeleton file).

Procedure

- Consult the template file (..\config\sapci\cit_ci\cif.rater.config.xml.sk) about the current settings
- Export your current configuration from SAP CC:
`./setup.sh cif export <MY_FILENAME> rater`
- Change the parameters
- Import the new configuration:

```
./setup.sh cif import <MY_FILENAME> rater
```

Setting up the Bulkloader Instances (CIF)

Use

After billable items are extracted and converted from the charged item or refill record files, SAP CC 5.0 loads the billable items into SAP Convergent Invoicing (SAP CI) in the SAP ERP/FI-CA system. You can therefore configure the file management for this function (path, multithreading, buffering, and file error management). The SAP JCo and RFC procedures provide the communication between SAP CC 5.0 and SAP Convergent Invoicing.

After chargeable items are extracted and converted into consumption items, SAP CC 5.0 loads the consumption items into SAP Convergent Invoicing (SAP CI) in SAP ERP/FI-CA. You can therefore configure the file management for this function (path, multithreading, buffering, and file error management).

For monitoring and managing errors, consult the [Operations Guide documentation](#), page [21].

Default Settings

SAPinst configures the system automatically with default values.

Procedure

- Consult the template file (..\config\sapci\cit_ci\cif.bulkloader.config.xml.sk) about the current settings
- Export your current configuration from SAP CC:
`./setup.sh cif export -login=<LGN> -password=<PWD> <MYFILENAME>
bulkLoader`
- Change the parameters
- Import the new configuration:
`./setup.sh cif import -login=<LGN> -password=<PWD> <MYFILENAME>
bulkLoader`

Refreshing the Consumption Item Mapping

Use

You cannot modify any consumption item mapping but you must refresh any existing consumption item mapping defined in SAP Convergent Charging if SAP ERP/FI-CA changed the related consumption item class.

Procedure

To refresh the consumption item mapping, consult the primary help of the Core Tool user interface in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → *Configuration Information* → *Power User Documentation - Core Tool* → *About the consumption item mapping or Modifying the consumption item mapping* ◀. You can access to the primary help from the graphical user interfaces.

Basic System Settings for Generating Billable Items Only



NOTE

SAPinst performs this configuration with appropriate default values if you selected the appropriate options; Therefore, make changes to this configuration only if it is necessary for your business requirements.

You can consult some configuration template files in the <profile>\config\sapci\cit\ folder.

Billable Item Management

Use

Some configuration activities are necessary at installation time or later so that SAP CC 5.0 can post billable items into SAP Convergent Invoicing (SAP CI) in the SAP ERP/FI-CA system.

Prerequisites

- The JCo communication settings are configured
- The configuration for managing charged items or refill records is available.

Activities

- Set up the CIF for the rater instances of the Core Server system [page [277](#)]
- Set up the CIF for the bulkloader instances of the Core Server system
- Set up the EIF

Result

- The SAP CC Core Server system is configured
- You can configure master data for the service provider and:
 - Create the billable item mapping with SAP CC Core Tool (the necessary charged item classes or refill record classes are automatically created) [page [383](#)]
 - Use the billable item mapping to customize a charge in a charge plan or in an offer or to customize the refill logic in a refill plan [page [246](#)]

Setting up the Rater Instances (CIF)

Use

SAP CC 5.0 generates charged item or refill record files temporarily. You can configure the file management for this function (path, multithreading, rollover policy and pre-creation policy).

Output Data	Function	Settings	Default
Postpaid Charged Item	Event Date Shifting	There is no configuration parameter. The <code>eventDateShifter</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Billable Item Validation	There is no configuration parameter. The <code>billableItemValidator</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Writing in Bulk Mode	Root Path	SAPCC_CIT/POSTPAID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	true
		Pre-Creation Policy	<Empty value>
Prepaid Charged Item	Billable Item Validation	There is no parameter.	N/A
	Writing in Bulk Mode	Root Path	SAPCC_CIT/PREPAID/Instance#@INSTANCE_ID@
		Channel Count	2

Output Data	Function	Settings	Default
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	true
		Deflate Output Format	GZIP
		Auto Commit	false
		Store File Information	false
		Pre-Creation Policy	<Empty value>

For monitoring and managing errors, consult the [SAP CC Operations Guide documentation](#), see [Fundamental User Assistance and Guides](#) section, page [21].



CAUTION

Before being saved to files, SAP Convergent Charging validates the charged items and the refill records to make sure that they will be correctly converted into billable items.

Default Settings

SAPinst configures the system automatically with default values available in the configuration skeleton.

Procedure

- Consult the template file (..\config\sapci\cit\cif.rater.config.xml.sk) about the current settings
- Export your current configuration on the *SAP Global Host* of your SAP CC system:
`setup cif export rater <MY_FILENAME>`
- Change the parameters
- Import the new configuration:

```
setup cif import rater <MY_FILENAME>
```

Setting up the Bulkloader Instances (CIF)

Use

After billable items are extracted and converted from the charged item or refill record files, SAP CC 5.0 loads the billable items into SAP Convergent Invoicing in the SAP ERP/FI-CA system. You can therefore configure the file management for this function (path, multithreading, buffering, and file error management). The SAP JCo and RFC procedures provide the communication between SAP CC 5.0 and SAP Convergent Invoicing.

Output Data	Function	Settings	Default
Prepaid Charged Item	Multi JCo Destination	There is no configuration parameter. The <code>multiJCoDestination</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Reading in Bulk	Root Path	SAPCC_CIT/PREPAID/Instance#@INSTANCE_ID@"
		Channel Count	2
		Buffer Size	1000
		Remove File	true
	Posting in Bulk (Bulk loading)	Destination	CI_DESTINATION
		Error Handling (*)	 NOTE Consider the error handling configuration.
		Auto Commit	true
Postpaid Charged Item	Multi JCo Destination	There is no configuration parameter. The <code>multiJCoDestination</code> XML node is present in the CIF configuration settings.	The function is enabled.
	Reading in bulk	Root Path	SAPCC_CIT/POSTPAID/Instance#@INSTANCE_ID@"
		Channel Count	2
		Buffer Size	1000

Output Data	Function	Settings	Default
	Posting in bulk (Bulk loading)	Remove File	true
		Destination	CI_DESTINATION
		Error Handling (*)	 NOTE Consider the error handling configuration.
		Auto Commit	true

Error Handling

Function	Error Handling	Settings	Default
Posting in bulk (Bulkloading) Prepaid Charged Items	Invalid Billable Item: Writing in bulk	Root Path	SAPCC_CIT/PREPAID/INVALID/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	false
		Auto Commit	true
		Store File Information	false
		Pre-Creation Policy	<Empty value>
	Communication Exception	Root Path	SAPCC_CIT/PREPAID/COM_EXCEPTION/Instance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M

Function	Error Handling	Settings	Default
Posting in bulk (Bulkloading) Postpaid Charged Items		Deflate	false
		Auto Commit	true
		Store File Information	false
		Pre-Creation Policy	<Empty value>
	Invalid Billable Item: Writing in bulk	Root Path	SAPCC_CIT/POSTPAID/INVALID/I nstance#@INSTANCE_ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	false
		Auto Commit	true
		Store File Information	true
		Pre-Creation Policy	<Empty value>
	Communication Exception	Root Path	SAPCC_CIT/POSTPAID/COM_EX CEPTION/Instance#@INSTANCE _ID@
		Channel Count	2
		Time-Based FileRolloverPolicy	HOURLY
		Max. Size Based File Rollover Policy	1M
		Deflate	false
		Auto Commit	true
		Store File Information	true
		Pre-Creation Policy	<Empty value>

For monitoring and managing errors, consult the [SAP CC Operations Guide documentation](#), see page [21].

For configuring the conversion, consult the next section.

Default Settings

SAPinst configures the system automatically with default values.

Procedure

- Consult the template file (..\config\sapci\ci\cif.bulkloader.config.xml.sk) to get more details about each setting
- Export your current configuration from SAP CC:

```
setup cif export -login=<LGN> -password=<PWD> bulkloader <myfilename>
```
- Change the parameters
- Import the new configuration:

```
setup cif import -login=<LGN> -password=<PWD> bulkloader <myfilename>
```

Setting up the Default Field Mapping Between CIT and BIT (Implementation Project)

Use

In this *Customizing* activity, you configure how SAP CC 5.0 generates fields in the billable items (BIT) sent to SAP Convergent Invoicing in SAP ERP.

To configure the billable item mapping in SAP CC 5.0 easily, it is recommended to create and maintain a list containing the fields defined in the billable item classes created in SAP Convergent Invoicing in SAP ERP.

You can set up how SAP CC must generate each field by default and set up any field as a mandatory field in SAP CI so that SAP CC adds this field automatically when the power user creates the new billable item mapping.

SAP CC generates two types of field:

- A constant value
- A base property from the rating and charging context (SAP CC always calculates any base property and identifies it with a technical key)

This table lists the fields that SAP CC can generate and the ID of their keys:

BIT Field	Status in BIT	Generation Method
SRCTATYPE	Mandatory	Constant value: CCCIT

BIT Field	Status in BIT	Generation Method
SRCTAID		Property from rating and charging context: Key: <code>itemSetIdSt</code>
SUBPROCESS	Mandatory	Generated by the SAP CC system  DO NOT MODIFY THIS ENTRY
BITTYPE	Mandatory	Generated by the SAP CC system  DO NOT MODIFY THIS ENTRY
VKONT	Mandatory	Property from rating and charging context:  DO NOT MODIFY THIS ENTRY
GPART	Mandatory	Property from rating and charging context: External (Postpaid) Account ID  DO NOT MODIFY THIS ENTRY
BITDATE	Mandatory	Property from rating and charging context: Key: <code>eventDate</code>
BITTIME	Mandatory	Property from rating and charging context: Key: <code>eventDate</code>
BITDATE_FROM		Property from rating and charging context: Key: <code>recurringStart</code>
BITDATE_TO		Property from rating and charging context: Key: <code>recurringStop</code>
BIT_AMOUNT	Mandatory	Property from rating and charging context: Key: <code>baseAmount</code>
BIT_CURR	Mandatory	Property from rating and charging context: Key: <code>currency</code>
POSTREL		Constant value: true
PRINTREL		Constant value: true
TAX_INCLUDED		Property from rating and charging context: Key: <code>taxVatGrossPriceFlag</code>
TAX_DET_TYPE		Constant value: 01

BIT Field	Status in BIT	Generation Method
TAX_DATE_TYPE		This field is generated with no value: Key: <code>emptyString</code>
EXT_TAX_ID		Property from rating and charging context: Key: <code>taxVatRateCode</code>
XANZA		Constant value: false
PREPAID	Mandatory	Property from rating and charging context: Key: <code>isPrepaid</code>
PPACC	Mandatory	Property from rating and charging context: Key: <code>accountCode</code>
PPREFILL	Mandatory	Property from rating and charging context: Key: <code>isPrepaidRefill</code>
VTREF	Mandatory	Property from rating and charging context: Key: <code>contractId</code>
SUBAP	Mandatory	Property from rating and charging context: Key: <code>contractType</code>
CONTRACTITEMID	Mandatory	The external code of a contract item stored in SAP CC. Property from rating and charging context: Key: <code>contractItemExternalId</code>

**CAUTION**

Because the definitions of billable item classes in SAP CI can change, you must maintain SAP CC according to your business. Do not forget that you must restart the SAP CC Core Server system after a maintenance operation.

**NOTE**

In this configuration file, the keys `emptyString`, `emptyNumber` and `emptyDate` are used to force the generation of a field with no value in the BIT. The list of keys is available in the SAP CC 5.0 Java API References in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API References → Core APIS (Java and XML) → `com.highdeal.pnr.if` → [TransactionFieldBook](#) or in the Core Server SDK software unit.

Default Settings

In a billable item, several fields are set up according to the default field mapping of SAP CC 5.0 at installation time. A template file is available in the configuration folders.

Activities

As a technology consultant, you have to initiate this configuration according to the one of SAP Convergent Invoicing in SAP ERP. As a system administrator, you may update this configuration in SAP CC when a new field is created in SAP CI.

Prerequisites

- You know the configuration of billable item classes in SAP Convergent Invoicing in SAP ERP.
- The default_ci_ei_mapping.xml.sk file from an SAP CC installation is available in the folder /usr/sap/<SID>/CCD<SAP_INST_NB>/CC_CORE_SERVER/config/ci/, or it can be exported from a running server with [Setup Tool](#) and the **sapci** command.

Procedure

- With SAP CC [Admin+](#), check that the EIF_CONN_CLASS parameter has the value **com.highdeal.eif.ci.CIConnector**
- Create the configuration file “myDefaultFieldMapping.xml”
- Verify and update the content of this file according to the configuration of billable item classes defined in SAP CI:
 - The XML schema is basic and mostly includes the `exportableItemMappingField` tag (identifying a field in the generated billable items), the default way to generate the tag, and the status of the tag (mandatory or not):


```
<?xml version="1.0" encoding="UTF-8"?>
<exportableItemMapping externalSystemCode="CI">
  <!-- Field generated by default with a constant -->
  <exportableItemMappingField name="<FIELD1>">
    <additionalInformation name="constant" value="CCCIT" />
    <additionalInformation name="isMandatory" value="true" />
  </exportableItemMappingField>
  <!-- Field generated by default with a value computed by SAP CC -->
  <exportableItemMappingField name="<FIELD2>">
    <additionalInformation name="value" value="<KEYWORD>" />
    <additionalInformation name="isMandatory" value="true" />
  </exportableItemMappingField>
</exportableItemMapping>
```
 - For each `exportableItemMappingField` tag, add the `additionalInformation` tag and set up the name to `constant` if SAP CC generates this field with a constant value or set the name to `value` if SAP CC generates this field with a value computed during the rating or charging process according to the keyword. For more information, see the example below.
 - Change some settings or add some field descriptions, if necessary. The list of keywords is available in the *SAP CC 5.0 Java API References* in SAP Help Portal at: 

<https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API References → Core APIS (Java and XML) → *pnr.tif.TransactionFieldBook* << or in the Core Server SDK software unit.

- Import this new configuration in the SAP CC Core Server system by using [Setup Tool](#).
 - Type: `setup sapci importDefaultMapping -login=<LGN> -password=<PWD> chargedItem ..\config\withCI\myDefaultFieldMapping.xml`
- Restart all the instances of the SAP CC system



EXAMPLE

By default, SAP CC can generate the fields named SRCTATYPE and VKONT in the billable items. SRCTATYPE is filled in with the constant string value "CCCIT" and VKONT with the property of the rating context including the identifier of an external postpaid account defined in a subscriber account.

By default, SAP CC can generate a new charged item class automatically when creating a new billable item mapping. The structure of the charged item class is similar to the structure of the billable item class defined in the mapping. This charged item class will include fields named SRCTATYPE and VKONT, which are set up to produce the right data in the final billable item.

An extract of the configuration file of the default field mapping can include the following rows:

```
<?xml version="1.0" encoding="UTF-8"?>
<exportableItemMapping externalSystemCode="CI">
  <exportableItemMappingField name="SRCTATYPE">
    <additionalInformation name="constant" value="CCCIT" />
    <additionalInformation name="isMandatory" value="true" />
  </exportableItemMappingField>
  <exportableItemMappingField name="VKONT">
    <additionalInformation name="value" value="externalAccountCode" />
    <additionalInformation name="isMandatory" value="true" />
  </exportableItemMappingField>
  ...
</exportableItemMapping>
```

Checking the Updater Instances (EIF)

Use

SAP CC 5.0 exchanges information on billable item classes managed by SAP ERP Convergent Invoicing in the SAP ERP system.



NOTE

SAP CC 5.0 includes a default mapping definition related to the fields generated by the SAP CC system and the fields known by the SAP ERP/FI-CA system. You can customize this mapping as described in the customization section.

Default Settings

- *SAPinst* sets up the system configuration automatically with default values
- You must not change the system configuration

Procedure

- Launch the [Admin+ User Interface](#)
- Check that the EIF_CONN_CLASS parameter has the value `com.highdeal.eif.ci.CIConnector`

Basic Settings for the CIF

In this section groups some system configuration procedures that facilitate the CIF configuration of the rater or bulkload instances in the running SAP CC Core Server system:

- Enabling the Event Date Shifting Function in the CIF
- Disabling the Billable Item Validator in the Rater Instances

Enabling the Event Date Shifting Function in the CIF

The event date shifting function is introduced with SAP CC 4.0 SP04 to enhance the integration with SAP Convergent Invoicing (SAP CI) in SAP ERP/FI-CA. To enable this function, the CIF configuration settings must include the relevant `eventDateShifter` keys.

You can use the delivered template files as examples. Depending on your SAP system landscape and if the *Consumption Item Management* function is enabled in SAP CI, consult the file:

- `"/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/cit/cif.rater.config.xml.sk"` if the SAP CC system is configured to send only billable items to SAP CI
- or the file `"/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/cit_ci/cif.rater.config.xml.sk"` if the SAP CC system is configured to send billable items and consumption items to SAP CI

Procedure

In case you are integrated with SAP CI, apply the procedure below:

- On the *SAP Global Host* of the SAP CC Core Server system, open a system console in the directory of the `"/usr/sap/<SID>/CCD<SAP_INST_NB>/script/"` to execute a command of the [Setup Tool](#) user interface, see page [46]
- Export the CIF configuration for the rater instances using the following command of Setup Tool and your credentials (logon, password):

```
setup cif export rater <MY_CIF_SETTINGS_FILE>
```

- Edit the XML file and add the necessary `eventDateShifter` XML nodes either:
 - Around each `sequence` XML node, which surrounds a `billableItemValidator` XML node
 - Around each `billableItemValidator` XML node, which is not surrounded by an `sequence` XML node

- Import the CIF configuration for the rater instances using the following command and your credentials (logon, password):

```
setup cif import rater <MY_CIF_SETTINGS_FILE>
```

- Restart the rater instances to apply the modifications.

Disabling the Billable Item Validator in the Rater Instances

Use

It is recommended to disable the billable item validator in case of charged item aggregation in order to avoid to lose charged items for events which are already confirmed.

Procedure

Use the [Setup Tool](#) user interface, see page [46].

System Settings for Logging and Tracing

This section provides information that relates to the solution scenario.

Basis Settings



NOTE

To configure the SAP CC Core Server system, refer first to the basic information in the [System Settings for Logging and Tracing](#) section, page [102].

System Settings for Tracing the JCo Communications

To temporarily troubleshoot the JCo RFC communications between the SAP CC system and the SAP CRM system or the SAP ERP system you can enable the JCo trace management.



CAUTION

Take particular care when enabling traces. The performances of the SAP CC system may reduce significantly. In a production system landscape, contact your SAP Support Team.



NOTE

Refer to the *SAP CC System Parameter Reference* documentation for more information about the following configuration parameters of the SAP CC Core Server system:

- [JCO_TRACE_LEVEL](#): Turns on the Java Connector (JCo) traces
- [JCO_CPIC_TRACE_LEVEL](#): Turns on the Java Connector (JCo) CPIC traces
- [JCO_JRFC_TRACE_LEVEL](#): Turns on the Java Connector (JCo) RFC traces
- [JCO_TRACE_PATH](#): The location of the path for Java Connector (JCo) trace files

Procedure

- Launch the [Admin+ user interface](#) and log on

- Determine the appropriate trace levels that are relevant for your investigations and troubleshooting; Consult the *SAP CC System Parameter Reference* documentation for more detailed information
- Check or set up the trace path (see the JCO_TRACE_PATH parameter)
- Enable and set up the generation of JCo traces (see the JCO_TRACE_LEVEL parameter) for all the relevant instances of the SAP CC system or for selected instances
- When relevant for your investigations, enable the generation of the JCo RFC traces (see JCO_JRFC_TRACE_LEVEL)
- When relevant, enable and set up the generation of the JCo *Common Programming Interface - Communication* (CPIC) traces (see the JCO_CPIC_TRACE_LEVEL system parameter)

**IMPORTANT NOTE**

At the end of the investigations, you must disable the JCo traces by setting up the JCO_TRACE_LEVEL parameter back to 0 (default value) for all the relevant instances of the SAP CC system.

System Settings for Managing ABM Notifications via JCo



NOTE

This configuration is performed by *SAPinst*. You do not need to change these system settings at initial installation time.

In the integrated *SAP Solution* scenario with the SAP CRM and SAP ERP/FI-CA components of SAP Business Suite, SAP Convergent Charging must send the following account balance management (ABM) notifications via JCo communication channels:

- Amount alert (prepaid account balance)
- Expiration alert (prepaid account)



CAUTION

In this *SAP solution* scenario, do not set up a filter for notifications that will block the amount alert notifications or the expiration alert notifications; See page [\[122\]](#).

SAP CC 5.0 uses the following JCo functions:

- SAP CRM: CRM_ISX_PPACC_ALERT_HANDLER
- SAP ERP: FKK_PREP_MESSAGE

Setting up the Temporary Storage of ABM Notifications via JCo

Use

SAP CC 5.0 uses temporary data files for collecting all the notifications before sending them to the SAP CRM or SAP ERP/FI-CA system by calling a JCo function.

You can configure the technical management of these files according to the type of instance of the SAP CC Core Server system:

Settings for All the Rater Instances of the Core Server System (Notification File Generation)

File Settings	Technical Name	Example
Root Path (Output)	rootPath	CC_AMOUNT_ALERT_NOTIF/Instance#@INSTANCE_ID@/@JCO_DESTINATION_NAME@
Channel Count	channelCount	2
Max Size Based File Rollover Policy	timeBasedFileRolloverPolicy	1M
Time Based File Rollover Policy	timeBasedFileRolloverPolicy	HOURLY
Deflate	deflate	true
Auto Commit	autoCommit	false

Settings for the Bulkloader Instances of the Core Server System (File Transmission)

JCo Settings (*)	Technical Name	Example
Destination Alias	destination	■ crm ■ CI_DESTINATION
Function	function	■ CRM_ISX_PPACC_ALERT_HANDLER ■ FKK_PREP_MESSAGE



(*) CAUTION

Do not change the values of the JCo settings.

File Settings	Technical Name (**)	Example
Root Path (Input)	rootPath	■ CC_AMOUNT_ALERT_NOTIF/Instance#@INSTANCE_ID@/@JCO_DESTINATION_NAME@ ■ CC_EXPIRATION_ALERT_NOTIF/Instance#@INSTANCE_ID@/@JCO_DESTINATION_NAME@
Channel Count	channelCount	2
Buffer Size	bufferSize	1000
File Removal	removeFile	true



(**) NOTE

The technical names of these parameters have a prefix. By default the prefixes are:

- AMOUNT_ALERT_NOTIF_READER
- EXPIRATION_ALERT_NOTIF_READER

The files that cannot be transmitted are managed with the following parameters for the Bulkloader instances:

File Error Management

File Settings	Technical Name	Example
Root Path (Output)	rootPath	CC_NOTIF_ERR/Instance#@INSTANCE_ID@/@JCO_DESTINATION_NAME@
Channel Count	channelCount	2
Max Size Based File Rollover Policy	maxSizeBasedFileRolloverPolicy	1M
Time Based File Rollover Policy	timeBasedFileRolloverPolicy	HOURLY
Deflate	deflate	false
Auto Commit	autoCommit	true



NOTE

Consult the *SAP CC System Parameter Reference* documentation for more details on page [\[51\]](#).

Default Settings

- *SAPinst* sets up the SAP CC Core Server system to activate the publication of notifications.
 - By default, the SAP CC system sends the notifications to the SAP CRM systems (when part of the system landscape).
- *SAPinst* uses default values from template files for the configuration (see files: notification_policy.rater.xml.sk, notification_policy.bulkloader.crm.xml.sk, notification_policy.bulkloader.xml.sk, bulkloader_policy.xml.sk)

Prerequisites

You have installed your SAP CC system landscape with *SAPinst*.

Procedure

- Determine the notification policies configured for each type of instance of the SAP CC Core Server system
- Access to the template files (see default settings) located in the directory:
/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/

**NOTE**

You can consult the *SAP CC System Parameter Reference* for details on page [51].

- Change the configuration for the rater instances of the SAP CC Core Server system
 - Export the current notification settings for the rater instances of the Core Server system by using the [Setup Tool user interface](#):

```
setup notificationpolicy export -login=<LGN> -password=<PWD>
<myraternotifpolicy> rater
```
 - Edit and change the exported file
 - Save this file
 - Import the changed file:

```
setup notificationpolicy import -login=<LGN> -password=<PWD>
<myraternotifpolicy> rater
```
- Change the configuration for the bulkloader instances of the Core Server system
 - Export the current settings for the Bulkloader instances of the Core Server system; Use Setup Tool and the command:

```
setup notificationpolicy bulkloader export -login=<LGN> -
password=<PWD> <mybulkloaderpolicy>
```
 - Edit and change the exported file
 - Save this file
 - Import the changed file:

```
setup notificationpolicy bulkloader import -login=<LGN> -
password=<PWD> <mybulkloaderpolicy>
```
 - Export the current notification settings for the bulkloader instances of the Core Server system; Use Setup Tool and the command:

```
setup notificationpolicy export -login=<LGN> -password=<PWD>
<mybulkloadernotifpolicy> bulkloader
```
 - Edit and change the exported file
 - Save this file
 - Import back the changed file:

```
setup notificationpolicy import -login=<LGN> -password=<PWD>
<mybulkloadernotifpolicy> bulkloader
```
- Restart the SAP CC system

**CAUTION**

- Do not change the structures of the exported configuration files.
- The values of the Root Path parameters must be consistent:
 - Check that the AMOUNT_ALERT_NOTIF_WRITER_ROOT_PATH parameter corresponds to the same physical directory than the AMOUNT_ALERT_NOTIF_READER_ROOT_PATH parameter.
 - Check that the EXPIRATION_ALERT_NOTIF_WRITER_ROOT_PATH parameter corresponds to the same physical directory than the EXPIRATION_ALERT_NOTIF_READER_ROOT_PATH parameter.

You can also use the Admin+ user interface.

Setting up the Network Notifications (Implementation Project)

Use

In an integrated *SAP Solution* scenario, you can optionally set up SAP Convergent Charging so it publishes ABM notifications and administrative notifications to the network.

Notification Groups	Notifications	Publication via JCo	Publication on Network
Account Balance Management Notifications (ABM)	Amount alert	Mandatory	Optional
	Expiration alert	Mandatory	Optional
	User defined alert (*)	Not possible No user defined alert is sent to the SAP CRM and SAP ERP systems	Optional
Administrative Notifications	All (*)	Not possible No administrative notification is sent to the SAP CRM and SAP ERP systems	Optional

**(*) NOTE**

In SAP CC 5.0, the user defined alert notifications and the administrative notifications are not sent via JCo. SAP CRM and SAP ERP cannot manage this kind of notifications. You can handle these notifications by customizing and developing a handler application based on Java. See the section Publishing Notifications for detail about this implementation task (see page [\[148\]](#)).

Prerequisites

- You have determined a concept for the notification policy management
- The notification function has been implemented in your landscape by your project team and consultants and a Java based application is able to retrieve the notifications published by SAP CC on the network (see page [\[148\]](#))

Default Settings

SAPinst does not activate the publication of notifications on the network.

**CAUTION**

SAPinst uses the template files:

- notification_policy.bulkloader.crm.xml.sk
- notification_policy.bulkloader.xml.sk

They are available in the configuration folder:

/usr/sap/<SID>/CCD<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/

During the patch or the update procedures, the content of the configuration folder is reset with the appropriate files. Do not save permanently your modifications in these template files.

In an integrated scenario with both SAP CRM and SAP ERP, only the SAP CRM will receive the notifications from SAP CC.

Procedure

Export the notification configuration files and insert the `<network/>` element.

**EXAMPLE: CONFIGURATION FILE FOR THE RATER INSTANCES**

You can insert the `<network/>` element after the definition of the filters:

```
<?xml version="1.0" encoding="UTF-8"?>
<notificationPolicy>
  <sequence>
    <nameFilter pattern="AMOUNT_ALERT">
      <argumentFilter name="balanceType" pattern="prepaid">
        <bulkWriter adminParameterPrefixName="AMOUNT_ALERT_NOTIF_WRITER"
rootPath="CC_AMOUNT_ALERT_NOTIF/Instance#@INSTANCE_ID@" channelCount="2"
          timeBasedFileRolloverPolicy="HOURLY"
maxSizeBasedFileRolloverPolicy="1M" deflate="true" autoCommit="false" />
      </argumentFilter>
    </nameFilter>
    <nameFilter pattern="EXPIRATION_ALERT">
      <bulkWriter adminParameterPrefixName="EXPIRATION_ALERT_NOTIF_WRITER"
rootPath="CC_EXPIRATION_ALERT_NOTIF/Instance#@INSTANCE_ID@" channelCount="2"
          timeBasedFileRolloverPolicy="HOURLY" maxSizeBasedFileRolloverPolicy="1M"
deflate="true" autoCommit="false" />
    </nameFilter>
    <network />
  </sequence>
</notificationPolicy>
```



EXAMPLE: CONFIGURATION FILE FOR THE BULKLOADER INSTANCES

You can insert the **<network/>** element in the definition of the filter:

```
<?xml version="1.0" encoding="UTF-8"?>
<notificationPolicy>
  <nameFilter pattern="^AMOUNT_ALERT$|^EXPIRATION_ALERT$">
    <JCo destination="crm" function="CRM_ISX_PPACC_ALERT_HANDLER">
      <bulkWriter adminParameterPrefixName="NOTIF_WRITER"
rootPath="CC_NOTIF_ERR/Instance#@INSTANCE_ID@" channelCount="2"
        timeBasedFileRolloverPolicy="HOURLY" maxSizeBasedFileRolloverPolicy="1M"
deflate="false" autoCommit="true" />
    </JCo>
    <network />
  </nameFilter>
</notificationPolicy>
```

Business Customizing

This section details the data or system customizations that are relevant for the integrated scenarios with SAP CRM, SAP Convergent Invoicing, and SAP ERP/FI-CA components of SAP Business Suite.



NOTE

You have to customize some data according to the stage of the implementation project: Consult first the list of activities recommended on page [64].

Rerating Function with SAP CI (Consumption Item Storage in SAP CI)

If you install SAP CC to be integrated with SAP CI and the storage of consumption items in SAP Convergent Invoicing, SAP CI manages the rerating function (enabled by default). In this case, the installation configures the system landscape automatically.

For more information, refer to the [SAP CC Installation Guide documentation](#), page [21].

Otherwise, if your system landscape is not already integrated with SAP CI, and if you decide to integrate SAP CC with SAP CI, you must migrate your platform to move from a system landscape where SAP CC rates or rerates chargeable items to a landscape where SAP CC rates chargeable items and SAP CI rates and rerates high volumes of chargeable items.

Note that in both landscapes, BART Server is still involved in the batch charging of chargeable items.

For more information, refer to the [SAP CC Transition Guide \(Offline Charging in SAP CI\) Guide documentation](#), page [21].

Determining the Retention Period for Rerating in SAP CC

Use

In offline environment, the SAP CC system stores the transactional data that results from the charging and refilling operations processed by the system. This data is stored in the back-end database system and enables the SAP CC system to charge service consumption again (recharging operation) in case of billing errors. By default the retention period is set to 40 days (1 month and 10 days). For business, legal, or technical reason you may need to change this function. You can extend this period up to 70 days.

**CAUTION**

Check that the retention period for rerating is lower than or equal to the retention period used for expired allowances.

Changing the Retention Period for Rerating

Use

You can extend this period up to 70 days.

**CAUTION**

Do not change the retention period for a production system. It must be performed at installation time.

Prerequisites

- There is no provider contract in the SAP CC system
- You have determined the rerating retention period required for your business

Procedure

- Launch the [Admin+ user interface](#) and log on
- Change the COUNTER_SNAPSHOT_COUNT system parameter according to the required retention period
- Restart the SAP CC Core Server system

Setting up the SAP Currency

Use

SAP CC 5.0 is able to manage SAP currencies managed by SAP ERP/FI-CA for the following functions:

- Pricing Implementation: the master data can use SAP Currency in all the decision trees

- Charging: at runtime, the system performs the calculations according to the SAP currencies
- Refilling: at runtime, the system performs the calculations according to the SAP currencies

You must manually maintain the SAP currencies known by SAP Convergent Charging by synchronizing the list with the SAP ERP/FI-CA system. If you need another SAP currency, you must create it in SAP ERP first.

RECOMMENDATION

We recommend creating the secondary currency that relates to the precision of the rating calculations by SAP Convergent Charging: By default, you should create **EUR6**.

NOTES

- You can manage the currencies in *Customizing for SAP NetWeaver* under: **General Settings** → **Currencies** .
- For more details about the process to generate billable items, consult the *SAP CC Application Help*.
- If the rating precision of SAP Convergent Charging differs from 6, you should create the appropriate secondary currencies. For example: **EUR4**.

Default Settings

At the first successfully launch, the SAP CC Core Server system retrieves business data (SAP currencies) from the SAP ERP/FI-CA system and stores this data in the SAP CC Core Database.

Prerequisites

- Your integrated scenario includes the SAP ERP/FI-CA component of SAP Business Suite
- The SAP currencies are up-to-date in the SAP ERP system

Procedure

- Create **EUR6** in SAP NetWeaver
- Launch the SAP CC [Core Tool](#) user interface and log on
- Re-synchronize the SAP currencies: **SAP CC** → **Core Tool** → **Tools** → **Currencies** → **Synchronizing currencies** 

Result

The SAP currencies known by SAP Convergent Charging are up-to-date and stored in the Core Database. All the relevant instances of the Core Server system are updated in a short time.

Implementing the Spending Status Monitoring in SAP BRIM

Use

SAP CC 5.0 can manage monitoring plans in the pricing catalog of a service provider. The current versions of SAP CRM cannot directly manage monitoring plans when modeling commercial products. You must set the `WS_MONITORING_PLAN_RETURNED_AS_CHARGE_PLAN` parameter to `true`.

Refer to the *Customizing* activity about the spending status monitoring feature in chapter 3.

Default Settings

The default parameter value is `false`.

Procedure

- Launch the [Admin+ user interface](#)
- Change the `WS_MONITORING_PLAN_RETURNED_AS_CHARGE_PLAN` system parameter
- Restart the SAP CC system

Result

You can configure and release one or more monitoring plans in master data stored in SAP CC 5.0. The must be visible in SAP CRM.

Master Data Basic Settings

This section details specific settings relevant for the configuration of the master data for the service provider. This master data is stored in one or more pricing catalogs.

Setting up the Master Data of the Service Provider

Use

In this integrated end-to-end scenario with the SAP CRM and the SAP ERP/FI-CA components of the SAP Business Suite, the pricing in SAP CC includes some dedicated tasks.

Prerequisites

Before creating Master Data, the following elements are mandatory:

- The 3 systems (SAP CRM, SAP CC, and SAP ERP) from the SAP Business Suite are up and running and configured for this integrated scenario.
- SAP users with relevant roles are created for setting up the technical catalog for service providers.
- Relevant master data is created in the SAP CRM and in the SAP ERP/FI-CA systems.
 - Create and generate a BIT-class.
 - Create all data (properties like sub process and billing process).

Procedure

In SAP CC Core Tool:

Configuration Tasks	Configuration Recommendation
Determine the content and the format of the <i>Chargeable Items</i> that will be sent to SAP CC for the usage of a marketable service by an end customer. You can have different categories if you have several services (voice, SMS, MMS, internet) or a unique convergent format.	Preparation

Configuration Tasks	Configuration Recommendation
Model the <i>Chargeable Item Classes</i> that should be configured in SAP CC: ■ What information must be present in the incoming charged items ■ What properties must be used by the rating and charging policy ■ What information must be expected by an external billing system	Preparation
Determine the content and the format of the <i>Refill Items</i> that will be sent to SAP CC for the refill services. Some information elements must be transmitted to the billing functions (SAP ERP/FI-CA).	Preparation
Model the <i>Refill Item Classes</i> that should be configured in SAP CC	Preparation
Identify the key information elements for the pricing, charging, and refilling policies: ■ Allowances (refillable units) ■ Shared counters in the future contracts ■ Parameters to be set in the contracts	Preparation
Model the global pricing policy with charges and charge plans, refill logic and refill plans: ■ Rating and charging policy ■ Refilling policy (how to credit units or amounts, how to use these free units)	Preparation
Model the necessary counters that should be visible in SAP CRM: ■ For the management of refillable units ■ For other purpose These counters must be declared in the charge plans and in the refill plans. If you share a counter from a parent contract, you need a charge plan for the parent contract and another charge plan for the linked contracts.	Preparation
Check that the necessary <i>Billable Item Classes</i> are available in the SAP ERP/FI-CA system	Preparation

Configuration Tasks	Configuration Recommendation
Check that the <i>Refillable Units</i> and the <i>Refill Packages</i> are defined in the Billable Item Classes are available in the SAP ERP/FI-CA system <i>In the ERP system view the refillable units in Customizing for Contract Accounts Receivable and Payable under Prepaid Processing -> Refills -> Define Refillable Units.</i> <i>View the refill packages in the ERP system in Customizing for Contract Accounts Receivable and Payable under Prepaid Processing -> Refills -> Define Refill Packages.</i>	Preparation
Determine the output data details that should be generated by SAP CC in billable items after the rating and charging functions	Preparation
Determine the output data details that should be generated by SAP CC in billable items after the refilling function	Design
Create a catalog for the service provider. The SAP CC user used for the communications via the Web Services with SAP CRM is uniquely restricted to this catalog.	Base Configuration
Import a specific mapping table class named <i>Price Table</i>	Base Configuration <i>Data Settings for Price Management with SAP CRM</i>
Create and set up the necessary chargeable item classes <i>Create first a chargeable item class</i>	Base Configuration
Create and set up the billable item mapping (each field) with an associated charged item class	Base Configuration
Check and set up these charged item classes (each field)	Base Configuration
Create and set up a first version of the necessary reusable charges that will be added and customized in charge plans visible in SAP CRM: ■ Set up the persistent counters ■ Set up the parameters ■ Set up the price plan ■ Set up the charging plan	Master Data Raw Configuration <i>Data Settings for Recurring Fee and Recurring Refill Management</i> <i>Data Settings for Price Management with SAP CRM</i> <i>Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA</i>
Create the appropriate counter name dictionary (Admin role) that includes the names of all the counters that are visible from the SAP CRM system	Master Data Raw Configuration
Model a first version of the necessary charge plans	Design

Configuration Tasks	Configuration Recommendation
Create and set up each charge plan	Master Data Raw Configuration <i>Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA</i>
Add and customize charges in each charge plan	Master Data Raw Configuration <i>Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA</i> <i>Data Settings for Recurring Fee and Recurring Refill Management</i>
Set up the charged item generation in the customized charges of the charge plans You can output a lot of elements from the rating context: properties, counters, parameters...	Master Data Raw Configuration
Create and set up the billable item mapping (each field) with an associated charged item class	Base Configuration
Check and set up the refill record class (each field)	Master Data Raw Configuration
Create a specific translation table that includes the configuration of the refill packages as defined in the SAP ERP system	Base Configuration
Create and set up a first version of the necessary reusable refill logic that will be added and customized in a refill plans visible in SAP CRM: ■ Set up the persistent counters ■ Set up the parameters ■ Set up the logic for the refill and reversal of refill management	Master Data Raw Configuration <i>Data Settings for Recurring Fee and Recurring Refill Management</i> <i>Data Settings for Price Management with SAP CRM</i> <i>Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA</i>
Model a first version of the necessary refill plan	Design
Create and set up the refill plan	Master Data Raw Configuration
Add and customize refill logic in the refill plan	Master Data Raw Configuration
Set up the refill record generation in the refill logic customized in a refill plan You can output a lot of elements from the rating context: properties, counters, parameters...	Master Data Raw Configuration

Configuration Tasks	Configuration Recommendation
Test your charges, refill logic, charge plans and refill plans Update these objects	Configuration Test
Transport your objects in the test landscape that include the SAP CRM and SAP ERP components interfaced with SAP CC	Configuration Test
Release the charge plans and the refill plans	Finalization

Data Settings for Allowance Management with SAP CRM

When SAP CRM is integrated with SAP CC, SAP CRM creates allowances in SAP CC on demand or automatically when the provider contract is activated or changed.

In order for SAP CRM to create allowances in SAP CC, you must configure SAP CC as described in the Integration Guide for the Offer-to-Cash End-to-End Process Based on SAP Billing and Revenue Innovation Management (BRIM). Refer to this guide for more information: SAP Help Portal at: <http://help.sap.com>.



NOTE

SAP Convergent Charging manages allowance data in provider contracts. Allowances are available in the *SAP BRIM solution* within SAP Business Suite 7i2016 as of the following combination of software versions and business functions in SAP systems:

- SAP CRM 7.0 EhP4, SP 1
- SAP ERP 6.0 EhP8, SP 1

The following *Business Function* must be activated in your SAP CRM system:

- CRM_PROVORDERINT_3_4 - Integration of SAP CC and SAP CI with the Provider Order for

Depending on your SAP industry, the following *Business Function* must be activated in your SAP ERP system:

- For Contract Accounts Receivables and Payables: FICAX_CI_5B - Contract Accounts AR/AP, 05B
- For SAP Utilities: ISU_CA_3B - Utilities, Contract Accounts A/R and A/P 3b
- For SAP Telecommunications: TEL_CA_5B - Contract Accounts Receivable and Payable, ERP 6.07 SP4

Data Settings for Recurring Fee and Recurring Refill Management

Use

In this integrated end-to-end scenario, you use SAP Convergent Charging to model some automated and periodic operations for recurring fees and recurring refills.

When designing the following master data for the service provider, you have to perform some specifics settings:

Topic	Master Data	Specific Data Settings	Condition
Recurring Fee	Charge	Price management If you model some recurring fees, you have to configure the charges in SAP CC so they use the price conditions defined in SAP CRM.	Mandatory
		Billing cycle correlation management If you want to take into account the billing cycle information (defined in SAP ERP/FI-CA) in the configuration of your recurring fees and recurring refills, you can use a dedicated parameter named SAP_BILL_CYCLE_DATE. It is automatically added in the charge plans and in the refill plans in SAP CC and cannot be modified by the SAP CC user when configuring these plans.  EXAMPLE You can synchronize the recurring fees with the billing cycles for each end customer. SAP CC will trigger the fees a couple of days before the coming billing cycle date.	Optional
Recurring Refill	Refill Logic	Billing cycle correlation management	Optional



NOTE

When adding recurring rates in a price plan of a charge, you can also set up the charging function by adding a charging refill component in the charging plan of this charge. For more information about Recurring Charging, see in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Charging components → [Recurring Charging](#).

Activities

The configuration of the master data for the service provider includes the following activities detailed in the next sections:

- [Data Settings for Price Management with SAP CRM](#) [page 353]
- [Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA](#) [page 354]
- [Data Settings for One-Off Fees in SAP CC](#) [page 355]

Data Settings for Price Management with SAP CRM

Use

In this integrated end-to-end scenario, you use SAP Convergent Charging to model some periodic fees. These fees are based on prices and price conditions that are managed by SAP CRM at the product level.

To model recurring fees in your charges and charge plans, you have to use a particular mapping table class that is named *Price Table*. SAP CRM is responsible for converting price conditions into a mapping table for each commercial product and for replicating and maintaining these business data tables in SAP CC. SAP CC stores these mapping tables in the pricing catalog of the service provider.



NOTES

- For more information about Prices for SAP Customer Relationship Management (SAP CRM), see SAP Help Portal at: ► <http://help.sap.com> → *SAP Business Suite* → *SAP Customer Relationship Management* → *Application Help* → *Master Data* → *Products* → *Functions* → *Prices* ◀.
- You can create and use other mapping table classes and mapping tables than the price table, but they will not be managed by SAP CRM.
- For more information about data distribution mechanism in this integrated scenario, see the SAP CRM Library in SAP Help Portal at: ► <http://help.sap.com> → *SAP Business Suite* → *Customer Relationship Management* → *SAP EHP 2 for SAP CRM 7.0* → *Application Help* → *English* → *SAP CRM for Industries* → *Telecommunications* → *Functions for the Telecommunications Industry* → *Products* → *Price Conditions for Distribution to SAP CC* ◀.

Prerequisites

You have installed the SAP CRM and SAP ERP/FI-CA components of SAP Business Suite

Activities

With the Core Tool user interface, you will:

- Set up one pricing catalog of the service provider with a mapping table class for the management of price conditions in SAP Convergent Charging
- Set up the charges that include recurring rates in their price plan so that they use this particular mapping table class
- Set up the charge plans with two particular parameters. The SAP CRM system will redefine these parameters when creating provider contracts with contract items that activate these charge plans. The values will be the key of the price and the ID of the mapping table to be used for the commercial product corresponding to the provider contract.



NOTES

- For more information about this configuration of master data for the service provider in SAP Convergent Charging, see the *SAP CC 5.0 Library (Application Help)* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Charges → Using SAP CRM Prices in Recurring Charges ◀.
- For more recommendations about price key determination in SAP CRM, see the *Cross Catalog Mapping* section from the *Configuration Guide for SAP CRM 7.0 Enhancement Package 2* available for the *SAP for Telecommunications* business scenario *Sales and Order Management*: ► *Basic Settings for SAP for Telecommunications Business Scenarios* → *Recommendations for Setting Up Integration with SAP Convergent Charging* → *Cross Catalog Mapping* → *Price Key Determination* ◀.

Data Settings for Synchronizations with Bill Cycles in SAP ERP/FI-CA

Use

To be able to manage the bill cycles in SAP ERP/FI-CA, you can have to correlate or synchronize all the recurring fees and recurring refills configured in SAP Convergent Charging. These configurations are part of the master data for the service provider and they are applicable for the end customers of this service provider.

You have to configure specifically the following objects in SAP CC:

- Charges and charge plans
- Refill logic and refill plans

Prerequisites

You have implemented an integrated *SAP Solution* scenario with SAP ERP/FI-CA component of SAP Business Suite.

**NOTES**

- For more information about integration with SAP ERP/FI-CA, see the *SAP Library* for SAP ERP Enhancement Packages. Consult the SAP Help Portal at: ► <http://help.sap.com> → SAP ERP → SAP ERP Central Component → SAP ERP Enhancement Packages → ERP Central Component Enhancement Package 5 → Industries in SAP ERP → SAP Telecommunications → Billing-Account-Based Billing → Billing → Processes and Functions of Billing → [Billing Cycle](#) ◀.
- For more information about data replication mechanisms in this integrated scenario, see the *SAP CRM Library* in SAP Help Portal at: ► <http://help.sap.com> → SAP Business Suite → Customer Relationship Management → SAP EHP 1 for SAP CRM 7.0 → Application Help → English → SAP CRM for Industries → Telecommunications → Functions for the Telecommunications Industry → Order and Contract Processing in the Interaction Center → Billing Cycle and Determination Rules ◀.

Activities

With the Core Tool user interface, you will:

- Configure your reusable charges
 - When creating a charge with a recurring rate, add a parameter (date format) in the price plan
 - Set up the recurring rates so they use this parameter as Reference Date for triggering the fees
- Configure your charge plans
 - Add these charges in your charge plans
 - Link their parameters with a parameter declared by default in the charge plan (see the SAP_BILL_CYCLE_DATE parameter in the primary help of the Core Tool user interface)
- The same activities are relevant with the refill logic and a refill plan

**NOTE**

For more information about this configuration of master data for the service provider in SAP Convergent Charging, see the *SAP CC product documentation* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Charges → [Synchronizing recurring fees with SAP CI billing cycles](#) ◀.

Data Settings for One-Off Fees in SAP CC

Use

The one-off charges must be configured in SAP CRM. There are two exceptions for which you can insert one-shot rates in your price plans in SAP Convergent Charging:

- Technical reason:
 - You need to reset some counters declared in the charges
- Pricing modeling reason:
 - You need to base the price calculation on counters that are updated after consumption of the service (usage) or during periodical updates (recurring)



NOTE

For more information about one-off charges created in SAP CRM and distributed to SAP ERP, see in SAP Solution Manager or in SAP Help Portal at: <http://help.sap.com> → *SAP Business Suite: Documentation for SAP Solution Manager Content* → *ST ICO 150: Configuration* → *Scenario and Process Configuration* → *SAP for Telecommunications: Configuration Documentation* → [One-Off Charges](#) ↩.

Setting up a Refill Item Class

Use

In this integrated end-to-end scenario with SAP ERP and SAP ERP/FI-CA components of SAP Business Suite, SAP CC receives refill items from the SAP ERP systems, processes this data and sends resulting billable items back to SAP ERP/FI-CA in the appropriate ERP system.

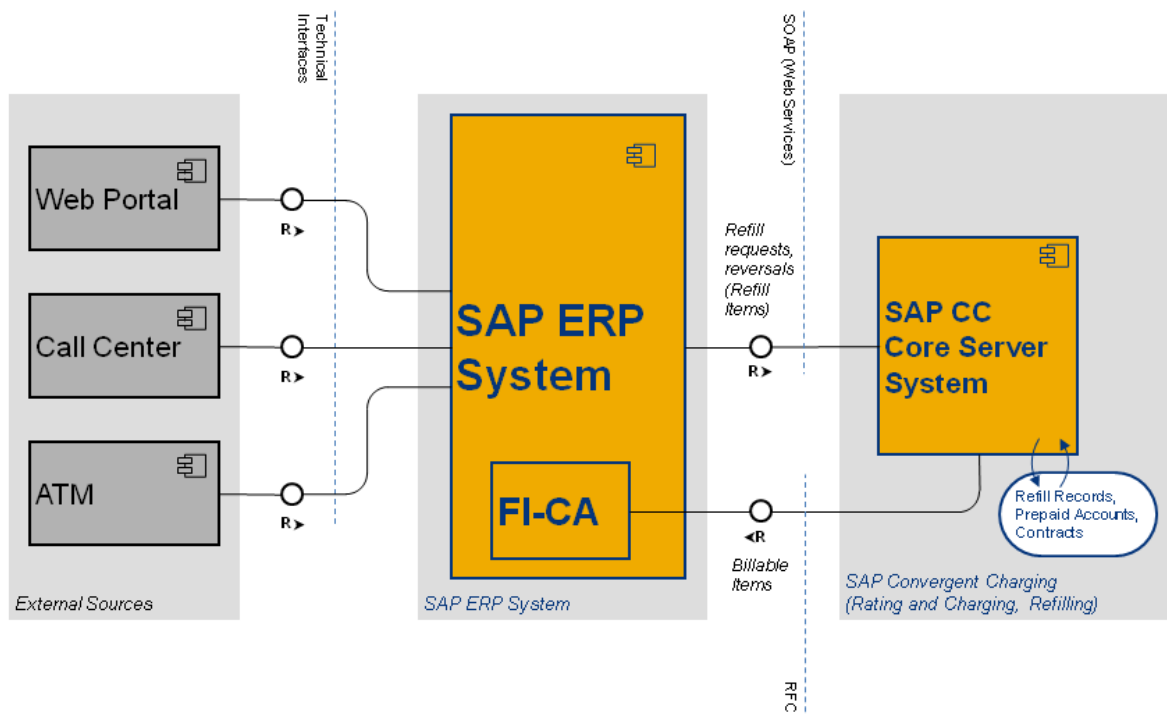
Refills can either be credits posted to a prepaid account or free units, as for example free minutes. Refill packages can define up to three types of refillable units (for example, free minutes, free SMS, and free amounts of data for download) as well as an amount for the prepaid account.

You have to configure the refill item classes in SAP Convergent Charging to define the input properties that you can use in the refill logic or that must be transmitted to SAP ERP/FI-CA as billing system.



RECOMMENDATION

A single refill item class can be configured in SAP CC for the management of refills and reversals of refill.



Refill management: data flow

An SAP ERP system triggers a refill and reverses a refill by sending a request to the SAP CC Core Server system. The typical messages are:

Incoming Message	Description	Comment
Refill Request	An SAP ERP system triggers a refill by defining the amount to credit to the prepaid account. NOTES ■ This original amount can be modified by SAP CC when performing the refilling process ■ No refillable unit can be set up	You have to configure the refill logic and a refill plan that will be used at runtime to define the behavior of SAP CC.

Incoming Message	Description	Comment
Refill Request for Refill Based on Packages	The SAP ERP system triggers a refill by referring to a refill package that determines the refillable units and the refill amount to credit to the prepaid account.  NOTES ■ This original refill amount can be modified by SAP CC when performing the refilling process ■ The original free unit numbers can be modified by SAP CC when performing the refilling process	You have to configure the refill logic and a refill plan that will be used at runtime to define the behavior of SAP CC.
Reversal of Refill Request	The SAP ERP system reverses a refill already processed.	The same kind of message is used to reverse a classical refill or a refill based on a package. The reversal message includes the amount and the refillable units refilled by SAP CC previously. You have to configure the refill logic that will be used at runtime to define the behavior of SAP CC.

For more information about the origins of the refill requests, see the *Integration Guide for the Order-to-Cash End-to-End Process*.

These messages include refill items that have a common structure detailed in the table:

Data Property in Incoming Refill Items	Description	Format	Scope	Availability in Refill Request	Availability in Refill Reversal Request
Refill Date	Date of the refill request	Date/Time	Refill management	Mandatory	Yes

Data Property in Incoming Refill Items	Description	Format	Scope	Availability in Refill Request	Availability in Refill Reversal Request
Refill Amount	<i>Refill Amount</i>	Values: <i>0: refill based on refill packages</i> <i>Positive: amount to credit</i> <i>Negative: reversal</i>	Refill management: <i>Used by the refill logic in SAP CC to compute the final refill amount that is credited to the balance of the prepaid account</i> Reversal management: <i>Used by the refill logic in SAP CC to update properly the balance of the prepaid account</i>	Mandatory <i>Can differ from the final amount credited after the execution of the refill process by SAP CC</i>	Mandatory <i>The refill amount finally credited to the prepaid account</i>
Refill Currency	<i>Refill Currency</i>	String	<i>Used by SAP CC to check that the refill currency is the same than the currency of the prepaid account</i>	Mandatory	Mandatory
PPRSN	<i>Reason for Balance Change on Prepaid Account</i>	String	Refill management Reversal management Bonus management for refills: <i>You can use the input value to determine the appropriate bonus policy</i> <i>Ex: 01, 05 or 11</i>	Mandatory	Mandatory
CRDRS	<i>Reason for Free Increase of Prepaid Balance</i>	String		Mandatory	Mandatory
TUSE1	<i>Refillable Unit (Component 1)</i>	String	Refill package management only	Conditional	No
TUSE2	<i>Refillable Unit (Component 2)</i>	String	Refill package management only	Conditional	No
TUSE3	<i>Refillable Unit (Component 3)</i>	String	Refill package management only	Conditional	No

Data Property in Incoming Refill Items	Description	Format	Scope	Availability in Refill Request	Availability in Refill Reversal Request
CNTU1	<i>Number Executed (Component 1)</i>	Number	Refill package management only	Conditional	No
CNTU2	<i>Number Executed (Component 2)</i>	Number	Refill package management only	Conditional	No
CNTU3	<i>Number Executed (Component 3)</i>	Number	Refill package management only	Conditional	No
REFPK (*)	<i>Reference of the Package</i>	String	Refill package management only	Conditional	No
RFPCN (*)	<i>Number of Refill Packages</i>	String	Refill package management only	Conditional	No
PPDOC (*)	<i>Posting Document for Prepaid Account in FI-CA</i>	String			
PPNOT (*)		String			
TUMTH (*)	<i>Refill Method</i>	String			
TULOC (*)	<i>Point of Sale for Prepaid Credit</i>	String			
BKVID (*)	<i>Bank Details ID</i>	String			
CRDID (*)	<i>Payment Card ID</i>	String			
CGUID (*)	<i>Key for Payment Card Supplement</i>	String			
XRVRF (*)	<i>Decrease of Prepaid Credit or Units</i>	String			
PREPR (*)	<i>Reference Number Used for the Refill</i>	String			

For more general information about a refill item class, see [Setting up Refill Item Classes](#) on page [225].

For more information about these messages, see the SAP CC product documentation in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Integration & Development Information → SOAP → Refill Management → [Refill a Prepaid Account](#) ↗.

**NOTE (*)**

Some of these incoming properties must be transmitted to SAP ERP/FI-CA in the output data (billable items):

- BKVID
- PPNOT
- CRDID
- CGUID
- PPDOC
- PREPR
- REFPK
- RFPCN
- TULOC
- TUMTH
- XRVRF

You must set up these configurations when creating a refill plan:

- Define the *Refill Record Mapping* of the refill logic customized in the refill plan. This mapping includes the configuration of the generation of temporary refill records that are converted into billable items and sent to SAP ERP / FI-CA.

Prerequisites

- You have checked that the SAP ERP system sends refill items compliant with this structure. No customized property is sent.
- If customized properties are sent, you have determined the scope of these incoming data, how SAP CC should manage this data and how this data are expected by SAP ERP / FI-CA.

Procedure

To create and set up the relevant refill item class:

- Study the input data (refill items) from the SAP ERP system
- Model the refill item class
- Create the refill item class with the SAP CC Core Tool user interface
 - Add the following properties:

Property in the Refill Item Class	Description	Format
Refill Date	Date of the refill request	Date/ Time
Refill Amount	Refill Amount	Number
Refill Currency	Refill Currency	String
PPRSN	Reason for Balance Change on Prepaid Account	String
CRDRS	Reason for Free Increase of Prepaid Balance	String

Property in the Refill Item Class	Description	Format
TUSE1	Refillable Unit (Component 1)	String
TUSE2	Refillable Unit (Component 2)	String
TUSE3	Refillable Unit (Component 3)	String
CNTU1	Number Executed (Component 1)	Number
CNTU2	Number Executed (Component 2)	Number
CNTU3	Number Executed (Component 3)	Number
REFPK	Reference of the Package	String
RFPCN	Number of Refill Packages	String
PPDOC	Posting Document for Prepaid Account in FI-CA	String
PPNOT		String
TUMTH	Refill Method	String
TULOC	Point of Sale for Prepaid Credit	String
BKVID	Bank Details ID	String
CRDID	Payment Card ID	String
CGUID	Key for Payment Card Supplement	String
XRVRF	Decrease of Prepaid Credit or Units	String
PREPR	Reference Number Used for the Refill	String

Result

You can use this class to create the refill logic.



NOTE

Consult the customizing of SAP ERP to determine if other fields are present in the refill items sent to SAP CC to trigger the refills.

Setting up a Refill Record Class and the Associated Billable Item Mapping

Use

In this integrated end-to-end scenario, SAP CC produces temporary refill records as result of the refilling process. It converts this data onto billable items and sends them to SAP ERP/FI-CA.

You have to configure the generation of these refill records and billable items:

- The first step is to create the billable item mapping that defines the conversion, and to create the associated refill record class.
- The second step is to finalize the configuration in the refill plans when adding the refill logic: In the *Refill Record Mapping* you will have to set up the sources of the generated properties:
 - Default property calculated by SAP CC
 - Particular property computed during the execution of the refill logic

RECOMMENDATION

SAP recommends using the automated creation of refill record classes when creating the billable item mapping in the SAP CC Core Tool user interface.

NOTE

During the implementation project, you can customize this automated creation of a refill record class. Consult the implementation activity with your project team about [Setting up the Default Field Mapping Between CIT and BIT \(Implementation Project\)](#), see page [326].

For a prepaid scenario, the following properties are expected by SAP ERP/FI-CA:

Property	Source	Value in Refill Record Class	Refill Record Mapping	Must be Set by the Refill Logic?
SRCTATYPE	Constant	'CCCIT'	n/a	No
SRCTAID	Default Property Calculated by SAP CC	Set ID of Refill Records	n/a	No
SUBPROCESS	List from CI	'TPRF'	n/a	No
BITTYPE	List from CI	'RFL_'	n/a	No
PREPAID	Default Property Calculated by SAP CC	Account Type is Prepaid	n/a	No
PPREFILL	Default Property Calculated by SAP CC	Charged Transaction is a Prepaid Refill	n/a	No
VKONT	Default Property Calculated by SAP CC	External (Postpaid) Account ID in SAP CC	n/a	No

Property	Source	Value in Refill Record Class	Refill Record Mapping	Must be Set by the Refill Logic?
GPART	Default Property Calculated by SAP CC	Subscriber Account ID in SAP CC	n/a	No
VTREF	Default Property Calculated by SAP CC	Provider Contract ID in SAP CC	n/a	No
VTPOS		-Unset-		
SUBAP	Default Property Calculated by SAP CC	Contract Type	n/a	No
PPACC	Default Property Calculated by SAP CC	Prepaid Account ID in SAP CC	n/a	No
BILL_BASEDATE		-Unset-		
BILL_FIRST		-Unset-		
BITDATE	Default Property Calculated by SAP CC	x	n/a	No
BITTIME	Default Property Calculated by SAP CC	x	n/a	No
BITDATE_FROM	Default Property Calculated by SAP CC	Start of Refill Recurring Period	n/a	No
BITDATE_TO	Default Property Calculated by SAP CC	Stop of Refill Recurring Period	n/a	No
BIT_AMOUNT	CC Calculated Property and Modified by the Refill Logic	Base Amount  This amount is the final refill amount computed by the execution of the relevant refill logic.	n/a	YES  To be set up in the refill logic
BIT_CURR	Default Property Calculated by SAP CC	Currency of the Refill	n/a	No
TAX_INCLUDED	Default Property Calculated by SAP CC	Tax is Included in Total Amount	n/a	No
TAX_DET_TYPE	Constant	'01'	n/a	No
EXT_TAX_DATE		-Unset-		No

Property	Source	Value in Refill Record Class	Refill Record Mapping	Must be Set by the Refill Logic?
EXT_TAX_ID	Default Property Calculated by SAP CC	VAT Transaction Rate Code	n/a	No
BITREF32		-Unset-		No
PY_GROUP		-Unset-		No
BITTEXT50	Property from Input Data (Refill Item) <i>Different input property name and output property name</i>	-Unset- <i>To be set in the refill record mapping</i>	PPNOT	No
BKVID	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	BKVID	No
CNTU1 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU1</i>	YES  To be set up in the refill logic
CNTU1_REQ (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU1_REQ</i>	YES
CNTU2 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU2</i>	YES
CNTU2_REQ (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU2_REQ</i>	YES
CNTU3 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU3</i>	YES
CNTU3_REQ (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CNTU3_REQ</i>	YES

Property	Source	Value in Refill Record Class	Refill Record Mapping	Must be Set by the Refill Logic?
CRDID	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	CRDID	No
CRDRS (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_CRDRS</i>	YES  To be set up in the refill logic
PCARD_GUID32	Property from Input Data (Refill Item) <i>Different input property name and output property name</i>	-Unset- <i>To be set in the refill record mapping</i>	CGUID	No
PPAMOUNT_REQ (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_PPAMOUNT_REQ</i>	YES  To be set up in the refill logic
PPDOC	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	PPDOC	No
PPRSN (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_PPRS</i>	YES
PREPR	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	PREPR	No
REFPK	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	REFPK	No
RFPCN	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	RFPCN	No

Property	Source	Value in Refill Record Class	Refill Record Mapping	Must be Set by the Refill Logic?
TULOC	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	TULOC	No
TUMTH	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	TUMTH	No
TUSE1 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_TUSE1</i>	YES
TUSE3 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_TUSE2</i>	YES
TUSE3 (*)	Particular Property Computed During the Execution of the Refill Logic	-Unset-	<i>computed_TUSE3</i>	YES
XRVRF	Property from Input Data (Refill Item)	-Unset- <i>To be set in the refill record mapping</i>	XRVRF	No

**NOTE (*)**

Some properties of the refill record class are unset and cannot be set up to properties declared in the refill item class. You must design the refill logic to generate these properties.

For more information about a *Billable Item Mapping*, see the *SAP CC product documentation* in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Billable Item Mapping → Working with the Billable Item Mapping → [Creating with the Billable Item Mapping](#) ◀.

Prerequisites

- The SAP CC Core Server system is configured for this integrated scenario

Procedure

By default, SAP CC creates the billable item mapping relevant for you with the associated refill record class.

- Check the properties declared in the billable item mapping. These properties will be generated in the billable items:
 - Check the properties that are filled in with a constant value: You can modify the value
 - Check the properties that are filled in with a property from the refilling context in SAP CC: It is not necessary to change these properties
 - Check the properties that remain unset: You will have to define the generation method when setting up the refill plan that includes the refill logic referencing this refill record class



EXAMPLE

- The billable item mapping defines the following properties that will be generated by SAP CC in the billable items:
 - SRCTATYPE 'CCCIT'
 - SRCTAID Set ID of Refill Records/Charged Items
 - SUBPROCESS 'TPRF'
 - BITTYPE 'RFL_'
 - PREPAID Account Type is Prepaid
 - PPREFILL Charged Transaction is a Prepaid Refill
 - VKONT External (Postpaid) Account ID in SAP CC
 - GPART Subscriber Account ID in SAP CC
 - VTREF Provider Contract ID in SAP CC
 - SUBAP Contract Type
 - PPACC Prepaid Account ID in SAP CC
 - BITDATE Event Date
 - BITTIME Event Date
 - BITDATE_FROM Start of Refill Recurring Period
 - BITDATE_TO Stop of Refill Recurring Period
 - BIT_AMOUNT Base Amount (modified by the refill logic)
 - BIT_CURR Currency of the Refill
 - TAX_INCLUDED Tax is Included in Total Amount
 - TAX_DET_TYPE '01'
 - EXT_TAX_ID VAT Transaction Rate Code
- The following properties will be generated by SAP CC in the billable items but are not set in this billable item mapping and must be set in a refill plan when customizing the refill logic:
 - CNTU1, EXT_TAX_DATE, VTPOS, BILL_BASEDATE, BILL_FIRST

Result

The billable item mapping and a refill record class are available. You can set up the refill logic.

**NOTE**

Note that the following properties are not set in the billable item mapping but must be set up when customizing the refill logic in a refill plan:

- CNTUi and CNTUi_REQ
- TUSEi
- CRDRS
- PPAMOUNT_REQ
- PPRSN

We recommend designing the refill logic so it generates some new properties:

- computed_CNTUi and CNTUi_REQ
- computed_TUSEi
- computed_CRDRS
- computed_PPAMOUNT_REQ
- computed_PPRSN

Setting up the Refill Logic

Use

In this integrated end-to-end scenario, you must design the refill logic that will define the behavior of SAP CC for the refills of prepaid accounts.

**RECOMMENDATION**

Create and set up the refill logic with the multicurrency option enabled to simplify the configuration data in SAP CC.

Procedure: Determine the Scope of the Refill Logic

Define the scope of the refill logic you must configure for the service provider as part of the pricing implementation:

- Determine if you need to manage periodic refills
- Determine if you need to manage initial refills
- Determine if you need to manage refill packages as configured in the SAP ERP system
- Determine if you need to manage “bonus” to give an extra credit amount or free units for certain refills

	Refill Package Management	Bonus Management	Refill Reversal Management	Refill Logic Configuration
Request for refill	Yes	Yes	Yes	You must add two <i>Usage Refill</i> components in the refill logic
Automated Periodic Refill (*)	Yes	Yes <i>The refill logic must set the output CRDRS property to the constant 'BONUS'</i>	n/a	You must define some <i>Recurring Refill</i> components in the refill logic
Automated Initial Refill (*)	n/a	Yes <i>The refill logic must set the output CRDRS property to the constant 'INITIAL'</i>	n/a	You must define a <i>One-shot Refill</i> component in the refill logic

**NOTE (*)**

SAP Convergent Charging triggers the recurring refills and the one-shot refills only when it receives a request to refill a prepaid account. The relevant billable items are not generated until the processing of this refill request.

Procedure: Determine the Refillable Units

Determine the refillable units that the refill logic must handle as allowances.

**EXAMPLE**

Free minutes, free SMS, free amounts of data for downloads

Get the list of refillable units declared in the SAP ERP system in *Customizing* for Contract Accounts Receivable and Payable under: ► Prepaid Processing → Refills → Define Refillable Units ◀.

**NOTE**

For each refillable unit you will have to:

- Declare a persistent counter in the refill logic that can be linked to a future counter declared in the refill plan
- Create a counter name in the counter dictionary
- Declare a counter in the refill plan
- Design the logic that will refill these units
- Design the charge logic that will base the price computation with these units

Procedure: Create the Counter Names

Create the necessary counter names with the SAP CC Core Tool user interface.



NOTE

Use these names to declare your counters in a refill plan and in the necessary charge plans.



EXAMPLE

With the SAP CC Core Tool user interface, you can set up the following counter names:

- FREE_SMS
- FREE_MINUTES

You are able to design a refill plan by declaring two counters.

Procedure: Setting up the Translation Table for the Refill Packages

Create and set up a translation table dedicated to the refill management based on refill packages. This table must be maintained synchronously to the definition of the refill packages in the SAP ERP system. This translation table must be used in the refill logic.

- Determine the refill packages defined in the SAP ERP system in *Customizing* for Contract Accounts Receivable and Payable under: ► Prepaid Processing → Refills → Define Refill Packages ◀.
- With the SAP CC Core Tool user interface, create a translation table in the catalog of the service provider
- Set up the table schema:
 - Define a single input column named **REFPK** (the reference of the refill package)
 - Define the output columns: You need a column for each free refillable unit and one output column for the free amount to credit
- Set up the table instance with values declared in the SAP ERP system for the refill packages

For more information about a *Translation Table*, see the *SAP CC product documentation* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration → Power

User Documentation - Core Tool → Translation Tables → Working with Translation Tables → [Setting up a Translation Table](#) ↩.

You must use this translation table in the refill logic by inserting a *Table Operator* component in the logic.

For more information on how to use a translation table in the logic, see the *SAP CC product documentation* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → About Refill Logic Components → Operators → [Translation Table Introducer](#) ↩.



EXAMPLE

With the SAP CC Core Tool user interface, you can set up the following translation table:

- Input Column:
 - REF PK
- Output Columns:
 - FREE_REFILL_AMOUNT
 - FREE_SMS
 - FREE_MINUTES

You are able to set up the following table instance:

RFPK	FREE_REFILL_AMOUNT	FREE_SMS	FREE_MINUTES
RFPACK1	0	100	0
RFPACK2	0	100	200
RFPACK3	10	100	0
RFPACK4	10	100	200
RFPACKJPY1	0	100	0
RFPACKJPY2	0	100	200
RFPACKJPY3	1000	100	0
RFPACKJPY4	1000	100	200

Data Settings for the Expected Properties Generated by the Refill Logic

You have to configure how SAP Convergent Charging fills in the following properties in the billable items:

Property of the Billable Items That are Set by the Refill Logic	Description
TUSE1 TUSE2 TUSE3	Name or ID of the Refillable Unit as defined in the SAP ERP system
CNTU1 CNTU2 CNTU3	Value of the Refillable Unit (Number Executed) <i>For each refillable unit</i>
CNTU1_REQ CNTU2_REQ CNTU3_REQ	Requested Number <i>For each refillable unit</i>
PPAMOUNT_REQ	Requested Change of Credit
CRDRS	Reason for Free Increase of Prepaid Balance
PPRSN	Reason for Balance Change on Prepaid Account
BIT_AMOUNT	Base Amount

RECOMMENDATION

You can set up the refill logic to generate new computed properties that can be used to configure the generation of billable items (and temporary refill records) when the refill logic is customized in a refill plan.

The refill logic must create the following properties:

Property Generated by the Refill Logic	Usage Refill	Reversal	Recurring Refill	One-shot Refill
Refillable Unit ID: <i>computed_TUSE1</i> <i>computed_TUSE2</i> <i>computed_TUSE3</i>	The refill logic must identify the refillable units that have been changed. The identifier is a string compliant with the declaration in the SAP ERP system. <i>Ex.: FREE_MIN</i> Normal refill request: <i>Set by the refill logic only if bonus management</i> Based on refill package: <i>Set by the refill logic from refill package information</i>	<i>Copied by the refill logic from input (TUSEi)</i>		
Refillable Unit Value: <i>computed_CNTU1</i> <i>computed_CNTU2</i> <i>computed_CNTU3</i>	Normal refill request: <i>Set by the refill logic only if bonus management</i> Based on refill package: <i>Set by the refill logic from package information</i> <i>Bonus management applied</i>	Set by the refill logic: <i>Final value of the refill unit(s) debited</i> Format: Negative values  EXAMPLE <i>Copied from input (CNTUi) if corresponding counter threshold is fine</i> <i>You must customize the behavior in case of counter error: current value of the counter is lower than value to debit</i>		
Requested Number: <i>computed_CNTU1_REQ</i> <i>computed_CNTU2_REQ</i> <i>computed_CNTU3_REQ</i>	Normal refill request: <i>n/a</i> Based on refill package: <i>Set by the refill logic from refill package information</i> <i>Bonus management not applied</i>	<i>Copied by the refill logic from input (CNTUi)</i>		

Property Generated by the Refill Logic	Usage Refill	Reversal	Recurring Refill	One-shot Refill
Requested Change of Credit: <i>computed_PPAMOUNT_REQ</i>	Normal refill request: <i>Set by the refill logic: Copied from input (Refill Amount)</i> Based on refill package: <i>Set by the refill logic from refill package information</i> <i>Bonus management not applied</i>	<i>Copied by the refill logic from input (Refill Amount)</i>		
Reason for Free Increase of Prepaid Balance: <i>computed_CRDRS</i>	Normal refill request: <i>Copied by the refill logic from input (CRDRS)</i> <i>Exception: BONUS in case of bonus applied on the refill amount</i> Based on refill package: <i>Copied by the refill logic from input (CRDRS)</i> <i>Exception: BONUS in case of bonus applied on the refill amount</i>	<i>Copied by the refill logic from input (CRDRS)</i>	Set by the refill logic: <i>'BONUS' in case of bonus applied on the refill amount credited</i>	Set by the refill logic: <i>'INITIAL' (initial refill only)</i>
Reason for Balance Change on Prepaid Account <i>computed_PPRSN</i>	Normal refill request: <i>Copied by the refill logic from input (PPRSN)</i> Based on refill package: <i>Copied by the refill logic from input (PPRSN)</i>	<i>Copied by the refill logic from input (PPRSN)</i>	Set by the refill logic: <i>'02'</i>	Set by the refill logic: <i>'16' (initial refill only)</i>
Base Amount	Normal refill request: <i>Set by the refill logic</i> <i>Bonus management applied on the input amount (Refill Amount)</i> Based on refill package: <i>Set by the refill logic from refill package information</i> <i>Bonus management applied</i>	Set by the refill logic: <i>Final value of the prepaid balance debited</i> Format: Negative value  EXAMPLE <i>Copied from input (Refill Amount) if corresponding balance threshold is fine</i> <i>You must customize the behavior in case of failure: balance is lower than value to debit</i>		

You must insert a *Property Introducer* component in the logic to generate new computed properties that can be used to configure the generation of billable items (and temporary refill records) when customizing the refill logic in a refill plan (see the refill record mapping).

For more information on how to create new properties in the refill context, see the *SAP CC product documentation* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → About Refill Logic Components → Operators → [Property Introducer](#) ↩.

Procedure: Set up the Logic

In the SAP CC Core Tool user interface, create the refill logic:

- In the *Definition* tab, declare the refill item class that is used by the refill logic
- In the *Parameters* tab, declare the parameters you want to use in the instructions of the logic
- Declare the persistent counters you want to handle in the logic
 - Declare a counter for each refillable unit you want to manage
- To finalize the configuration of the refill logic, you must perform the relevant procedures according to your preparations:
 - Setting up a Usage Refill for the Management of Refills Triggered by the SAP ERP System
 - Setting up a Usage Refill for the Management of Reversals
 - Setting up a Recurring Refill Triggered Automatically
 - Setting up a One-shot Refill at the Creation of a Contract

Setting up a Usage Refill for the Management of Refills Triggered by the SAP ERP System

Use

You have to insert and set up a *Usage Refill* component in the refill logic to configure the behavior of SAP CC when it receives a refill request triggered by the SAP ERP system.

- You must set up the usage identifier of this usage refill to the dedicated value: `_refill_`
- You must design the refill logic to produce the necessary computed properties listed above
- You can design the refill logic to manage potential bonus (additional refill amount, additional free units)

For more information about the refill logic and the usage refill, see the *SAP CC product documentation* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → Refill Components → [Usage Refill](#) ↩.

Prerequisites

- You have configured the appropriate *Refill Item Class* in SAP CC for this service provider

- You are setting up the refill logic

Procedure

- Insert a *Usage Refill* in the refill logic
- In the *Definition* tab, set the *Usage Identifier* to: refill
- Design the logic in case of refill based only on refill amount not null (normal refill)
 - Determine the value of the `computed_PPAMOUNT_REQ` property



EXAMPLE

You can take into account the amount of the prepaid account balance to change the refill amount to be credited.

- Design the logic in case of bonus management:

You can use the input value of *PPRSN* (Reason for Balance Change on Prepaid Account) to determine the appropriate bonus policy (Ex.: 01, 05 or 11)

Set the relevant `computed_TUSEi` properties to the appropriate identifiers of the refillable units

Set the necessary `computed_CNTUi` properties to the appropriate total numbers of free units

Use a *Function* component to set the final refill amount that takes into account a bonus amount

- Design the logic in case of refill package management (received refill amount is null)
 - Check that the reference of the refill package (incoming property `PREFPK`) is known by SAP CC and retrieve the definition of the package
 - Set the relevant `computed_TUSEi` properties to the appropriate identifiers of the refillable units as declared in the SAP ERP system
 - Set the necessary `computed_CNTUi_REQ` properties to the appropriate total numbers of free units by taking into account the incoming property `RFPCN`
 - Set the `computed_PPAMOUNT_REQ` property to the appropriate total amount of credit by taking into account the incoming property `RFPCN`
 - Design the logic in case of bonus management:

Set the necessary `computed_CNTUi` properties to the appropriate total numbers of bonus units: `computed_CNTUi = computed_CNTUi_REQ + bonus`

Use a *Function* component to set the final refill amount that takes into account a bonus: `final amount = computed_PPAMOUNT_REQ + bonus amount`

- Set the property `computed_PPRSN` with the value of the input property `PPRSN` (declared in the refill item class): SAP CC does not change the value in case of refill request
- Set the property `computed_CRDRS` with:
 - The constant 'BONUS' in case of bonus applied on the refill amount
 - The value of the input property `CRDRS` (declared in the refill item class)
- Update the relevant counters related to the refillable units

Setting up a Usage Refill for the Management of Reversals

Use

You must insert and set up a *Usage Refill* component in the refill logic to configure the behavior of SAP CC when the SAP ERP system reverses a refill.

- You must set up the usage identifier of this usage refill to the dedicated value: `_reverse_refill_`
- You must design the refill logic to produce the necessary computed properties listed above:
 - The properties `computed_CNTUi_REQ` and `computed_PPAMOUNT_REQ` must include the original values of the reversal triggered by the SAP ERP system
 - The refill amount and the `computed_CNTUi` properties must include the final values by taking into account the possible issues
- You can design the refill logic to manage possible issues: The prepaid account balance or a counter corresponding to a refill unit may not be sufficient.

For more information about the refill logic and the usage refill, see the *SAP CC product documentation* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → Refill Components → [Usage Refill](#) ↩.

Prerequisites

- You have created and configured the appropriate *Refill Item Class* is available in SAP CC for this service provider
- You have inserted and configured the usage refill for refill management in the refill logic

Procedure

- Insert a *Usage Refill* in the refill logic
- In the *Definition* tab, set the *Usage Identifier* to `_reverse_refill_`
- Copy the input data as output data:
 - Set the property `computed_CRDRS` with the value of the input property `CRDRS` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill

- Set the property `computed_PPRSN` with the value of the input property `PPRSN` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill
- Set the relevant `computed_TUSEi` properties with the value of the input properties `TUSEi` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill
- Set the necessary `computed_CNTUi_REQ` properties with the value of the input properties `CNTUEi` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill
- Set the `computed_PPAMOUNT_REQ` property with the value of the input default property `Refill Amount` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill
- Design the logic to configure the behavior of SAP CC in case of issues (insufficient funds):
 - Set the `computed_CNTUi` properties with the negative values finally reversed
 - Update the relevant counters related to the refillable units by reusing the `computed_CNTUi` properties
 - Use a *Function* component to set the final refill amount reversed (negative value)

**EXAMPLE**

The SAP ERP system reverses 5 EUR refill. The balance of the prepaid account is less. As configured in the refill logic, SAP Convergent Charging confirms a reversal of 4 EUR and decreases the balance to 0.

- Initial refill request: 5 EUR
- Incoming refill amount to be reversed: -5 EUR
- Refill amount finally reversed: -4 EUR

Setting up a Recurring Refill Triggered Periodically

Use

You have to insert and set up a *Recurring Refill* component in the refill logic to configure a periodic behavior of SAP CC.

**NOTES**

- If you want to reset periodically the value of a counter dedicated to a refillable unit, check that the corresponding counter is not already reset within a charge plan dedicated for this use case (counter sharing in provider contracts). See the [Recommendations for the Initialization of Counters Shared In Provider Contracts](#) on page [253].

- If you reset the values of the counters dedicated to the refillable units, determine if you must design the refill logic to set up the `computed_CNTUi_REQ` and `computed_CNTUi_REQ` computed properties.

For more information about the refill logic and the recurring refill, see the *SAP CC product documentation* in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → Refill Components → [Recurring Refill](#) ◀.

Procedure

- Insert a *Recurring Refill* in the refill logic

Setting up a One-Shot Refill for the Creation of the Contract

Use

You must insert and set up a *One-shot Refill* component in the refill logic to configure the behavior of SAP CC when creating a provider contract of an end customer.

- You must set up the base event to: *Activation*
- You must design the refill logic to produce the necessary computed properties:
 - The `computed_CRDRS` property must be set to **INITIAL**
 - The `computed_PPRSN` property must be set to **16**
 - The `computed_PPAMOUNT_REQ` property must be set to the initial refill amount
- You can design the refill logic to set the initial value of the refillable units



NOTES

- If you want to set up initial value for the refillable units, be sure that the corresponding counters are not already initialized within a charge plan dedicated for this use case (counter sharing in provider contracts). Check also that they are not initialized within a charge plan that deals with recurring fees at the beginning of periods. See the [Recommendations for the Initialization of Counters Shared In Provider Contracts](#) on page [253].
- If you initialize the counters dedicated to the refillable units, determine if you must design the refill logic to set up the `computed_CNTUi_REQ` and `computed_CNTUi_REQ` computed properties.

For more information about the refill logic and the one-shot refill, see the *SAP CC product documentation* in SAP Help Portal at: ► <https://help.sap.com/cc> → SAP CC 5.0 → Configuration → Power User Documentation - Core Tool → Logic Components → Refill Logic Components → Refill Components → [One-Shot Refill](#) ◀.

**EXAMPLE**

You can set up the refill logic and the refill plan to be able to define an initial refill amount in each provider contract. Create the necessary parameters INITIAL_REFILL_ENABLED and INITIAL_REFILL_AMOUNT.

Procedure

- Insert a *One-shot Refill* in the refill logic
- In the *Definition* tab, set the *Event Name* to *Activation*
- Design the logic to introduce the necessary computed properties
- Design the logic to set these computed properties:
 - Set the `computed_CRDRS` property to the constant text: **INITIAL**
 - Set the `computed_PPRSN` property to the constant text: **16**
 - Set the `computed_PPAMOUNT_REQ` property with the appropriate refill amount. You can use a parameter that would be redefined in the refill plan and in the provider contract.
 - Use the value of the input default property `Refill Amount` (declared in the refill item class): SAP CC does not change the value in case of reversal of refill
- End each branch with a *Function* component that defines the initial refill amount that will be credited to the balance of the prepaid account

*Setting up a Refill Plan***Use**

In this integrated end-to-end scenario, you must design a refill plan that will define the behavior of SAP CC for the refills of prepaid accounts.

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Refill Plans ◀. You can access to the primary help from the graphical user interfaces.

Prerequisites

- The counter dictionary is up-to-date
- The relevant master data is available in the catalog of the service provider:
 - The refill record class and its associated billable mapping
 - The refill logic as recommended in this chapter

Procedure

- Insert the declarations of the counters related to the refillable units
- Insert the declarations of other counters that can be shared in a provider contract
- Insert the parameters and their default values and the conditions of use
- Insert the declaration of the account assignment expected in the contracts for the subscription to this refill plan: The prepaid account
- Declare the technical data that is used to identify an end customer: The phone numbers
- Insert and customize the refill logic
 - Link the necessary counters
 - Link the necessary parameters
 - Link the account assignment
 - In the *Technical Data* tab, insert a service identifier named **refill** and link it to the technical data defined in the refill plan
 - Configure the generation of refill records

Output Property	Property Computed by the Refill Logic	Input Property Declared in the Refill Item Class	Other Settings
BILL_BASEDATE			Empty
BILL_FIRST			Empty
BITREF32			Empty
BITTEXT50		PPNOT	
BKVID		BKVID	
CNTU1	computed_CNTU1		
CNTU1_REQ	computed_CNTU1_REQ		
CNTU2	computed_CNTU2		
CNTU2_REQ	computed_CNTU2_REQ		
CNTU3	computed_CNTU3		
CNTU3_REQ	computed_CNTU3_REQ		
CRDID		CRDID	
CRDRS	computed_CRDRS		
EXT_TAX_DATE			Empty
PCARD_GUID32		CGUID	
PPAMOUNT_REQ	computed_PPAMOUNT_REQ		
PPDOC		PPDOC	
PPRSN	computed_PPRS		
PREPR		PREPR	
PY_GROUP			Empty

Output Property	Property Computed by the Refill Logic	Input Property Declared in the Refill Item Class	Other Settings
REFPK		REFPK	
RFPCN		RFPCN	
TULOC		TULOC	
TUMTH		TUMTH	
TUSE1	computed_TUSE1		
TUSE3	computed_TUSE2		
TUSE3	computed_TUSE3		
VTPOS			Empty
XRVRF		XRVRF	

Data Settings for Converting Charged Items and Refill Records into Billable Items

- Setting up the Billable Item Mapping
 - Billable Item Mapping
 - Charged Item Class
 - Refill Record Class
- Setting up the Charged Item Mapping
- Setting up the Refill Record Mapping
- Maintaining the Billable Item Mapping
 - Billable Item Mapping
 - Charged Item Class
 - Refill Record Class

Setting up Billable Item Mapping

Use

In this integrated end-to-end scenario, SAP Convergent Charging uses the billable item mapping to configure how the system generates billable items to SAP Convergent Invoicing (SAP CI) in SAP ERP system. This object is part of the pricing catalog of the service provider. It describes the mapping between a billable item class (defined in SAP ERP / FI-CA) and a charged item class (or refill record class) defined in SAP CC.

By default, SAP CC 5.0 generates billable items according to a dedicated source transaction type: CCCIT. The source transaction ID has the value of the Charged Item Set ID or the Refill Record Set ID.

**NOTE**

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►
<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Billable Item Mapping ◀.

You can access to the primary help from the graphical user interface.

Prerequisites

SAP ERP/FI-CA is up and running

Procedure

- Launch the [Core Tool user interface](#) and log on
- Create the billable item mapping object and save it in the database: ► Core Tool → File → New → Billable Item Mapping

Setting up a Charge Plan

Use

In this integrated end-to-end scenario, you must design a charge plan that will define the behavior of SAP CC because this charge plan will be referenced in a contract item of the provider contracts of end customers. As only the charge plans are visible in SAP CRM, you must define your policy to design this master data. You can design some charge plans dedicated to the charging of customer consumption (service usage) and you can design some charge plans dedicated to the recurring fees and to the reset of technical counters.

If you share a counter from a parent contract, you need to design a charge plan for the parent contract to reset or credit the shared counter and another charge plan for the linked contracts to debit the shared counter.

Prerequisites

- The counter dictionary is up-to-date
- The relevant master data is available in the catalog of the service provider:
 - The charged item class and its associated billable mapping
 - The charges

Activities

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►
<https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About Refill Plans ◀. You can access to the primary help from the graphical user interfaces.

Setting up a Monitoring Plan

Use

In this integrated end-to-end scenario, you can design a monitoring plan that will define the behavior of SAP CC because this charge plan will be referenced in a contract item of the provider contracts of end customers. As only the charge plans are visible in SAP CRM, you must define your policy to design this master data. You can design some charge plans dedicated to the charging of customer consumption (service usage) and you can design some charge plans dedicated to the recurring fees and to the reset of technical counters.

If you share a counter from a parent contract, you need to design a charge plan for the parent contract to reset or credit the shared counter and another charge plan for the linked contracts to debit the shared counter.

Prerequisites

- The SAP CC system is interfaced with a policy or monitoring system (or a connector application); the development is available and installed in the system landscape.
- The current versions of SAP CRM cannot directly manage monitoring plans. You must set the `WS_MONITORING_PLAN_RETURNED_AS_CHARGE_PLAN` parameter to true.

Activities

Consult the primary help of the Core Tool user interface in SAP Help Portal at: ►

<https://help.sap.com/cc> → *SAP CC 5.0* → *Configuration Information* → *Power User Documentation - Core Tool* → *About Monitoring Plans* ◀. You can access to the primary help from the graphical user interfaces.

Master Data Maintenance

Maintaining the Billable Item Mapping

Use

After the billable item class is assigned to the “released as productive” status, the user can change the billable item class in the SAP ERP system (SAP Convergent Invoicing) by adding some optional fields at the end of the structure. In some business cases, it is necessary that the power user takes these changes into account so that SAP Convergent Charging can generate the new version of billable items.



NOTE

For more information about how to configure the interfaces for managing billable item classes, see the *SAP Library* for SAP ERP Enhancement Packages. Consult the documentation in SAP Help Portal at: <http://help.sap.com> → SAP ERP → Central Component → Enhancement Packages → Industries in SAP ERP → SAP Telecommunications → Billing in Contract Accounts Receivable and Payable → Integration of SAP Convergent Charging ↩.

Procedure: Preparations

Perform the following preparations:

- In SAP ERP/FI-CA:
 - Determine the changes to do in the billable item class (ex.: adding a field)
 - Determine if the configuration of SAP CC must be updated according to its final use and the way to fill it in
- In SAP CC:
 - Identify the billable item mapping to change with the [Core Tool user interface](#) and the charged item class (or the refill record class) that is referred by this mapping as source
 - Identify the price plan, the charging plan, or the refill logic to update if necessary so that SAP CC is capable to generate the content of the new field for the billable items



EXAMPLE

Three new fields are added to a billable item class.

- By default, SAP CC can generate the content of the first field.
- SAP CC can generate the content of the second field by filling it in with a property already existing in the rating context.
- To generate the third field, the power user has to add a new parameter in the price plans and change the decision tree to define the calculation algorithm for this parameter. Then

this parameter will be used in the modification of the charged item classes (or refill record classes).

Procedure: Maintenance of the Billable Item Mapping

To update the billable item mapping and associated configurations after the billable item class has been changed in SAP Convergent Invoicing:

- Launch [SAP CC Core Tool](#) and log on
- Open the billable item mapping that is now obsolete
 - Identify the charged item class that is referred
 - Select the root node of the tree and click the *Refresh* button:
The new field(s) should appear in the structure.
 - Save the changes
- Open the charged item class (or refill record class) identified previously:
 - Add some new field(s) to this class. The field name must be the same as the one in the billable item mapping previously updated:
► *Core Tool* → *File* → *Open* → *Charged Item Class* or ► *Core Tool* → *File* → *Open* → *Refill Record Class*
 - Set up this field according to your business.
You can set the appropriate property or let the power user decide what to do at the offer or charge/refill plan level.
 - Save the changed class to the database
- Open again the billable item mapping to finalize the maintenance:
 - Select the new field(s) and, as a *Source*, select the field created in the charged item class (or refill record class)
 - Save the changes
- Change all the relevant charge plans, refill plans and offers:
 - Update all the offers that include customized charges using this charged item class: ► *Core Tool* → *File* → *Open* → *Offer*
 - Update all the charge/refill plans that include customized charges using this charged item class or refill record class: ► *Core Tool* → *File* → *Open* → *Charge Plan*
 - For each customized charge in such a charge plan, refill plan or offer, select the charge, and click the *Refresh* button on the *Charged Item* tab. A new field appears.
 - Set up this field onto the appropriate property or value source if it is relevant, and update the price plans, charging plans, and refill logic if necessary so that they produce the right data.
 - Save these charge plans, refill plans, and offers to the database



NOTE

For testing purposes, the power user must create the new billable item mapping when the structure of a billable items has changed. You must update all the charges in the charge plans and offers.

**TIP: CUSTOMIZING**

In case the new field of BIT can easily be generated by SAP Convergent Charging with a constant value or with a base property from the rating and charging context, you can also customize and reconfigure the SAP CC system. Consult your implementation project team for [Setting up the Default Field Mapping Between CIT and BIT \(Implementation Project\)](#) on page [326]. A restart of the SAP CC Core Server system can be needed.

Maintaining the Consumption Item Mapping

Because SAP Convergent Invoicing manages the consumption item classes, you cannot modify the consumption item mapping created from these consumption item classes, but you must refresh it to synchronize any change with SAP CI. For more information, consult the chapter [Basic System Settings for Generating Consumption Items](#).

Procedure

To refresh the consumption item mapping, consult the primary help of the Core Tool user interface in SAP Help Portal at:  <https://help.sap.com/cc> → SAP CC 5.0 → Configuration Information → Power User Documentation - Core Tool → About the consumption item mapping or Modifying the consumption item mapping . You can access to the primary help from the graphical user interfaces.

Master Data Migration

You can migrate customer master data stored in a former system. SAP ERP is the central component for driving the migration. Consult the documentation about the migration strategy and the use of the transaction FKKCC_MD_MIG (Migration of master data to SAP CC).

Consult the Integration Guide for more information.



Advanced Configurations

Setting up a Landscape Without SAP ERP

Use

SAPinst does not manage the initial installation of a landscape with SAP CRM but without SAP ERP. If you want to install such a landscape, you have to perform the standard installation of SAP CC and set up manually the system and data:

- System integration: SAP CC must be integrated with another billing system, potentially connected to SAP CRM
- System customizations: N/A (the 2 systems are already integrated together)
- Data customizations: N/A (SAP Currencies are not available in SAP CC)
- System configurations:
 - Set up the jco communication (secured or not) and the notification function as detailed in this chapter
 -
- Master Data configurations:

Prerequisites

- SAP ERP/FI-CA is not part of the landscape of SAP CC
- SAP CRM is configured to receive the business and alert notifications from SAP CC

Procedure

- Consult the template file
(`/usr/sap/<SID>/CCD_<SAP_INST_NB>/exe/CC_CORE_SERVER/config/sapci/jco.destination.sk`) to create a temporary file containing the JCo destination parameters for SAP CRM (referenced below as `<crm_destination_file>`).
- Apply the recommendations from the beginning of this chapter
- Import the JCo destination for SAP CRM:


```
./setup.sh jcodestination import -login=<LGN> -password=<PWD> crm <crm_destination_file>
```
- Reset the notification policy configuration for SAP CRM
- Restart the instances of the SAP CC Core Server system
- Check the logs of the server
- Check that the SAP CRM system

Result

The SAP CC Core Server system is up and running and can communicate with the SAP CRM system. The notification publication function is enabled.

The different communication channels are available.



9 Technical Configuration of the User Interfaces

SAP Convergent Charging 5.0 includes several user interfaces. As an IT administrator or IT consultant, you configure these interfaces in your SAP system landscape. There is no configuration parameter for the [Admin+](#) and the [BART+](#) command line interfaces of SAP CC.

Consider the configuration tasks of the following user interfaces:

- Desktop applications:
 - BART Tool
 - CAT Tool
 - Core Tool
- Web application:
 - Cockpit, page [\[403\]](#)

Settings for the Desktop Applications (such as Core Tool)

All the graphical user interfaces of SAP Convergent Charging 5.0 have a default configuration. They create a configuration file at first launch time if you did not create the file before.

You can configure the following interfaces:

- Core Tool
- BART Tool
- Connector Administration Tool (CAT Tool)

The configuration files are located in the <HOME>/config/ folder of each program.



NOTE

The configuration settings of the user interfaces are not related or restricted to an SAP user. They are applied for all the SAP users.

Setting Up the Primary Help

Use

All the graphical user interfaces of SAP CC 5.0 can benefit from primary help sets based on HTML technology. For legal reasons, they are not configured by default and you have to set up the necessary links and potentially install the documentation DVD locally or on an internal web site according to your policy. You can also set up these links to access directly to the SAP Help Portal.

Prerequisites

- A graphical user interface of SAP CC is installed and you have a logon
- When relevant, the documentation DVD for SAP CC 5.0 is installed on a shared network folder or locally on the machine that hosts a graphical user interface

Activities

You have to set up the following application parameters:

Parameter	Description	Core Tool	BART Tool	CAT
help.contents.url	The URL to a HTML page that will be displayed from the <i>Help</i> menu of the user interface	X		X
help.components.url	Special: The URL to a HTML page that will be displayed from the <i>Help</i> menu of the user interface	X		
help.portal.url	The URL to a help or documentation portal (inside or outside your company) that will be displayed from the <i>Help</i> menu of the user interface	X		X
BART.help.contents.url	See <i>help.contents.url</i>		X	
BART.help.portal.url	See <i>help.portal.url</i>		X	

**NOTE**

The configuration settings of the user interfaces are not related or restricted to an SAP user. They are applied for all the SAP users.

Results

Once logged on, the SAP users can access online to the documentation from the *Help* menu of the graphical user interfaces.

Setting Up the Core Tool User Interface

Use

SAP CC Core Tool is a graphical component of SAP CC 5.0. The user interface can start running without any configuration file. It will store some parameters of a user working session. You can set up these parameters and some other parameters and preferences listed in this section.

Procedure

- Stop the graphical user interface
- Edit the `core_tool.config` file or create such a file by copying the `core_tool.config.sk` template file
- Set the following parameters in the different sections
- Restart

Parameter	
Parameter(s)	language
Description	This parameter specifies which language is used for the graphical user interface.
Type	string
Default Value	EN
Range of Values	A code from ISO-639 Consult the template of configuration file

Parameter	
Parameter(s)	country
Description	This parameter specifies which country specific language is used for the graphical user interface.
Type	string
Default Value	US
Range of Values	A code from ISO-3166 Consult the template of configuration file

Parameter	
Parameter(s)	frame.width frame.height
Description	These parameters specify the width and height of the window of the program.
Type	integer
Default Value	Width: 900 Height: 700
Range of Values	1 to 65,535

Parameter	
Parameter(s)	help.contents.url help.components.url help.portal.url
Description	These parameters specify which main topics are displayed when navigating in the <i>Help</i> menu of the Core Tool user interface . They can be configured to use the local primary help files or files located on a web portal (in SAP Help Portal or from a customer site). Note: The <i>Docu DVD</i> is required for this configuration.

Type	string
Default Value	By default, the URLs are targeted to the SAP Help Portal. See example bellow for details
Range of Values	A valid HTTP URL or FILE URL for each entry in the menu of the graphical user interface where the documents must be accessible
	EXAMPLE (WEB SITE) You can set up the following parameters: <pre>help.contents.url=https://help.sap.com/doc/d847860d561a47568a936d5f3cbeb9da/5.0/en-US/core_tool/frameset.htm help.components.url=https://help.sap.com/doc/d847860d561a47568a936d5f3cbeb9da/5.0/en-US/comporef/frameset.htm help.portal.url=https://help.sap.com/cc50</pre> In case of an upgraded Core Tool, we recommend to change these parameters to use the primary help set dedicated to your version to view both data models that can be configured: <pre>help.contents.url=https://help.sap.com/doc/d847860d561a47568a936d5f3cbeb9da/5.0/en-US/core_tool_hybrid/frameset.htm help.components.url=https://help.sap.com/doc/d847860d561a47568a936d5f3cbeb9da/5.0/en-US/comporef_hybrid/frameset.htm help.portal.url=https://help.sap.com/cc50</pre> EXAMPLE (LOCAL MACHINE) You can set up the following parameters: <pre>help.contents.url=file:/C:/myrootfoldername/StandardHTML/EN/core_tool/frameset.htm help.components.url=file:/C:/myrootfoldername/StandardHTML/EN/comporef/frameset.htm help.portal.url=https://help.sap.com/cc50</pre> Where C is the local drive letter and where myrootfoldername is the main folder that includes a copy of the documentation from the DVD. EXAMPLE (SHARED NETWORK FOLDER) You can set up the following parameters: <pre>help.contents.url=file://mysharednetworkfoldername/StandardHTML/EN/core_tool/frameset.htm help.components.url=file://mysharednetworkfoldername/StandardHTML/EN/comporef/frameset.htm</pre>

	<pre>help.portal.url=https://help.sap.com/cc50</pre> Where <code>mysharednetworkfoldername</code> is the main folder (or path) that includes a copy of the documentation from the DVD.

Parameter	
Parameter(s)	xml.verbose
Description	For troubleshooting or for testing purposes, this parameter allows you to trace the XML communications exchanged between the Core Tool user interface and the SAP CC Core Server system.
Type	boolean
Default Value	false
Range of Values	false or true

Setting Up the BART Tool User Interface

Use

The SAP CC BART Tool is an optional component of SAP Convergent Charging needed for configuring SAP CC BART Server.

Procedure

- Stop the graphical user interface
- Edit the bartTool.config file or create such a file by copying the bartTool.config.sk file. Those files are xml files.
- Set the following parameters in the different sections
- Restart

Parameter	
Parameter(s)	language
Description	This parameter specifies which language is used for the graphical user interface.
Type	string
Default Value	EN
Range of Values	A code from ISO-639 Consult the template of configuration file
	 EXAMPLE You can set up the following parameters <pre><language> en</language></pre>

Parameter	
Parameter(s)	country
Description	This parameter specifies which country specific language is used for the graphical user interface.
Type	string
Default Value	US
Range of Values	A code from ISO-3166 Consult the template of configuration file
	 EXAMPLE You can set up the following parameters <pre><country> US</country></pre>

Parameter	
Parameter(s)	BART.help.contents.url BART.help.portal.url

Description	These parameters specify which main topics are displayed when navigating in the <i>Help</i> menu of the BART Tool. They can be configured to use local primaty help files or files located on a web portal (from SAP Help Portal or from a customer site). Note: The <i>Docu DVD</i> is required for this configuration.
Type	string
Default Value	By default, the URLs are targeted to the SAP Help Portal. See example bellow for details
Range of Values	A valid HTTP URL or FILE URL for each entry in the menu of the graphical user interface where the documents must be accessible
	 EXAMPLE (WEB SITE) You can set up the following parameters: <pre><BartHelpContentsURL> https://help.sap.com/doc/d847860d561a47568a936d5f3cbeb9da/5.0/en-US/bart_tool/frameset.htm </BartHelpContentsURL> <BartHelpPortalURL>http://help.sap.com</BartHelpPortalURL></pre>  EXAMPLE (LOCAL MACHINE) You can set up the following parameters: <pre><BartHelpContentsURL>file:/C:/myrootfoldername/StandardHTML/EN/bart_tool/frameset.htm</BartHelpContentsURL></pre> Where C is the local drive letter and the myrootfoldername is the main folder that includes a copy of the documentation from the DVD.  EXAMPLE (SHARED NETWORK FOLDER) You can set up the following parameters: <pre><BartHelpContentsURL>file://mysharednetworkfoldername/StandardHTML/EN/bart_tool/frameset.htm</BartHelpContentsURL></pre> Where mysharednetworkfoldername is the main folder (or path) that includes a copy of the documentation from the DVD.

Setting Up the Connector Administration Tool (CAT Tool) User Interface

Use

SAP CC CAT Tool is an optional component of SAP Convergent Charging needed for configuring an Import/Export Connector (IEC) application in your SAP system landscape.

Procedure

- Stop the graphical user interface.
- Edit the cat.config file or create such a file by copying the cat.config.sk template file.
- Set the following parameters in the different sections.
- Restart.

Parameter	
Parameter(s)	default_language
Description	This parameter specifies which language will be used for the graphical user interface. When not set, the program uses the language of the Operating System or English
Type	String
Default Value	Not set
Range of Values	Consult the template of configuration file

Parameter	
Parameter(s)	language
Description	This parameter specifies which language is used for the graphical user interface.
Type	string
Default Value	EN
Range of Values	A code from ISO-639 Consult the template of configuration file

Parameter	
Parameter(s)	country

Description	This parameter specifies which country specific language is used for the graphical user interface.
Type	string
Default Value	US
Range of Values	A code from ISO-3166 Consult the template of configuration file

Parameter	
Parameter(s)	help.contents.url help.portal.url
Description	These parameters specify which main topics are displayed when navigating in the <i>Help</i> menu of the CAT. They can be configured to use the local primary help files or files located on a web portal (in SAP Help Portal or from a customer site). Note: The <i>Docu DVD</i> is required for this configuration.
Type	String
Default Value	By default, the URLs are targeted to the SAP Help Portal See example below for details
Range of Values	A valid HTTP URL or FILE URL for each entry in the menu of the graphical user interface where the documents must be accessible
	 EXAMPLE <pre> help.contents.url=https://help.sap.com/doc/d847860d561a 47568a936d5f3cbeb9da/5.0/en-US/cat/frameset.htm help.portal.url=https://help.sap.com/cc50 </pre> See also the examples from Core Tool configuration.

Settings for the Cockpit Application

SAP CC Cockpit is an optional software component of SAP Convergent Charging 5.0. It includes a Web-based application that provides IT administrators and IT consultants with a Fiori-like user interface to manage the SAP CC Core Server systems in the SAP system landscape. You deploy and run the Cockpit applications in a Java Web server such as Apache Tomcat Server.

As of SP 0, you quickly configure all the parameters of the connected Core Server system from your Web browser.

Configuration Tools and Files

All the configuration settings of the SAP CC Cockpit application are stored in a single text file. You create this file at the installation time manually. There is a configuration file for each Cockpit application deployed in a Tomcat Server.

The default filename is `sap_cc_cockpit_cccockpit.properties` when the Web application path is '`cccockpit`' in Tomcat. Use the following filename convention:
`sap_cc_cockpit_<WEB_APP_NAME>.properties` where `<WEB_APP_NAME>` is the technical short name of each Cockpit application.



NOTE

The operating system user that runs the Tomcat process or service must have the read access right to the configuration files of the SAP CC Cockpit applications.

The file format uses the ISO 8859-1 character encoding. Characters that cannot be directly represented in this encoding scheme must be written using unicode escapes. Consult details at: <https://docs.oracle.com/javase/8/docs/api/java/util/Properties.html#load-java.io.InputStream->.

A template file `sap_cc_cockpit_[WEB_APP_NAME].properties.sk` is delivered. See page [404].

Location

The configuration files are available in the home directory of the operating system user that runs the Tomcat process or service in the dedicated host. Refer to the the *Installation Guide* documentation, page [21].

Delivered Template

To facilitate the configuration, a template file (`sap_cc_cockpit_[WEB_APP_NAME].properties.sk`) is provided to IT administrators and IT consultants.

This skeleton is available in the delivered ZIP file of the *CC Cockpit* software unit.

Make a copy of the SK file, rename this text file, and edit your new file to set up your expected application parameters.

Do never modify the template file itself.

Configuration Tool

You configure the SAP CC Cockpit application by editing the configuration file of the Web application manually.

You use the operating system functions to enable the read access right to the cockpit configuration files to this user account the run the Tomcat process or service.

Initial Configuration

An initial configuration is mandatory before you can run the user interface. First you set up the basic settings:

- Setting up the ID of the SAP CC Core Server system to administer
- Setting up the connection information to the Core Server system

Refer also to the *Installation Guide documentation* about the mandatory post-installation tasks, see page [\[21\]](#).

Basic Settings

Setting Up the ID of the SAP CC Core Server System to Administer

The SAP CC Cockpit application connects to the SAP CC Core Server system defined in the [configuration file](#).

You configure or maintain the following application parameter:

Application Parameter	Description	Default Settings	Recommendation
May 2017		CUSTOMER	404 / 479

cc.sid	The unique SAP System Identifier (SID) that is assigned to the Core Server system you want to administer.	Not set: the Web application cannot start.	The defined SID must be consistent with the URLs declared in the cc.id parameter.

Application Parameters of Cockpit: SID of Core Server



NOTE

If you change the SID, the SAP CC power users can continue their sessions and save their modifications to the previously defined Core Server system.

Basic Settings for the Communications

Setting Up the Connection Information to the SAP CC Core Server System

The SAP CC Cockpit application connects to the SAP CC Core Server system defined in the configuration file. It connects to the master dispatcher instance via the HCI technical interface. It uses the connection credentials (logon, password) entered by the users of the Cockpit user interface who are SAP CC administrators.

The connection information consists in a startup list of URLs of the dispatcher instances in the Core Server system to administer.

Prepare the configuration by determining the necessary URLs. You can use the [Admin+](#) user interface and the `list` command to know the current instance map of your Core Server system.

Depending on the instance map, you configure or maintain the following application parameter:

Application Parameter	Description	Default Settings	Recommendation
hci.http.url	A comma-separated list of URLs of deployed dispatcher instances. In a secure environment, use URLs based on HTTPS. In each dispatcher instance, the URL is the	Not set: the Web application cannot start.	The defined URLs must target to system instances that belong to the Core Server system declared in the cc.id parameter.

	public endpoint of the HTTP communications dedicated to the HCI technical interface.		

Application Parameters of Cockpit: URLs of Core Server

**NOTE**

If you change these settings, the SAP CC power users can continue their sessions and save their modifications. They only view the URL changes when they log off and log on again to the user interface.

**EXAMPLE**

In a development system landscape, both the Core Server system and the Tomcat Server run on the same host. You can set up the Web application with the following list:

`hci.http.url=http://localhost:9100/,http://localhost:9101/`

Settings for the Security and User Management

SAP CC 5.0 allows you to manage the security for the SAP CC power users who work with the Cockpit application. It provides you with some functions and mechanisms to manage user authentication and user sessions in this user interface:

Feature	Functions
User logon and authentication	SAP Convergent Charging provides IT administrators with multiple functions and options to define a security policy in the SAP CC system landscape. Refer to the function details in Settings for the User Management, page [92].
User session handling	SAP CC Cockpit enriches these functions with: ■ Session expiration handling and alerting ■ Automated or manual session locking

For more information about the security features of SAP Convergent Charging, consult the *Security Guide* documentation, see page [21] in [Fundamental User Assistance and Guides](#).

Setting Up the User Session Management in Cockpit

To adapt your security policy, you configure the following application parameters:

Application Parameter	Description	Default Settings	Recommendation
<code>browser.sessionTimeout</code>	The expiration period in minutes during which the SAP CC administrators can work. The user interface keeps the modifications and the preferences of the SAP user. After this period, the user session expires and the user loses the unsaved modifications. A user session ends when the user logs off or when the timeout occurs.	60 (2 hours)	The session expiration period must be longer than the lock timeout.
<code>browser.sessionLockTimeout</code>	The maximum period during which the session can be left inactive, inactive meaning that there is no interaction between the SAP user and the browser and the user interface. After this period, the application locks the user session automatically and the user must log on again.	10	The session lock period must be shorter than the session timeout.

Application Parameters of Cockpit: Options of the User Session Management

Procedure

- Edit the configuration file.
- Change the values.
- Save the file.

Settings for the Tracing Function

SAP CC 5.0 Cockpit supports the tracing function of SAP Convergent Charging to monitor or troubleshoot the Cockpit application deployed on the Apache Tomcat Server.

Trace messages provide your support specialist with important information to locate an issue.

Setting up the Tracing Function

In the Tomcat Server, the back-end component of SAP CC Cockpit records some trace messages to files and can print them to the console.

You define your logging and tracing policy and then configure the Web application to comply with the policy. You can set up the expected level of traces, number of backups, and maximum size of each backup file. You can manage several output formatted streams.

You configure or maintain the following application parameters:

- Severity threshold for the generation of trace messages: see `ls.trc.severity`
- Output destinations of messages (console, files): see `ls.trc.destination`
- Console output: see the `ld.console.enabled` and `ld.console.formatter` application parameter
- Output files (filename and path, file size, file rotation, output format):
 - Fileset #2: see `ld.file2.enabled`, `ld.file2.name`, `ld.file2.size`, and `ld.file2.setsize`
 - Other filesets
- Trace domains that can be filtered



NOTES

- Refer to the *Customizing* activity of the SAP CC Core Server system for more details regarding to the logging and tracing settings.
- Consult the *SAP CC System Parameter Reference* for more information about each parameter. It relates to the configuration of the Core Server systems but you can take into account the different recommendations.

Default Settings

The Cockpit application records traces in rotating TRC files and keeps three 2 MB backup files.

The default settings are:

Application Parameter	Default Settings
Log messages	
There is no parameter to configure.	You cannot set up parameter such as <code>ls.sys.severity</code> or <code>ls.app.severity</code> .
Trace messages	

ls.trc.severity	ERROR
ls.trc.domain	SQL,NET,MSG,HB,AK,BLK,CACHE,LOCK,NOTIF,ADMIN,HCI,WS,WSBUS,CIF,RIF,SLDDS,JCO,PPI,PERF,DATA
ls.trc.destination	LDC,LDF2
Output: Console	
ld.console.enabled	false
ld.console.formatter	TRACE
Output: File destination #2	
ld.file2.enabled	true
ld.file2.name	@CATALINA_HOME@/logs/@WEB_APP_NAME@_LDF2.trc
ld.file2.size	2M
ld.file2.setsize	4
ld.file2.formatter	LIST

**NOTE**

Refer to the configuration template [sap_cc_cockpit_\[WEB_APP_NAME\].properties.sk](#), page [404].

Procedure (Immediate Changes)

- Edit the configuration file.
- Change the values.
- Save the file.

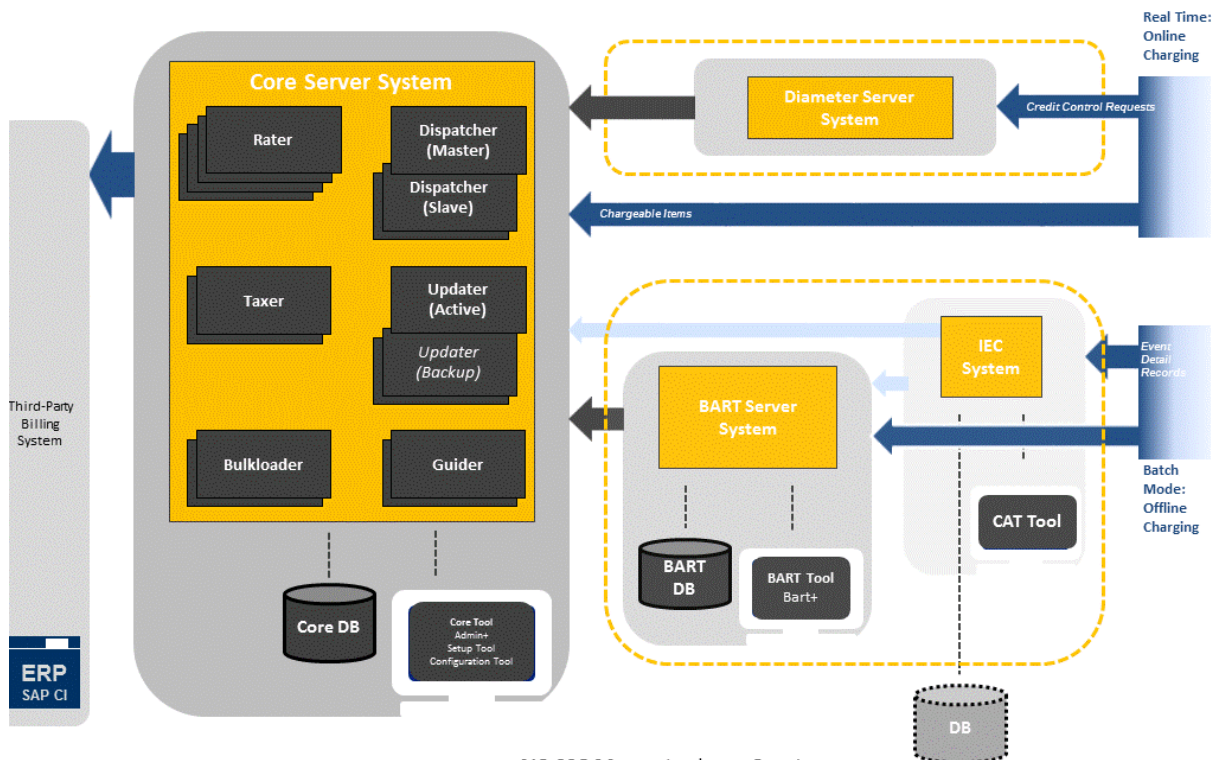
10 Configuration of BART Server

SAP CC BART Server is an optional software component of SAP Convergent Charging 5.0 in an offline charging scenario variant. It is used in a batch-mode for handling the batch acquisitions of past consumption detail records (CDRs) and triggering the batch charging operations.

Scenario Variants

Several variants of integrations are possible:

- Offline acquisition from connected system
 - The SAP CC BART Server system communicates with the SAP CC Core Server system and an external mediation system
- Offline acquisition from repository (file, database)
 - The SAP CC BART Server system communicates with the SAP CC Core Server system and an Import/Export Connector (IEC) application for SAP CC, present in the system landscape and able to retrieve data from the client repository



SAP CC 5.0 System Landscape Overview

Configuration Tools and Files

The SAP CC BART Server system is configured by using the user interfaces:

- [BART Tool](#) [page 48]
- [BART+](#) [page 47]
- [BART Setup Tool](#) [page 48]

Configuration File (bart.config)

All the configuration settings of the BART Server system are stored in a text file: All the system parameters are available in the bart.config configuration file.

Its file format uses the ISO 8859-1 character encoding. Characters that cannot be directly represented in this encoding scheme must be written using unicode escapes. Consult details at: http://java.sun.com/docs/books/jls/third_edition/html/lexical.html#3.3.

A template file [bart.config.sk](#) is available, see page [412].

Use

Prefer using the configuration user interface ([BART+](#)) to set up the system parameters.

It can update the configuration file in backend.

Technical Information

The bart.config file and the associated template (bart.config.sk) contain detailed information about the configuration of every system parameter, which you can refer to get more information before changing a configuration value.

Location

The bart.config file is located in one of the following folders:

- <DRIVE>:\usr\sap\<SID>\CAB<INST_NB>\config\ (MS Windows operating system)
- /usr/sap/<SID>/CAB<INST_NB>/config/ (UNIX or other operating systems)

Delivered Template

To facilitate the configuration, a template file (`bart.config.sk`) is provided to IT administrators and IT consultants.

This skeleton is available in the delivered *CC BART Server* software unit.

Make a copy of the SK file, rename this text file, and edit your new file.

Do never modify the template file itself.

System Settings for the Java Virtual Machine

SAP Convergent Charging 5.0 must accommodate to hardware which ranges from a basic laptop up to 64-CPU machines. The default values that are used in the setups are very low so that the SAP CC BART Server system can be installed on a small configuration without being modified.

The default values are usually not suitable for a production environment. The memory allocated to the JVM must be customized to ensure high-level performance.



NOTE

Consult the *System Settings for the Java Virtual Machine* section in this guide for more information about the [available and recommended JVM options](#), page [71].

Determining the JVM Options for an SAP CC BART Server System

Use

In this *Customizing* activity, you define the JVM options recommended for your SAP CC BART Server system.

These options may be critical. The most critical JVM options are about the:

- configuration of the memory heap
- configuration of the garbage collector (GC)
- configuration of direct buffers



NOTE

Refer to SAP Note [2006073 – JVM options recommendations for SAP CC](#) to perform this activity.

You use a configuration pattern and make some adjustments.

Default Settings

At installation time, *SAPInst* does not set any JVM option. This enables any type of installation, even on a single small computer such as a laptop for test and demo.

As an administrator, you set up the JVM options as needed regarding the usage planned for SAP Convergent Charging.

Prerequisites

You know the:

- integration of SAP CC (system landscape, features, master data volume)
- numbers of CPU core of the hosts where the instances are installed

Activity

Depending on your business requirements and the architecture of your SAP system landscape, apply the recommendations in *SAP Note* [2006073 – JVM options recommendations for SAP CC](#):

- During the project implementation phase
 - After the initial installation
 - During the tuning step
 - During the validation step
- During the production operation phase

Results

Apply these settings by configuring the startup configuration files (*jstart.config*). See the procedure in this guide.

System Settings for Database Communication

Setting up the Connection to the Database

Use

You can configure the database connection used by the SAP CC BART Server system.

Procedure

- Edit the [bart.config](#) file
- Make sure you correctly type the following attributes: logon, password, database URI
- Save the file
- Restart the server system

Setting up the Database Connection SQL Failure Management

Use

When the BART Database crashes during a rating session, this parameter defines the directory of the file used for storing information on non-committed CDR modifications. This file is usually created before an unexpected stop of the BART Server processes. When the BART Server system restarts, the SQL failure file is read and its content is committed to the database.

Procedure

- Edit the [bart.config](#) file
- Set the `sql.failures.log.file.name` parameter
- Save the file
- Restart the server system

System Settings for Communications

Specifying a list of protocols and cipher suites for communications using SSL/TLS

As of SP 2, SAP CC 5.0 gives the possibility to specify a list of protocols and cipher suites that can be enabled for communications:

- Encrypted using SSL/TLS
- Related to the Core Server, BART Server and Diameter Server systems

Procedure

- Edit the `bart.config` configuration file
- Set up the `tls.protocols` and `tls.cipher_suites` parameters accordingly
- Save the configuration file
- Restart the BART Server system

Setting up the Connection to the SAP CC Core Server System

Use

The SAP CC BART Server system connects to the SAP CC Core Server system for batch charging mass chargeable items resulting from customer service consumptions.

You can configure the connection settings:

- The IP addresses and the port number of the SAP CC Core Server system to connect to.
- The connection credentials (login, password) mandatory for the communications between the two server systems



NOTE

For more information, consult the template of the configuration file ([bart.config.sk](#)).

Default Settings

- HTTP Secured (HTTPS) connections are set up between the SAP CC Core Server system and the SAP CC BART Server system
- The appropriate IP addresses and listening port numbers are set up for all the dispatcher instances of the Core Server system



NOTE

These settings may have been changed at the installation time. See the *SAP CC Installation Guide* for details.

Prerequisites

- An SAP CC technical user dedicated to the SAP CC BART Server system is required with specific rights according to your security policy
- You have determined the current communication settings of the SAP CC Core Server system for the HTTP connections. If HTTP Secured (HTTPS) connections are configured, you may need to install certificates on the BART Server system if the certificates used by the SAP CC Core Server system are self-signed or signed by an unrecognized certification authority.

Procedure

To set up the SAP CC BART Server system to send request messages to the SAP CC Core Server system:

- Access to the machine that hosts the BART Server system
- Edit the [bart.config](#) configuration file
- Set up the `cc.dispatcher.boot.http.url.list_port` parameter
 - Use HTTPS URLs in case of secured communications
- Set up the credentials for the SAP CC User dedicated to the communications between the BART Server system with the Core Server system: `cc.login` and `cc.password` parameters (plain text)
- Save the configuration file
- Restart the BART Server system
- When the security is activated, the BART Server system cyphers the password in the [bart.config](#) configuration file

Results

The BART Server system connects to the Core Server system.

**NOTE**

For managing your SAP CC Users, consult the [Security Guide documentation](#).

Changing the Technical User

Use

The SAP CC BART Server system communicates with the SAP CC Core Server system for triggering batch charging operations requested by an administrator in the [BART Tool user interface](#).

Procedure

See the section *Setting up the Connection to the SAP CC Core Server System* in this document to change the technical user.

Setting up the HTTP/HTTPS Connections of the BART Server

Use

The SAP CC BART Server system provides a technical interface *HTTP Communication Interface (HCI)* to receive request messages.

You can set up some system parameters to define the listening port of the BART Server system, the number of dedicated threads that are available for handling simultaneous HCI calls and the security level.

These communication settings should be used by the client applications or systems that connect to the BART Server system:

- SAP CC BART Tool
- Mediation application (CDR batch acquisition operations)

You can maintain the settings for these communications in a development landscape.

Default Settings

HTTP Secured (HTTPS) connections are set up.

**NOTE**

These settings may have been changed at the installation time. See the *SAP CC Installation Guide* for details.

Procedure

- Edit the [bart.config](#) configuration file
- Set up the `bart.http.server.port` and `bart.http.server.threads` parameters
- Set up the `bart.http.secure` parameter to true or false
- Save the configuration file
- Restart the BART Server system

Enabling the Secured HTTP Connections

Use

You can change or enable the secured HTTP connections. You need to generate a private key and its associated public certificate.

The public certificates must be shared with the connected applications or systems.

Consult the *SAP CC Installation Guide* to generate a private key and its associated certificate for the HTTPS connections.

Activities

- Generate a private key and its associated public certificate
- Install the key/certificate in the SAP CC BART Server system
- Enable the HTTPS connections
- Share the public certificate with the connected applications or systems

Installing the Private Key and Certificate

Use

To be able to use HTTP Secured (HTTPS) connections, the private key and its associated public certificate must be loaded by the SAP CC BART Server system. The key and certificate are physically stored in an encrypted file located in the configuration folder. The Java Key Store (JKS) technology is used.

Prerequisites

- A private key file and a public certificate have been generated for the SAP CC BART Server system
- The key/certificate are imported into a keystore file in Java Key Store (JKS) format

Procedure

- Create a keystore file containing the private key and its associated certificate:
 - Use the same third party software used to generate the key/certificate
 - The keystore file must be created in JKS format
- Store the keystore file in /usr/sap/<SID>/CAB<INST_NB>/config/ folder of the BART Server system

Result

The SAP CC BART Server system can receive messages from the HTTP Communication Interface.



NOTE

Consult the *Installation Guide* about the generation of certificates for the HTTP connections and communications.

Setting up the TCP/IP Connection for the Acquisition or Rerating Functions

Use

You can configure:

- For the CDR batch acquisition function: the connection to the BART Server system
- For the rerating function: the listening port and the number of dedicated threads that are available to handle simultaneous API calls to the services using the TCP/IP protocol

Procedure

- Edit the [bart.config](#) configuration file
- Set up the `bart.collector.server.hostname` parameter
- Set up the `bart.collector.server.port` parameter
- Set up the `bart.collector.server.threads` parameter
- Set up the `rerating.pool_size` parameter
- Set up the `rerating.queue_size` parameter
- Save the file
- Restart the server system

Settings for the User Management

Changing the Password to Log on to the Core Server System

Use

The BART Server system uses a user/password to log on the Core Server system. You may have to change this password for security or test reasons.

Procedure

- Launch the [Core Tool user interface](#) and log on with a user that has the *User Administration* role
- Change the password of the user reserved for the BART Server system
- Consult the `bart.config.sk` skeleton file for detailed information
- Check with the [BART Tool user interface](#) that there is no running session
- Stop the BART Server system
- Edit the [bart.config](#) configuration file
- Update the `cc.login` and `cc.password` parameters with the values previously set in Core Tool
- Save the file
- Restart the BART Server system. It will cipher the password and save the configuration file.



CAUTION

You must restart immediately the BART Server system to secure this procedure.

System Settings for Logging and Tracing

Setting up the Logging and Tracing Function

Use

The SAP CC 5.0 BART Server system records the log messages and the trace messages to files and can print them to the console. You define your logging and tracing policy and the configure the BART Server system.

The attributes described below can be configured according to the expected level of logs, number of backups and maximum size of each backup log file.

- Severity thresholds for the generation of:
 - Log messages related to the system processing (system level): See `ls.sys.severity`
 - Log messages related to the business processing (application level): See `ls.app.severity`
 - Trace messages: See `ls.trc.severity`
- Output destinations of messages (console, files): See `ls.app.destination`, `ls.sys.destination`, and `ls.trc.destination`
- Console: See `ld.console.enabled`
- Output files (filename and path, file size, file rotation):
 - Fileset #1: See `ld.file1.enabled`, `ld.file1.name`, `ld.file1.size`, and `ld.file1.setsize`
 - Trace domains that can be filtered



NOTE

Refer to the *Customizing* activity of the SAP CC Core Server system for more details regarding to the logging and tracing settings. Refer to the *SAP CC System Parameter Reference* for more information about each parameter.



NOTE

You cannot set up the output formats of the messages neither in the console nor in the files.

Default Settings

The default settings are:

```
ls.app.severity=INFO
ls.sys.severity=INFO
ls.trc.severity=ERROR
ls.app.destination=LDC,LDF1
ls.sys.destination=LDC,LDF1
ls.trc.destination=LDC,LDF2
ls.trc.domain=
ld.console.enabled=false
ld.file1.enabled=true
ld.file1.name=work/log/bart_server.log
ld.file1.size=2M
ld.file1.setsize=4
ld.file2.enabled=true
ld.file2.name=work/log/bart_server.trc
ld.file2.size=2M
ld.file2.setsize=4
```



NOTE

Refer to the configuration skeleton file (bart.config.sk) provided by default with the SAP CC BART Server system.

Procedure (Immediate Changes)

- Launch the [BART+](#) user interface and log on
- Check the current settings
- Set up the new level for logs with the command and apply immediately and permanently this change:
 - `set log_level <NEW_LOG_LEVEL> all`
 - Set up the other relevant parameters: log.file.name, log.file.size, log.file.backups, log.errorfile.name
- Log off

Procedure (Offline Changes)

- Edit the [bart.config](#) file in /usr/sap/<SID>/CAB<INST_NB>/config/ folder of the SAP CC BART Server system

- Change the values of parameters in the log section
- Save the file
- Restart the BART Server system

System Settings for the System Landscape Directory

Enabling and Setting Up the SLD Data Supplier Function

Use

The SAP CC BART Server system can send information data to the SLD when starting. By default, this function is not enabled at installation time. You have to configure manually the BART Server system to connect to the SLD server system and to send payload data.

Prerequisites

- An SLD server system is up and running in your SAP system landscape.
- The Component Repository Content (CR Content) in the System Landscape Directory (SLD) is up-to-date (see SAP Note [669669](#)).
- The required credentials (SLD user, password) are available in the SLD server system. An SLD user is dedicated to your BART Server system.
-

Procedure

- Stop the BART Server.
- Edit the [bart.config](#) file.
- Enable the function by setting up a valid URL for the SLD server.
- Change the communication parameters to the appropriate values:

Communication Parameters	
bart.sld.url	The URL of the SLD Data Supplier Service in the SLD server system. Enter the URL in the following format: http://<SLD_HOST>:<SLD_PORT>/sld/ds  NOTE The required URL must end with the <code>'/ds'</code> fragment to refer the Data Supplier service in the SLD server.
bart.sld.user	The user name for the logon to the SLD server system for authentication

bart.sld.password	The password for the user needed for authentication

- Restart all the BART Server to apply the changes.
- Verify that the payload data is properly sent to the SLD server system.

Basic Settings

Setting up the Magic Number Pattern

Use

You can configure the deduplicate function to identify and tag the CDRs which must be identified as duplicates. BART Server manages sequences of magic numbers to uniquely identify a CDR acquired into the back-end BART database. A magic number is such a unique identifier.

To detect duplicate CDRs, the system can consider the:

- CDR name
- Consumption date (usage date of the customer service)
- User ID (USID) – the technical identifier of the end customer
- Service ID (SID) – the technical identifier of the customer service
- And all the data fields available in the incoming CDRs (CALL_DURATION, CALLEE, CALLER, ZZ_USAGE_TYPE, or ZZ_SERVICE_TYPE) depending on your business requirements



NOTE

A magic number pattern must be defined for each type (e.g. MMS, SMS, ...) of CDRs that are acquired by the BART Server system in the SAP CC system landscape.

Parameter	
Parameter(s)	magic_number.number
Description	The number of magic number patterns
Type	Integer
Default Value	1
Range of Values	Non zero integer

For each magic number pattern:

Parameter	
Parameter(s)	magic_number.<n>.item_name
Description	The CDR name on which the magic number should be associated

Type	String
Default Value (n=1)	cdr
Range of Values	A unique CDR name

Parameter	
Parameter(s)	magic_number.<n>.fields
Description	The list of data fields available in incoming CDRs; the BART Server system uses this information to calculate the corresponding magic numbers.
Type	String
Default Value (n=1)	name;consumption_date;user_id;service_id
Range of Values	It can contain one or more keys separated by a semi-colon character. Each key represent a data field available in the incoming CDRs. ■ The basic key values are: ● <code>name</code> (the CDR name) ● <code>consumption_date</code> (the usage date of the service usage) ● <code>user_id</code> (the technical identifier of the end customer) ● and <code>service_id</code> (the technical identifier of the customer service) ■ The key representing the customized data fields in the CDR have the following syntax using the reserved prefixed 'item' <code>item.<CUSTOM_DATA_FIELD></code> For example, if the CDRs include the call_duration data, you can set up the deduplicate function to take into account this data field by adding the customized key <code>item.call_duration</code> in the configuration file. id

**EXAMPLE**

The BART Server system acquires sets of CDRs that include particular data fields (ZZ_USAGE_TYPE and ZZ_SERVICE_TYPE) that are used during the batch charging operations to dynamically price the customer service usage.

You configure the BART Server system with the following settings:

```
magic_number.database_deduplicate=true
```

```
magic_number.number=2 (this is the total number of magic number patterns)
```

```
magic_number.1.item_name=cdr
```

```
magic_number.1.fields=name;consumption_date;user_id;service_id
```

```
magic_number.2.item_name=customCDR
```

```
magic_number.2.fields=name;item.ZZ_USAGE_TYPE;item.ZZ_SERVICE_TYPE;consumption_date;user_id;service_id
```

Note that `customCDR` is the name of these particular CDRs.

If you want to be able to rate and charge these CDRs, you must configure a chargeable item class with the appropriate `ZZ_USAGE_TYPE` and `ZZ_SERVICE_TYPE` customized properties in that class.

Use the [Core Tool user interface](#) to create the necessary chargeable item classes.

Default Settings

The deduplicate function is enabled and the BART Server system is able to detect dupe CRDs

To detect dupe CDRs, the system considers the:

- CDR name
- Consumption date of the customer service
- User ID (USID) – the technical identifier of the end customer
- Service ID (SID) – the technical identifier of the customer service

The magic number pattern is: `name;consumption_date;user_id;service_id`

Procedure

- Create a backup copy and edit the [bart.config](#) file
- In the configuration file, change the values of parameters in the magic number section
- Save the changed configuration file
- Restart the BART Server system

Setting up the Scheduled Job Management

Use

You can fine configure:

- The maximum number of scheduled jobs that can be active at the same time
- The period between the output of two status events

Procedure

- Edit the `bart.config` file
- Set up these parameters
- Save the file
- Restart the BART Server system

Monitoring and Event Broadcasting

Jobs, acquisition and rating session events can be broadcasted through the use of XML messages that are generated at a regular frequency on the UDP network layer. By default, BART Server of SAP Convergent Charging 5.0 is provided with an event broadcaster and with a file report handler.

The BART Server system handles the following events grouped by functions (topics).

Topic (Function)	Event	Description
Acquisition	Acquisition session start event	This event is triggered each time a new acquisition session is started through the mediation chain. This event mainly contains the definition of the session being created.
Acquisition	Acquisition session status event	This event is triggered at a regular frequency (depending on the BART Server configuration parameters) and describes the elapsed time of the session, the number of newly acquired CDRs and the number of duplicated CDRs.
Acquisition	Acquisition session stop event	This event is triggered each time an acquisition session is complete. It contains the total duration of the session, the number of acquired CDRs and the number of duplicated CDRs.
Rating	Rating session start event	This event is triggered each time a new rating session is started. This event mainly contains the definition of the session being created.
Rating	Rating session status event	This event is triggered at a regular frequency (depending on the BART Server configuration parameters) and describes the elapsed time of the session, the number of rated CDRs and the number of erroneous CDRs.
Rating	Rating session stop event	This event is triggered each time a rating session is complete. It contains the total duration of the session, the number of rated CDRs and the number of erroneous CDRs.
Job	Job start event	This event is triggered each time a job execution is started. This event mainly contains the definition of the job being started.
Job	Job status event	This event is triggered at a regular frequency (depending on the BART Server configuration parameters) and describes the elapsed time of the job execution.
Job	Job stop event	This event is triggered each time a job execution is complete. It contains the total duration of the job execution.

Setting up the File Report Handler

Use

The file report handler of BART Server is sensitive to stop events from acquisition and rating sessions. For each event received, the BART Server system produces a report file containing the details of the complete session.

Procedure

- Edit the report.config file. It is located in the folder /usr/sap/<SID>/CAB<INST_NB>/config/ (UNIX) of <DRIVE>:\usr\sap\<SID>\CAB<INST_NB>\config\ (MS Windows).
- Change the values of following parameters:
 - folder:** folder where to store the report file (default: <BART_HOME>/logs/)
 - filename:** prefix for reporting file (default: report)
 - fileSuffix:** suffix for reporting file (default: .txt)
- Save the file



EXAMPLE

See the following example of a report file for an acquisition session: report_acquisition_05-11-15.txt

```
#####
      ACQUISITION REPORT
#####
CREATION DATE = Tue Nov 15 21:34:10 CET 2005
ACQUISITION DATE = 2005-11-15 21:34:10.717
ACQUISITION DURATION = 24 sec
ACQUISITION SOURCE = somewhere_with_some_CDRs\source.txt
ACQUISITION DESCRIPTION = Test JUNIT
ACQUISITION MODE= Acquisition and de-duplicate mode
NB CDR ACQUIRED = 961
NB CDR DUPLICATE= 39
NB CDR CONSOLIDATE = 950
STATUS= ended
```



EXAMPLE

An example of reporting file for a rating session follows: report_rating_05-11-15.txt

```
#####
      RATING REPORT
#####
CREATION DATE = Tue Nov 29 17:53:32 CET 2005
RATING START DATE = 2005-11-29 17:53:32.303
RATING DURATION = 2 sec
RATING MAX CONSUMPTION DATE = 2005-11-29 17:53:32.287
```

```
RATING DESCRIPTION = null  
RATING MODE= most mode  
NB CDR RATED = 100  
NB CDR IN ERROR= 0  
STATUS= cleaned
```

Enabling the Monitoring Function

Use

These parameters define the monitoring state: Activated or not.

Procedure

- Edit the [bart.config](#) file
- Set the monitoring state parameter
- Set the communication settings for the monitoring function
- Set the technical settings for the monitoring function
- Save the file
- Restart the server system

Advanced: Resetting the Customized File Report Handler

Procedure

- Do change the configuration only for customized event handlers
- View the bart.config file
- Verify that the default parameter values are present:
report.handler.number = 1
report.handler.1 = com.highdeal.bart.event.handler.FileReportHandler

Technical System Settings

Technical Configuration for the Monitoring

Use

For each function (topic), you can configure the period between the generations of two status events:

- `acquisition.session.monitoring.period`
- `rating.session.monitoring.period`
- `scheduler.job.monitoring.period`

Technical Configuration for Acquisition Sessions

Use

You can fine configure:

- The maximum number of concurrent running acquisition sessions
- The period between the output of two status events

Detailed information on the generation of events is provided in the *SAP CC Application Help*.

Procedure

- Edit the `bart.config` file
- Set the `acquisition.session.max.number` and the `acquisition.session.monitoring.period` parameters
- Save the file
- Restart the server system

Technical Configuration for CDR Consolidation Cache Management

Use

You can fine configure the consolidation cache management:

- The `consolidation.cache.enable` parameter allows you to enable or disable the consolidation cache
- The `consolidation.cache.size` parameter allows you to set the size of the cache by giving the number of accesses handled by the cache

Procedure

- Consult the `bart.config.sk` file for detailed information
- Edit the `bart.config` file
- Set up these parameters
- Save the file
- Restart the server system

Technical Configuration for Rating Sessions Management

Use

You can fine configure the rating session management:

- The maximum number of concurrent rating sessions
- The period between the outputs of two status events
- The number of concurrent threads per rating session: It must be chosen according to the number of collecting threads available on the SAP CC Core Server side. Furthermore, it must be less than or equal to the number of collecting threads. However, keep in mind that several rating sessions can be launched at the same time
- The size of a CDR commit block: It corresponds to the maximum number of CDRs rated through the Core Server system before the result is committed to the BART Database.

Procedure

- Edit the `bart.config` file
- Set these parameters
- Save the file
- Restart the server system

Technical Configuration for Rerating

You can fine configure the following parameters:

- The number of threads (`rerating.pool.size=4`) used for rerating subscriptions. Keep in mind that a thread is used per subscription.

**CAUTION**

This parameter must not exceed the maximum number of concurrent rating sessions (`rating.session.max.number=10`) which is set in the configuration file. Furthermore, the number of rating and rerating sessions running at the same time must not also exceed the maximum number of concurrent rating sessions (*).

- The number of session orders stored in memory (`rerating.queue.size=100`) for rerating subscriptions.

(*) If necessary, you can change the value of the maximum number of concurrent rating sessions, but changing the value of this parameter may alter the performance of processes.

Implementation Tasks

This section lists the configurations determined by the solution consultants and by the technical consultants of your project team.

Scenario Variant	Technical Interface	SAP CC Software Units	Implementation
Offline acquisition from connected system	Java	BART Server	Implementing the CDR Acquisition with the Java API (TCP/IP)
Offline acquisition from repository (file, database)		BART Server, IEC	Implementing the CDR Acquisition with an IEC

Implementing the CDR Acquisition with the Java API (TCP/IP)

Use

The SAP CC BART Server system receives CDRs from network elements or applications and sends them as chargeable items to the SAP CC Core Server system. The acquisition is managed by the client application or system (mediation).

You can customize your application with the Java Library provided by SAP Convergent Charging in a Software Development Kit (SDK):

Function	Technical Interface	Software Units	Technical Operation or API
Acquisition of CDRs	Java	BART SDK	Java Package: com.highdeal.bart.message Java Class: CDRServiceClient

For more technical details, consult online the *SAP CC 5.0 Java API References* in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API References → BART APIS (Java and XML) → com.highdeal.bart.message ↵.

Activities

As technology consultant, you have to:

- Specify and implement your CDR acquisition process according to the Java API (TCP/IP) Specification of SAP Convergent Charging and by using the [com.highdeal.bart.message.CDRServiceClient](#) Java class

**NOTES**

- For test and training purpose, you can prefer managing the CDR acquisition with an IEC application and dummy files containing CDRs
- You can also use the Java API (XML/HTTP) or the XML API for managing the CDR acquisition for test purpose

**EXAMPLE**

```
CDRServiceClient collector;
try {
    collector = new CDRServiceClient("BART_HOST",2009);
} catch (Exception e) {
    System.out.println("Cannot initialize BART Collector client -> "+e);
    e.printStackTrace();
}

// build up the acquisition session
AcquisitionSessionModel session = new AcquisitionSessionModel(...)
try {
    session = collector.startAcquisitionSession(session);
} catch (InvalidAcquisitionException e) {
    System.out.println("InvalidAcquisitionException -> "+e);
} catch (ServerUnavailableException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (CommunicationFailureException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (Throwable t) {
    System.out.println("Throwable -> "+t);
}
System.out.println("StartAcquisition() completed");

Vector cdrs = new Vector();
cdrs.add(new CDRModel(...// build up some CDRs
try {
    result = collector.acquireCDR(cdrs, session);
} catch (InvalidCDRException e) {
    System.out.println("InvalidCDRException -> "+e);
} catch (InvalidAcquisitionException e) {
    System.out.println("InvalidAcquisitionException -> "+e);
} catch (ServerUnavailableException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (CommunicationFailureException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (Throwable t) {
    System.out.println("Throwable -> "+t);
}

try {
    session = collector.stopAcquisitionSession(session);
} catch (InvalidAcquisitionException e) {
    System.out.println("InvalidAcquisitionException -> "+e);
} catch (ServerUnavailableException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (CommunicationFailureException e) {
    System.out.println("OperationFailureException -> "+e);
} catch (Throwable t) {
    System.out.println("Throwable -> "+t);
}
System.out.println("StopAcquisition() completed");
```

Implementing the CDR Acquisition with an IEC

Use

The SAP CC BART Server system receives CDRs from an Import/Export connector (IEC) application and sends them as chargeable items to the SAP CC Core Server system. The acquisition is managed by the IEC application. You can also customize this application with some Java tasks that will be performed on the data.

Consult the primary help of the SAP CC Connector Administration Tool in SAP Help Portal: <https://help.sap.com/cc> → SAP CC 5.0 → System Administration → Power User Documentation - CAT → About Scenario ↩. You can access to the primary help from the graphical user interface.

Prerequisites

- The IEC software unit of SAP Convergent Charging is installed and configured on your landscape

Implementation Activities

As technology consultant, you have to:

- Model and set up a scenario file for the IEC to retrieve your CDRs from the appropriate repository (file or database). This scenario must include components for the acquisition by BART and for managing the acquisition sessions.
- You can configure several scenarios to process the data or to perform some pretreatments.
- You can customize your IEC application by developing some Java tasks that can be performed by the IEC application (see page [469]).

Advanced: CDR Acquisition with the Java API (XML/HTTP)

Use

For test or training purpose, the SAP CC BART Server system can receive CDR acquisition from the HTTP Communication Interface (HCI) of SAP Convergent Charging.

Consult online the SAP CC Java API Reference (BART) from the SDK or in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API Reference (BART) → com.highdeal.bart.hci ↩.

Activities

- Specify and implement your CDR acquisition process according to the API specifications of SAP Convergent Charging and by using the Java classes of the [com.highdeal.bart.hci](https://help.sap.com/cc) Java package

**EXAMPLE**

A sender has to be instantiated as described in the SAP Convergent Charging documentation:

```
HttpMessageSender sender = ....
    StartAcquisitionSessionOp op = new StartAcquisitionSessionOp();
    String description = "Tests for BART User Guide";
    String source = "BART Reference";
    AcquisitionSessionModel session = new AcquisitionSessionModel(source, description,
AcquisitionSessionModel.ACQUIRE_AND_DEDUPLICATE_MODE );
    op.setAcquisitionSession(session);

    MessageOriginator originator = new MessageOriginator();
    originator.setName("USER"); // set the user name who has rights to create session in BART
    originator.setAuthentication(new SimpleMessageAuthentication("PASSWORD")); // set the user password
    MessageHeader header = new MessageHeader();
    header.setOriginator(originator);
    MessageBody body = new MessageBody();
    body.addOperation(op);
    MessageEnvelope envelope = new MessageEnvelope();
    envelope.setBody(body);
    envelope.setHeader(header);

    try {
        MessageEnvelope result = sender.send(envelope);
        StartAcquisitionSessionResult opRes =
        (StartAcquisitionSessionResult) result.getBody().getResult(0);
        session = opRes.getAcquisitionSession();
    } catch (CommunicationFailureException e) {
        System.out.println("CommunicationFailureException -> "+e);
    } catch (InvalidAcquisitionException e) {
        System.out.println("InvalidAcquisitionException -> "+e);
    } catch (OperationFailureException e) {
        System.out.println("OperationFailureException -> "+e);
    }
    System.out.println("StartAcquisition() completed");
```

Advanced: CDR Acquisition with the XML API

Use

For test or training purposes, SAP CC BART Server can receive CDR acquisitions from the *HTTP Communication Interface (HCI)* technical interface of SAP Convergent Charging.

Consult online the *SAP CC Java API Reference (BART)* from the SDK or in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API Reference (BART) → *com.highdeal.bart.hci* about the xsd fragments.

Activities

- Specify and implement your CDR acquisition process according to the API specifications of SAP Convergent Charging and by using the XSD fragments provided in the [com.highdeal.bart.hci](https://help.sap.com/cc) documentation

**EXAMPLE OF HCI ENVELOPE SENT WITH THE HTTP CLIENT UTILITY PROGRAM**

```
API request sent through the http client utility:
<HOME>/bin/http_client <BART_HOST> <BART_HOME>bart_start_acquisition.xml
<?xml version="1.0" encoding="utf-8"?>
<envelope>
```

```
<header transaction="most">
</header>
<body>
  <startAcquisitionSession>
    <acquisition startDate="2005-01-11T14:22:03" source="bart.xml"
description="test source XML" mode="acquireAndDeduplicate"/>
  </startAcquisitionSession>
</body>
</envelope>
```

**EXAMPLE OF ANSWER**

```
<?xml version="1.0" encoding="utf-8"?>
<envelope>
  <header transaction="most">
  </header>
  <body>
    <startAcquisitionSessionResult>
      <acquisition sessionID= "12002" startDate="2005-01-11T14:22:03"
        source="bart.xml" description="test source XML"
        mode="acquireAndDeduplicate"/>
    </startAcquisitionSessionResult>
  </body>
</envelope>
```

Supervision with the Event Handler Framework

Use

Jobs, acquisition and rating sessions can be monitored through the use of events that are generated at a regular frequency. Because event handlers follow a specific framework, new handlers can be developed at reduced costs depending on specific customer business.

Consult online the SAP CC Java API Reference (BART) from the SDK or in SAP Help Portal at: <https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API References.

**NOTE**

BART Server is provided with a file report event handler. These output files report the occurrence of acquisition and rating stop events.

Activities

- Specify and implement your customized report handler according to the Java API specification of SAP Convergent Charging.

Setting up the Customized Event Handlers

Use

You can configure different report handlers that are active in the SAP CC BART Server including the default file report handler and customized report handlers.

An event handler is mainly defined by the following elements:

- A Java class implementing the event handler framework which describes how events are handled.
- A property file, needed for initializing the handler.
- A list of topics to which the handler will be sensitive. The list of available topics are:
 - Acquisition topic: Refers to any events related to an acquisition session (start, stop and status)
 - Rating topic: Refers to any events related to a rating session (start, stop and status).
 - Job topic: Refers to any events related to a job execution (start, stop and status).

Prerequisites

You have developed an event handler based on the Event Handler Framework.

Procedure

- Consult the `bart.config.sk` file for detailed information
- When relevant, create a `bart.config` file based on this skeleton file
- Edit and change your `bart.config` file by setting up the necessary parameters
- Set the number of customized event handlers (`report.handler.number`)
- For each handler, set the class name, the property file and the subscribed topics
- Save the file
- Restart the server



NOTE

By default, the SAP CC BART Server system is provided with a file report handler. The following settings are available:

- **`report.handler.number = 1`**
- **`report.handler.1 = com.highdeal.bart.event.handler.FileReportHandler`**

Job Framework

Use

The SAP CC BART Server system has its own scheduler for triggering jobs that must follow a framework. New jobs can be developed at reduced costs depending on specific customer requests. Jobs are defined by a status (active or inactive), a state (running or not running), a recurrence or a polling period.

Consult the SAP CC Java API References from the SDK or in SAP Help Portal at: ►

<https://help.sap.com/cc> → SAP CC 5.0 → Development Information → Java API Reference (BART) ◀.

Activities

- Specify and implement your customized event handler according to the Java API References of SAP Convergent Charging.

Implementing Logging and Tracing Functions in Your Java-Based Application

Use

In this *Customizing* activity, you develop a Java-based application to redirect the logs and traces generated by the SAP CC 5.0 Java Libraries dedicated to the following processes:

- Acquisition and collection
- System administration via HCI



NOTE

For more information about the SAP Logging API, see in SAP Help Portal at the following location: ►

<http://help.sap.com> → SAP Netweaver → Developing Applications Using Java → Using Java → Ensuring Quality → Logging and Tracing → [SAP Logging API](#) ◀.

Prerequisites

- You use the SAP JVM
- Your developments use the Java libraries from the SAP CC 5.0 Core SDK
 - client.jar
 - sap.com~tc~logging~java.jar
- Your source code uses
 - The `com.highdeal.bart.message` package of the SAP CC Java Libraries
 - The `com.highdeal.bart.hci` package of the SAP CC Java Libraries

Activities

Insert the `sap.com~tc~logging~java.jar` file in the Java class path of your developed application

Create a configuration file and set up the necessary system properties used by the SAP CC 5.0 Java Libraries:

System property for your application	Similar parameter available in SAP CC systems
<code>ls.app.severity</code>	<code>LS_APP_SEVERITY</code>

System property for your application	Similar parameter available in SAP CC systems
ls.sys.severity	LS_SYS_SEVERITY
ls.trc.severity	LS_TRC_SEVERITY
ls.app.destination	LS_APP_DESTINATION
ls.sys.destination	LS_SYS_DESTINATION
ls.trc.destination	LS_TRC_DESTINATION
ls.trc.domain	LS_TRC_DOMAIN
ld.console.formatter	LDC_FORMATTER
ld.file1.enabled	LDF1_ENABLED
ld.file1.name	LDF1_FILE_NAME
ld.file1.size	LDF1_FILE_SIZE
ld.file1.setsize	LDF1_FILESET_SIZE
ld.file1.formatter	LDF1_FORMATTER
ld.file2.enabled	LDF2_ENABLED
ld.file2.name	LDF2_FILE_NAME
ld.file2.size	LDF2_FILE_SIZE
ld.file2.setsize	LDF2_FILESET_SIZE
ld.file2.formatter	LDF2_FORMATTER
ld.file3.enabled	LDF3_ENABLED
ld.file3.name	LDF3_FILE_NAME
ld.file3.size	LDF3_FILE_SIZE
ld.file3.setsize	LDF3_FILESET_SIZE
ld.file3.formatter	LDF3_FORMATTER
ld.file4.enabled	LDF4_ENABLED
ld.file4.name	LDF4_FILE_NAME
ld.file4.size	LDF4_FILE_SIZE
ld.file4.setsize	LDF4_FILESET_SIZE
ld.file4.formatter	LDF4_FORMATTER
ld.file5.enabled	LDF5_ENABLED
ld.file5.name	LDF5_FILE_NAME
ld.file5.size	LDF5_FILE_SIZE
ld.file5.setsize	LDF5_FILESET_SIZE
ld.file5.formatter	LDF5_FORMATTER

**NOTE**

For more information about these properties, see the SAP CC 5.0 Core Server Parameter Reference in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → SAP CC 5.0 → Administration → Core Server → Parameter Reference ◀.

11 Configuration of the BART Database

The SAP CC BART Server system is an optional software component of SAP Convergent Charging used in a scenario for offline charging. It is connected to the BART Database that stores technical data.

Partitioning

SAP Convergent Charging is designed for managing and storing a large volume of data. The partitioning is necessary to improve BART's performances when storing a large number of Consumption Detail Records (CDRs) in the BART database. The partitioning will help the DBA to administrate the databases especially for purging and archiving the data as described in the *Operations Guide for SAP CC 5.0*.

The procedures listed in this section enable you to configure:

- The number of days kept in the database
- The number of days or partitions that are created in advance
- How partition creation is triggered (manually or automatically)
- The directories used to store the tablespaces or filegroups



NOTE

You must be connected as DBA to your RDBMS to use the following procedures.



RECOMMENDATION

Update the partitioning configuration periodically to make the partition creation policy compliant with your real traffic.

Determining the Keeping Days

By default 40 days of Consumption Detail Records (CDRs) are stored and kept in the BART Database. For business, legal, or technical reason you may need to change this function. You can extend this period up to 70 days.



CAUTION

If your business scenario includes rerating services, ensure that the configuration of the SAP CC Core Server system is consistent. The total keeping days must be equal to the retention period for rerating.

Check that the COUNTER_SNAPSHOT_COUNT system parameter is set to the same value than the keeping days.

Setting up the Partitioning Configuration

Setting up the Partitioning Configuration for Sybase ASE

Overview

This table describes the package procedures to use for configuring the partitioning feature.

Procedure	Description
CONFIGURE	This procedure allows the DBA to configure the global partitioning policy. This procedure fills in the PARTITION_PURGE table with the parameters specified as arguments.
ADD_SEGMENT	This procedure allows creating a new segment.
REMOVE_SEGMENT	This procedure allows the DBA to remove a segment which is no more used for storing new partitions.
MANAGE_NEW_PARTITION	This procedure allows the DBA to manually trigger the creation of new partitions. New partitions are created if needed.



NOTE

To automatically trigger partition creation, create a job in Sybase ASE which calls the **MANAGE_NEW_PARTITION** procedure.

Prerequisites

- You have determined the number of days the CDRs are kept

Procedures

Execute the following procedures with the required arguments:

Procedure	Arguments	Description
CONFIGURE	partitionDays (integer)	The number of days kept in the database (default: 40 days)
	partitionAdvanceDays (integer)	The number of partitions which must be created in advance
ADD_SEGMENT	segment (varchar)	Name of the segment to add (256 characters at maximum)
REMOVE_SEGMENT	segment (varchar)	The segment to be removed

MANAGE_NEW_PARTITION	None	

Setting up the Partitioning Configuration for Oracle

Overview

This table describes the package procedures to use for configuring the partitioning feature.

Procedure	Description
BART_ARCHIVE_PURGE.CONFIGURE	This procedure allows the DBA to configure the global partitioning policy. This procedure fills in the PARTITION_PURGE table with the parameters specified as arguments.
BART_ARCHIVE_PURGE.ADD_DIRECTORY	This procedure allows creating a new directory, to resize an existing directory or to reactivate a removed one for storing tablespaces.  NOTES ■ Each tablespace name is unique and is of the form BART_yyyymmdd where yyyymmdd is a date. ■ You must create one directory at least at installation. ■ Resize the directory if the initial size is exceeded.
BART_ARCHIVE_PURGE.CONFIGURE_TABLESPACE	This procedure allows you to configure tablespace names.
BART_ARCHIVE_PURGE.REMOVE_DIRECTORY	This procedure allows the DBA to remove a directory which is no more used for storing new tablespaces.
BART_ARCHIVE_PURGE.MANAGE_NEW_PARTITION	This procedure allows the DBA to manually trigger the creation of new partitions. New partitions are created if needed.
BART_ARCHIVE_PURGE.START_SCHEDULER	This procedure activates the Oracle database scheduler for calling each day (at 2:00 AM), the MANAGE_NEW_PARTITION procedure.

BART_ARCHIVE_PURGE.STOP_SCHEDULER	This procedure stops the MANAGE_NEW_PARTITION scheduling.
BART_ARCHIVE_PURGE.RUN_SCHEDULER	This procedure is equivalent to the START_SCHEDULER procedure except that the first execution of the MANAGE_NEW_PARTITION procedure is immediate.

Procedures

Execute the following procedures with the required arguments:

Procedure	Arguments	Description
BART_ARCHIVE_PURGE.CONFIGURE	partitionDays (integer)	The number of days kept in the database (default: 40 days)
	partitionAdvanceDays (integer)	The number of partitions which must be created in advance
BART_ARCHIVE_PURGE.ADD_DIRECTORY	directory (varchar)	Pathname (2.000 characters at maximum)
	fileSize (varchar, default: '1GB')	Initial size. The maximal size is 128G.
	extendSize (varchar, default: '250MB')	The size of the directory, automatically increased by Oracle if needed
BART_ARCHIVE_PURGE.CONFIGURE_TABLESPACE	tablespaceprefix (varchar)	The prefix of the tablespace name, default is "BART_".
	tablespacesuffix (varchar)	The suffix of the tablespace name, it is located after the date of the form yyyymmdd.
	datafilesuffix (varchar)	The suffix of the datafile, default is ".dat".
BART_ARCHIVE_PURGE.REMOVE_DIRECTORY	directory (varchar)	The directory to be removed
BART_ARCHIVE_PURGE.MANAGE_NEW_PARTITION	none	

BART_ARCHIVE_PURGE.START_SCHEDULER	none	
BART_ARCHIVE_PURGE.STOP_SCHEDULER	none	
BART_ARCHIVE_PURGE.RUN_SCHEDULER	none	

Setting up the Partitioning Configuration for MS SQL Server

Overview

This table describes the package procedures to use for configuring the partitioning feature.

Procedure	Description
CONFIGURE	This procedure allows the DBA to configure the global partitioning policy. This procedure fills in the PARTITION_PURGE table with the parameters specified as arguments.
ADD_DIRECTORY	This procedure allows creating a new directory, to resize an existing directory or to reactivate a removed one for storing filegroups.  NOTES ■ Each filegroup name is unique and is of the form BART_yyyymmdd where yyyymmdd is a date. ■ You must create one directory at least at installation.
REMOVE_DIRECTORY	This procedure allows the DBA to remove a directory which is no more used for storing new filegroups.
MANAGE_NEW_PARTITION	This procedure allows the DBA to manually trigger the creation of new partitions. New partitions are created if needed.



NOTE

To automatically trigger partition creation, create a job in SQL Server which calls the **MANAGE_NEW_PARTITION** procedure.

Prerequisites

- You have determined the number of days the CDRs are kept

Procedures

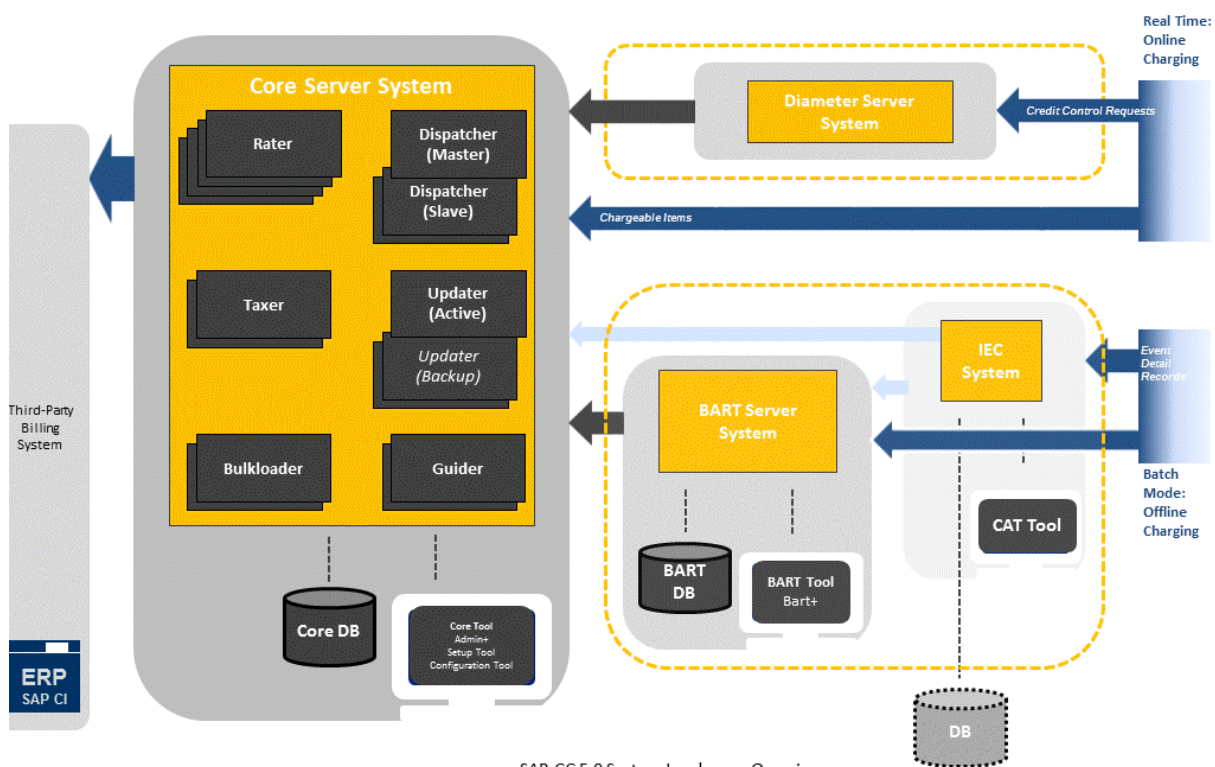
Execute the following procedures with the required arguments:

Procedure	Arguments	Description
CONFIGURE	partitionDays (integer)	The number of days kept in the database (default: 40 days)
	partitionAdvanceDays (integer)	The number of partitions which must be created in advance
ADD_DIRECTORY	directory (varchar)	Pathname (2.000 characters at maximum)
	fileSize (varchar, default: '1GB')	Initial size
	extendSize (varchar, default: '250MB')	The size of the directory
REMOVE_DIRECTORY	directory (varchar)	The directory to be removed
MANAGE_NEW_PARTITION	None	

12 Configuration of Diameter Server

SAP CC 5.0 Diameter Server is an optional software component of SAP Convergent Charging. It is used in an online charging scenario (real-time) for handling the mediation and credit control functions in front of SAP CC Core Server. These functions are based on the diameter protocol, an authentication, authorization, and accounting protocol for networks.

The SAP CC Diameter Server system is a connector system that communicates with the SAP CC Core Server system and with a downstream network element:



Configuration Files and Tools

You can configure the SAP CC Diameter Server system by editing the configuration files listed in the *Installation Guide*.

Each file includes detailed information. They are located in the folders:

/usr/sap/<SID>/CAD<INST_NB>/config/ (on UNIX) or
<DRIVE>:\usr\sap\<SID>\CAD<INST_NB>\config\ (on Windows).

Technical System Settings

Setting up the Quick Configuration

Use

For checking that the SAP CC Diameter Server system can run, few parameters must be set.

Procedure

- Stop the SAP CC Diameter Server system
- Edit the serverConfig.xml file located in the configuration folder
- Set up the following parameters in the different sections:

Parameter	Description
URI	IP address of the host that runs the SAP CC Diameter Server system
OCSHostName	IP address(es) of the host(s) that run(s) the SAP CC Core Server system
OCSPort	Port number of the Core Server system (usually 2000)
OperationTimeout	Timeout (in ms) of the charging request

- Restart the system

Setting up the Basic Configuration

Use

The serverConfig.xml file includes several sections:

- Stack identity parameters
- Capabilities exchange parameters
- Supported Application IDs
- Supported Vendor IDs
- Peer policy parameters
- Incoming messages handling parameters
- Routing table to handle proxiable requests
- Charging stack parameters
- Log level (can be changed dynamically)

You can set up the parameter values according to your business and your usage of the SAP CC Diameter Server system. Consult first the *SAP CC Application Help*.

Procedure

- Stop the SAP CC Diameter Server system

- Do a backup copy of the configuration files and archive the copies
- Edit the serverConfig.xml file located in the configuration folder
- Set up the following parameters in the different sections
- Restart the system and check the logs

**NOTE**

The parameter `RootLoggerLevel` can be changed while the SAP CC Diameter Server system is running. More precisely, the Diameter Server system reads the configuration file periodically and changes the log level according to the value set.

System Settings for the Java Virtual Machine

SAP Convergent Charging 5.0 must accommodate to hardware which ranges from a basic laptop up to 64-CPU machines. The default values that are used in the setups are very low so that the SAP CC Diameter Server system can be installed on a small configuration without being modified.

The default values are usually not suitable for a production environment. The memory allocated to the JVM must be customized for each instance to ensure high-level performance.



NOTE

Consult the *System Settings for the Java Virtual Machine* section in this guide for more information about the [available and recommended JVM options](#), page [71].

System Settings for Logging and Tracing

Setting up the Logging and Tracing Function

Use

By default, five rotating log files are generated by the SAP CC 5.0 Diameter Server system.

Default Settings

- Console
 - Level: All
 - Format: Simple
- Files (rotating log files with 5 files and 20MB file size):
 - Filename and path pattern: ../logs/diameter_server.log
 - Level: All
 - Format: Simple
 - Limit: 21000000
 - Count: 5
 - Append: true

Prerequisite

- You have defined the log and trace configuration policy in your system landscape

Procedure

- Stop the SAP CC Diameter Server system
- Do a backup copy of the configuration files and archive the copies
- Edit the logging.properties file in the configuration folder
- Set up the system parameters according to your policy
- Restart the system and check the logs

System Settings for the System Landscape Directory

Enabling and Setting Up the SLD Data Supplier Function

Use

The SAP CC 5.0 Diameter Server system can send information data to the SLD when starting. By default, this function is not enabled at installation time. You have to configure manually the Diameter Server system to connect to the SLD server system and to send payload data.

Prerequisites

- An SLD server system is up and running in your SAP system landscape.
- The Component Repository Content (CR Content) in the System Landscape Directory (SLD) is up-to-date (see SAP Note [669669](#))
- The required credentials (SLD user, password) are available in the SLD server system. An SLD user is dedicated to your Diameter Server system.
-

Procedure

- Stop the SAP CC Diameter Server system.
- Do a backup copy of the configuration files and archive the copies.
- Edit the serverConfig.xml file.
- Enable the function by setting up a valid URL for the SLD server.
- Change the communication parameters to the appropriate values:

Communication Parameters	
SLDURL	The URL of the SLD Data Supplier Service in the SLD server system. Enter the URL in the following format: http://<SLD_HOST>:<SLD_PORT>/sld/ds  NOTE The required URL must end with the '/ds' fragment to refer the Data Supplier service in the SLD server.
SLDUser	The user name or ID for the logon to the SLD server system for authentication of your SAP CC Diameter Server system
SLDPassword	The password associated to the SLD user that is dedicated to the authentication of your Diameter Server system

- Restart all the Diameter Server systems to apply the changes and check the logs.
- Verify that the payload data is properly sent to the SLD server system.

System Settings for Communications

Specifying a list of protocols and cipher suites for communications using SSL/TLS

As of SP 2, SAP CC 5.0 gives the possibility to specify a list of protocols and cipher suites that can be enabled for communications:

- Encrypted using SSL/TLS
- Related to the Core Server, BART Server and Diameter Server systems

Procedure

- Edit the `serverConfig.xml` configuration file
- Set up the `TLSEnabledProtocols` and `TLSEnabledCipherSuites` parameters accordingly
- Save the configuration file
- Restart the Diameter Server system

Business Settings

Changing the Service Dictionary

Use

The Service Dictionary is designed and customized by the project team during the implementation project phase.



CAUTION

A system administrator must not change these settings.

Prerequisites

The technical consultant has prepared the configuration changes according to the data flow (see the *Implementation Tasks* section in this document).

Procedure

- Stop the SAP CC Diameter Server system
- Do a backup copy of the configuration files and archive the copies
- Edit the serviceDictionary.xml file located in the configuration folder
 - This file is only read when the Diameter Server system starts
- Set up the parameter values according to your business requirements
- [Restart the system](#) and check the logs

Changing the AVP Dictionary

Use

The AVP Dictionary is designed by the project team during the implementation project phase.



CAUTION

A system administrator must not change these settings.

Prerequisites

The technical consultant has prepared the configuration changes according to the data flow (see the *Implementation Tasks* section in this document).

Procedure

- Stop the SAP CC Diameter Server system
- Edit the avpDictionary.xml file located in the configuration folder
 - This file is only read when the Diameter Server starts
- Set the parameters according to your business
- [Restart the system](#) and check the logs

Implementation Tasks

This section lists the system settings to be designed and customized by the solution consultants and by the technical consultants of your implementation project team.

With these *Customizing* activities, you can implement the session-based charging services with Diameter Server.



NOTE

Consult first the *SAP CC Application Help* for more information about the concepts and processes:

- Architecture
- Credit Control Messages Conversion Process

Implementing MSCC

Use

Consult first the *SAP CC Application Help*.

Procedure

- Stop the SAP CC Diameter Server system
- Do a backup copy of the configuration files
- Edit the serviceDictionary.xml file located in the configuration folder
- Set up the parameters according to your business
- [Restart the system](#) and check the logs

Support of MSCC AVPs

The elements of the Service Dictionary listed in the table below are dedicated to the support of MSCC AVPs.

XML Element	Description
<msccServiceKeyDesc>	Key used to determine which mapping has to be applied to the CCR

<msccServiceDesc>	Defines the mapping to be applied for transforming CCRs into charging requests for MSCC AVPs Constraints: ● Mandatory for activating the MSCC Support functionality ● Must contain one <msccMappingDesc> element
<msccMappingDesc>	Indicates where the following elements can be found in the CCR. Mandatory sub-elements: ● eventNameDesc: The name of the chargeable item class ● reservationIdDesc: The identifier of the reservation ● unitPropertyDesc: The unit property which is used to identify the property to inverse in case of inverse rating Optional sub-element: ● infoPropertyDesc: A user property to map, if required. You can define a default value for this property if it is not available in the MSCC AVP

To activate MSCC Support, you must add at least one <msccServiceDesc> element to the file serviceDictionary.xml. If a CCR contains several MSCC AVPs and no <msccServiceDesc> element is defined in serviceDictionary.xml, an error DIAMETER_UNABLE_TO_COMPLY is sent.

The file serviceDictionaryMSCC.xml is provided in the \examples\ directory of your installation as an example including MSCC elements. You can also use the file serviceDictionary.xsd to ensure that the structure of serviceDictionary.xml is valid.



NOTE

In the example file serviceDictionaryMSCC.xml, the Rating-Group AVP is used as key for the mapping and as reservation ID.

The CC-Sub-Session-Id (419) AVP can also be used as reservation ID.

Using the pattern **456[*]** in the AvpPath attribute means “for all the MSCC AVPs included in the incoming CCR”.

Implementing the Service Dictionary and the AVP Dictionary

Use

In this *Customizing* activity, you design and create the dictionary of attribute value pairs (AVP) that are relevant for the messages exchanged between the client application connected, the Diameter Server system and the Core Server system.

- AVP Name
- AVP Code
- AVP Type
- Vendor ID

You design and create the service dictionary that defines the mapping between the diameter messages and the charging operation messages exchanged between the Diameter Server system and the Core Server system. You use the file serviceDictionary.xsd to ensure that the structure of your customized service dictionary is valid.

This activity is linked to the pricing implementation activity as the AVPs define the input properties of the chargeable item classes that must be configured in SAP Convergent Charging.



EXAMPLE

AVP Name	AVP Code	AVP Type	Vendor ID
Call-Type	943	UTF8 String	12084
Service-Parameter-Value	442	Octet String	12084
SAPCC-DEDICATED-INFO1	944	Octet String	9999
SAPCC-DEDICATED-INFO2	945	Octet String	9999
Service-Information	873	Grouped	10415
Service-Generic-Information	1256	Grouped	10415
Deny-Reason	10027	Enumerated	11
Play-Announcement-Id	10045	Unsigned 32	11
Subscriber-Profile	10008	Grouped	11
Subscriber-Language	10009	UTF8 String	11

Consult first the *SAP CC Application Help*.

**CAUTION**

The `Service-Parameter-Value` AVP has to be defined in the dictionary since it is not supported in 3GPP any longer.

Activities

- Stop the SAP CC Diameter Server system
- Do a backup copy of the configuration files
- Edit the `avpDictionary.xml` file located in the configuration folder
- Set up the parameters according to your business requirements
- [Restart the system](#) and check the logs

**EXAMPLE OF CONFIGURATION FILES****Service Dictionary:**

```
<serviceInfoDesc propertyName="SAPCC-DEDICATED-INFO1" avpPath="944"/>
<serviceInfoDesc propertyName="SAPCC-DEDICATED-INFO2" avpPath="945"/>
```

AVP Dictionary:

```
<?xml version="1.0" encoding="UTF-8"?>

<!-- Specific AVP Dictionary for Diameter Server -->

<avpDictionary version="1.0" date="2008-01-01T00:00:00">

  <avpDesc name="Call-Type" code="943" type="UTF8String" vendorId="12084"/>
  <avpDesc name="Service-Parameter-Value" code="442" type="OctetString" vendorId="12084"/>
  <avpDesc name="Service-Information" code="873" type="Grouped" vendorId="10415"/>
  <avpDesc name="Service-Generic-Information" code="1256" type="Grouped" vendorId="10415"/>
  <avpDesc name="Deny-Reason" code="10027" type="Enumerated" vendorId="11"/>
  <avpDesc name="Play-Announcement-Id" code="10045" type="Unsigned32" vendorId="11"/>
  <avpDesc name="Subscriber-Profile" code="10008" type="Grouped" vendorId="11"/>
  <avpDesc name="Subscriber-Language" code="10009" type="UTF8String" vendorId="11"/>

  <!-- Specific AVPs for this implementation example -->

  <avpDesc name="SAPCC-DEDICATED-INFO1" code="944" type="UTF8String"/>
  <avpDesc name="SAPCC-DEDICATED-INFO2" code="945" type="UTF8String"/>

</avpDictionary>
```

Result

You configure the SAP CC Diameter Server system with these dictionaries. See the above procedures:

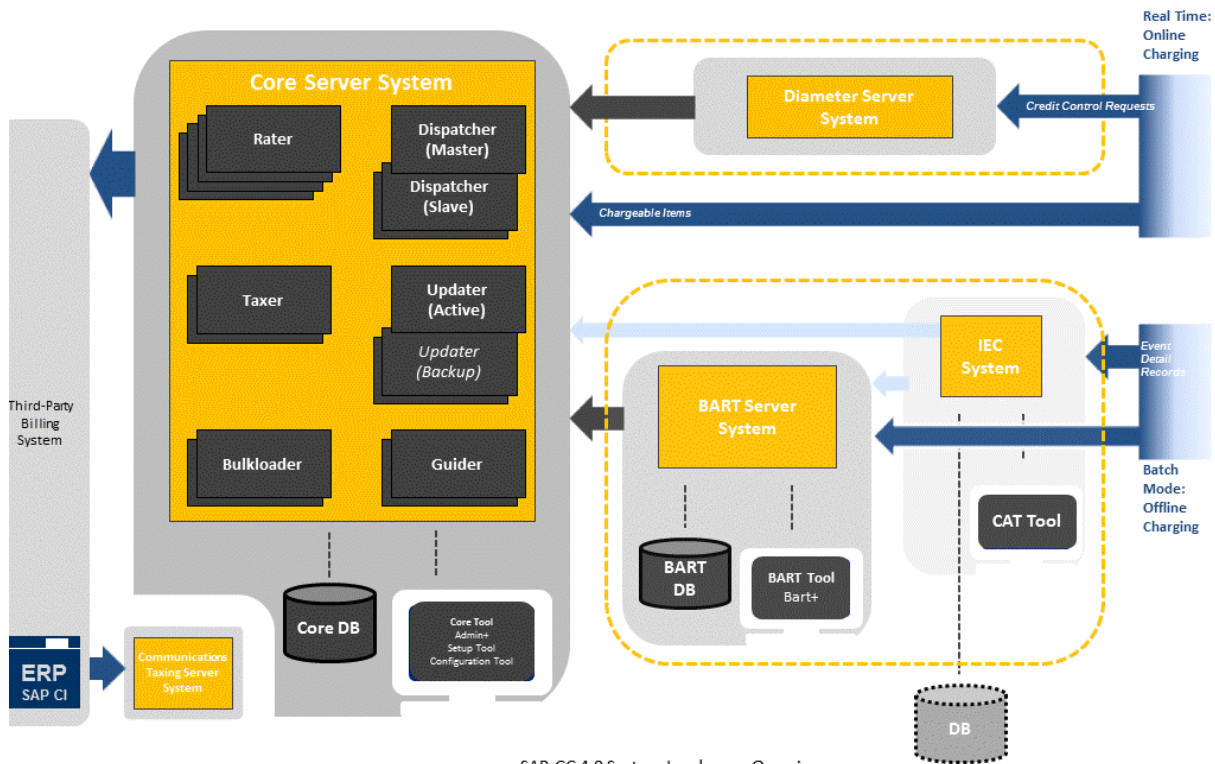
- Changing the AVP Dictionary
- Changing the Service Dictionary

You configure the relevant master data in SAP CC:

- You design and create the chargeable item classes that are relevant for your business requirements.
- In these classes, you add some properties that relate to the AVPs defined in the dictionary. For example, you add a string property named `SAPCC-DEDICATED-INFO1`.

13 Configuration of the IEC

Basic Settings



SAP CC 4.0 System Landscape Overview

Setting up a Scenario

Use

SAP CC 5.0 uses some scenario files to configure the SAP CC Import/Export Connector (IEC) applications.

Consult the primary help of the SAP CC CAT Tool user interface in SAP Help Portal: <https://help.sap.com/cc> → SAP CC 5.0 → System Administration Information → Power User Documentation - CAT → About Scenario. You can access to the primary help from the graphical user interface.

Procedure

- Launch the [CAT Tool user interface](#) and log on.
- Create a new scenario and save it in a file: **CAT → File → New → Scenario**.

Implementation Tasks

This section lists the configurations determined by the solution consultants and by the technical consultants of your project team.

Implementing Java Classes for Adding Functions

Use

You can customize your SAP CC Import/Export Connector (IEC) application by adding your own Java classes. You can add new actions, customize the reporting or customize the connection with the SAP CC BART Server.

You can customize your application with the Java Library provided by SAP Convergent Charging in a Software Development Kit (SDK):

Function	Technical Interface	Software Units	Technical Operation or API
Customization of New Functions for an IEC	Java	IEC SDK	■ Java Package: ● com.highdeal.iec ■ Java Class: ● JavaTask ● UserLogger ● AcquisitionSessionReportHandle r

For more technical details, consult online the SAP CC Java API Reference (IEC) in SAP Help Portal: <https://help.sap.com/cc> → SAP CC 5.0 → Development → Java API Reference (IEC).

Activities

As technology consultant, you have to:

- Specify and implement your Java classes according to the Java API Specification of SAP Convergent Charging.

Implementing Logging and Tracing in a Java Task

Refer to the documentation of the SAP framework.

14 Configuration of the SAP CC CTS Plugin

Set up the following parameters in the script `deploy_CC` to configure the SAP CC CTS plugin.



NOTE

The name of the script depends on your Operating System. The script is named:

- `deploy_CC.bat` for Windows
- `deploy_CC.sh` for Linux and Unix

- **SAPCC_JAVA_HOME:** the directory of your Java runtime environment. To set up this parameter, either:
 - Set up a `SAPCC_JAVA_HOME` environment variable
 - Uncomment and replace the `<JAVA_PATH>` string in the following line:
 `::SET SAPCC_JAVA_HOME=<JAVA_PATH>` for Windows
 `#SAPCC_JAVA_HOME=<JAVA_PATH>` for Linux and Unix



NOTE

If no `SAPCC_JAVA_HOME` is provided when you run the script `deploy_CC`, an error is thrown by the SAP CC CTS plugin to inform you that this configuration is missing.

- **LIBRARY_PATH:** the folder containing the libraries used by the SAP CC CTS plugin. The default value is the path to the `jar` folder. Change this value if you install these libraries in another folder than the default one. To set up this parameter, update the path as follows:
 - `SET LIBRARY_PATH=..\jars\` for Windows
 - `LIBRARY_PATH=../jars/` for Linux and Unix
- **LOG_SEVERITY:** the level of the log messages received from SAP CC Core Server. The possible log levels are:
 - `debug`: Display all the available information. This is useful when configuring the SAP CC CTS plugin.
 - `info`: Only display relevant information. This is default log severity.
 - `warning`: Display warnings and error messages.
 - `error`: Display error messages.

15 Configuration of the Documentation Center

SAP Convergent Charging 5.0 includes several HTML documents. SAP Help Portal provides your SAP CC users with real-time access to read and search for information.

In a productive system landscape, the SAP CC software is installed in isolated data centers. You cannot access to SAP Help Portal.

As an IT administrator or an IT consultant, you can implement your local Documentation Center for SAP CC.

Extract all the SDKs and the zip files available on SAP Help Portal to the same root directory.

For example, the destination folder includes:

- core_dbref (from SDK)
- core_tool (from SAP Help Portal)
- compo_ref

Typographic Conventions

Type Style	Description
	Arrows separating the parts of a navigation path, for example, menu options.
<i>Example Text</i>	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Cross-references to other documentation
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
EXAMPLE TEXT	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example text	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example text	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
<Example text>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system, for example, “Enter your <User name>”.
EXAMPLE	Keys on the keyboard, for example, F2 or ENTER .

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax

Copyrights

© Copyright 2017 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE. The information contained herein may be changed without prior notice.

Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors.

Microsoft, Windows, Excel, Outlook, and PowerPoint are registered trademarks of Microsoft Corporation.

IBM, DB2, DB2 pureScale, DB2 Universal Database, System i, System i5, System p, System p5, System x, System z, System z10, System z9, z10, z9, iSeries, pSeries, xSeries, zSeries, eServer, z/VM, z/OS, i5/OS, S/390, OS/390, OS/400, AS/400, S/390 Parallel Enterprise Server, PowerVM, Power Architecture, POWER6+, POWER6, POWER5+, POWER5, POWER, OpenPower, PowerPC, BatchPipes, BladeCenter, System Storage, GPFS, HACMP, RETAIN, DB2 Connect, RACF, Redbooks, OS/2, Parallel Sysplex, MVS/ESA, AIX, Intelligent Miner, WebSphere, Netfinity, Tivoli and Informix are trademarks or registered trademarks of IBM Corporation.

Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

Adobe, the Adobe logo, Acrobat, PostScript, and Reader are either trademarks or registered trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Oracle is a registered trademark of Oracle Corporation.

UNIX, X/Open, OSF/1, and Motif are registered trademarks of the Open Group.

Citrix, ICA, Program Neighborhood, MetaFrame, WinFrame, VideoFrame, and MultiWin are trademarks or registered trademarks of Citrix Systems, Inc.

HTML, XML, XHTML and W3C are trademarks or registered trademarks of W3C®, World Wide Web Consortium, Massachusetts Institute of Technology.

Java is a registered trademark of Sun Microsystems, Inc.

JavaScript is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

SAP, R/3, SAP NetWeaver, Duet, PartnerEdge, ByDesign, SAP Business ByDesign, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE in Germany and other countries.

Business Objects and the Business Objects logo, BusinessObjects, Crystal Reports, Crystal Decisions, Web Intelligence, Xcelsius, and other Business Objects products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Business Objects S.A. in the United States and in other countries. Business Objects is an SAP company.

All other product and service names mentioned are the trademarks of their respective companies. Data contained in this document serves informational purposes only. National product specifications may vary.

These materials are subject to change without notice. These materials are provided by SAP SE and its affiliated companies ("SAP Group") for informational purposes only, without representation or warranty of any kind, and SAP Group shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP Group products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.



Disclaimer

This documentation may describe use cases that are not authorized for all customers in all regions. Please refer to your license agreement and comply with any territorial or use restrictions that apply.

Some components of this product are based on Java™. Any code change in these components may cause unpredictable and severe malfunctions and is therefore expressly prohibited, as is any decompilation of these components.

Any Java™ Source Code delivered with this product is only to be used by SAP's Support Services and may not be modified altered in any way.

Documentation in SAP Help Portal

You can find the *SAP CC product documentation and user assistance* in SAP Help Portal at the following location: ► <https://help.sap.com/cc> → *SAP CC 5.0* ◀.

SAP Help Portal is the central place to access public or customer information about the SAP CC software product.

Quick links: [cc](#), [cc50](#)

SAP SE
Dietmar-Hopp-Allee 16
69190 Walldorf
Germany
T +49/6227/7-47474
F +49/6227/7-57575
www.sap.com