SAP Convergent Charging 4.0

Sizing Guidelines

CUSTOMER

Document Version 1.3 – October 2014

Document History

CAUTION

Before you start the implementation phase of SAP Convergent Charging (SAP CC) software component, make sure you have the latest version of this document.

You can find the latest version on SAP Service Marketplace in SAP Support Portal at the following location: https://service.sap.com/instguidescc → *SAP CC 4.0* → *Plan*.

You can subscribe to this folder.

Document History

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

Version	Date	Description
V1.0	August 2013	Initial version
V1.1	September 2013	First maintenance version - Minor changes
V1.2	March 2014	Second maintenance version - Minor changes - Allowances and Sybase ASE included
V1.3	October 2014	- Add CA Introscope and Sizing for Updater instances

SAP CC 4.0 Sizing Guidelines

Table Of Contents

Introduction (1/3)

Target Audience

- Solution Consultant
- Technology Consultant
- Implementation Project Team

Scope

This document is intended to help you in determining the best distribution rules and sizing rules.

The goal is to design your SAP Convergent Charging 4.0 system landscape, considering data volume, performance, robustness, scalability and high availability.

Sizing translates business requirements into hardware requirements based on predictions. That means determining the hardware requirements of an SAP CC 4.0 system, such as physical memory or CPU power.

The sizes of the hardware and database are influenced by both business aspects and technological aspects. This sizing identifies also some software and technology requirements for the database management system.

The regular growth of data volume and the load of the network must be taken into account as conditions for the initial sizing.

Introduction (2/3)

SAP CC Relevant Components

This document deals with the following components of SAP CC 4.0 within the following end-to-end business flows (business scenario variants):

- SAP CC Core Server (online charging or offline charging)
- SAP CC BART Server (offline charging)

These two server systems require a relational database management system (RDBMS). This document includes the guidelines for these back-end database systems:

- SAP CC Core Database
- SAP CC BART Database

NOTES

- This sizing takes into account neither the customer data provisioning processes (mass creation and configuration of subscriber accounts, subscriptions, or provider contracts) nor the rerating process.
- The sizing for the SAP CC Diameter Server and SAP CC Communications Taxing Server systems is out of scope of this document.

Introduction (3/3)

Implementation Planning Preparations

To prepare the planning of the implementation of SAP CC 4.0 software component:

- Read the *SAP CC 4.0 Library (Application Help)* to determine the components and services of SAP CC 4.0 and the installable software units for your business requirements. Take into account the prerequisites and the constraints for each business process.
- Design the architecture of the system landscape, which will include the SAP CC systems.
- Use the *SAP CC 4.0 Product Availability Matrix (PAM)* to check the most recent OSs and database systems supported by SAP CC 4.0.
- Use this *SAP CC 4.0 Sizing Guidelines* document to:
  - Select the right setup according to your service level requirements:
    - Performance (Throughput in peak or average throughput, latencies)
    - Data volume
    - High availability (HA)
  - Identify the sizing conditions, distributions rules, and the sizing rules that apply to your business.
- Read the *SAP CC 4.0 Implementation and Configuration Guide* to determine the integration elements and *Customizing* activities, the interfaces to be used (files, Java).

SAP CC 4.0 Sizing Guidelines

Business Requirements to Sizing

Introduction

Business Requirements to Sizing
- **Sizing Conditions**
- **Distribution Rules**
- **Sizing Rules**

Before You Start

System Landscape for SAP CC (TINY, SMALL, LARGE)

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Detailed Sizing Rules for LARGE Configuration

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Sizing Conditions and Business Requirements

You can size your SAP CC system landscape by identifying and specifying the business requirements for the production platform and its charging services.

Conditions	Online Charging	Offline Charging
Global Charging Services	▪ Online charging is real-time charging with or without credit control and service delivery control. ▪ It involves the main component of SAP CC: Core Server.	▪ Offline charging is an end-to-end process that includes a batch acquisition process and a batch charging process. ▪ It involves two SAP CC components: Core Server, BART Server.
Data Volume	Determine the volume of customer master data assigned to subscriber accounts: ▪ Subscriptions ▪ Provider contracts	Determine the volume of transactional data and master data : ▪ Consumption Detail Records (CDRs) ▪ Subscriptions ▪ Provider contracts
High Availability (HA)	Determine if the charging services must be highly available with acceptable decrease of performance planned or unplanned service disruption (hardware failure, maintenance, etc.).	Determine whether you must be able to process batch acquisition and batch charging at any time or not (in case of hardware failure).
Throughput	Determine if your SAP CC Core Server must handle: ▪ Peaks of traffic ▪ An average traffic with degraded performance in case of peaks	Determine whether you must consider the end-to-end throughput for the sizing or not. But also the throughput of the batch charging process. Refer to SAP Convergent Invoicing (SAP CI) documentation for SAP CI consideration
Latency	Determine whether your SAP CC Core Server must respond respecting a particular latency (Session based-charging with timeouts…)	

Distribution Rules

You can distribute the SAP CC systems among several host machines.

This document provides the rules to determine the localization of all the instances of the SAP CC Core Server system according to their types. The unique instance of the SAP CC BART Server system is also taken into account.

Rules	Recommendation	Description
Dedicated Hosts	Mandatory	The host machines are dedicated to SAP CC system landscape. The SAP CC Core Server and SAP CC BART Server systems cannot be installed on a host dedicated to the back-end database.
Dedicated RDBMS	Mandatory	Each database system is dedicated to an SAP CC system.
High Availability Considerations	Mandatory: result depends on business requirement	Particular distribution rules apply if you want to provide high availability services for online charging. Note: High Availability for SAP CC BART requires at least two BART Server systems deployed among two hosts to have an active/passive installation.
Simplified Rules	Mandatory: result depends on business requirement	Simplified distribution rules are available for basic platforms (see TINY and SMALL configurations) with low level of business requirements.
Reference Rules	Mandatory: result depends on business requirement	Important distribution rules are available for the LARGE platforms with high levels of business requirements.
Advanced Rules	Optional: for hardware budget optimization	Some advanced rules are available to optimize your hardware budget.

Sizing Rules

This document provides the rules for sizing the following software and hardware elements:

Software	Description	System
Database Third-Party Technology (and Software Edition)	Several database solutions and different editions are recommended according to your requirements: performance, high availability, high volume	RDBMS including the Core Database
Hardware	**Description**	**System**
CPU Power	CPU power is required for high-performance operations	All systems
Physical Memory (RAM)	RAM is required to store volume of data	All systems
File Storage Space	File storage space is required to store output data files generated by the SAP CC Core Server system as a result of the charging process	Core Server system (rater Instances)
Database Storage Space	Database storage space is required to store data: ▪ Master data: SAP CC Core Server ▪ Consumption Detail Records (CDRs): SAP CC BART Server	RDBMS including the Core Database and the BART Database

NOTE

This document uses typical host categories for the different hardware sizing rules. They are described in a specific section at the end of these sizing guidelines (see slide 47).

SAP CC 4.0 Sizing Guidelines

Before You Start

Before You Start (1/3)

How to Use this Sizing Guidelines Document

- Choose the type of the technical system landscape (TINY, SMALL, LARGE) following the SAP Customer requirements
- Determine if you need High Availability (HA) or not for your online charging (real-time services) and offline charging with the SAP CC Core Server system and its database
  - HA is available with:
    - Oracle RAC SE and Oracle RAC EE database systems
    - IBM DB2 Purescale system
- Click on the arrow  corresponding to your business case
- Follow the arrows to find the possible configurations for your business model (choosing Core Server, BART Server, and database).

IMPORTANT NOTE

This document uses typical host categories (CPU, memory) for the different hardware sizing rules. They are described in a specific section at the end of these sizing guidelines.

Before You Start
Dimensioning Axes for SAP CC Core Server

The following axes are available for dimensioning SAP CC Core Server and SAP CC Core Database.

Axes	Sizing Element	Assumption	Performance Impact
Total volume of subscriptions (or provider contracts)	▪ Memory ▪ Database storage space ▪ Database third party	Max Volume 20 M	▪ Online charging ▪ Offline charging ▪ Offline usage acquisition with BART ▪ Customer data provisioning
Average size of a subscription or of a contract	▪ Memory ▪ Database storage space ▪ CPU power	<=2 KB	▪ Customer data provisioning ▪ Online charging
Average number of accesses (per subscription or per provider contract)	▪ Memory ▪ Database storage space	<10	▪ Online charging ▪ Offline charging ▪ Customer data provisioning
Number of counters + Numbers in Allowances	▪ CPU power ▪ Memory ▪ Database storage	<=20	▪ Online charging ▪ Offline charging ▪ Using Allowances increase the CPU Consumption of 20% ▪ Using Rerating with Allowances requires twice as much memory.
Throughput (number of charged transactions per second)	▪ CPU power ▪ File storage ▪ Database third party	Based on peaks	▪ Online charging ▪ Offline charging
SAP CC monitoring with CA Introscope®	▪ CPU power ▪ File storage (log of the statistics)		▪ Increase the CPU Consumption of 6% ▪ Increase the Disk Usage of 8% ▪ Increase the Latency of 10%

Before You Start
Dimensioning Axes for SAP CC BART Server

The following axes are available for dimensioning SAP CC BART Server and SAP CC BART Database. The global performance of the offline charging process depends also on the sizing of the SAP CC Core Server system.

Dimensioning Axes	Sizing Element	Assumption for Sizing	Performance Impact
Daily business traffic (volume of events representing the usage of the service)	Database storage space	Max Volume 25 M	▪ Batch charging ▪ Usage batch acquisition with BART
Average size of a CDR	Database storage space	<=1 KB	▪ Batch charging ▪ Usage batch acquisition with BART
End-to-end throughput (number of CRDs acquired and batch charged per hour)	▪ CPU power ▪ File storage ▪ Database third party		Batch charging
Total volume of subscriptions (or provider contracts)		<=2.5M of subscriptions active for a business traffic day.	Usage batch acquisition with BART
CDRs Retention time (in days)		40 (Max 180)	Batch charging

Before You Start
Important Assumptions

The business scenario concerned by the sizing of SAP Convergent Charging is a B2C model. Consult our experts in B2B models. The following important assumptions are our references:

Assumption for Sizing	Dim. Axes	Online Charging	Offline Charging	How To Verify	Assumption Not Valid
Average size of a subscription (old data model) or a provider contract (new data model) is less than 2 KBytes	Yes	X	X	During the implementation project, try to create relevant data in the system and in the database to be able to determine the unit size (see Appendix)	Consult our experts
Less than 20 counters per subscription or provider contract in the database (including counters with Allowances)	Yes	X	X	After the modeling of the master data of a service provider (charges, charge plans), try to determine the number of counters that will be present in the related customer master data (subscriptions or provider contracts)	Consult our experts
Average number of accesses (per subscription or per provider contract) is less than 10	Yes	X	X	After the modeling of the master data of a service provider (charges, charge plans), try to determine the number of accesses that will be present in the related customer master data (subscriptions or provider contracts)	Consult our experts
Average size of a CDR is less than 1 KBytes	Yes		X	During the implementation project, try to create relevant data in the system and in the database to be able to determine the unit size.	Consult our experts

Before You Start
Important Assumptions - Latencies

The following important assumptions are relevant for latency on online charging:

Assumption for Sizing	How To Verify	Assumption Not Valid
Average size of a subscription (old data model) or a provider contract (new data model) is less than 2 KBytes	During the implementation project, try to create relevant data in the system and in the database to be able to determine the unit size.	Consult our experts
Less than 20 counters per subscription or provider contract in the database (including counters with Allowances)	After the modeling of the master data of a service provider (charges, charge plans), try to determine the number of counters that will be present in the related customer master data (subscriptions or provider contracts)	Consult our experts
Average number of modified counters (including prepaid balances and counters in Allowances) per real-time charging operation	After the modeling of the master data in the pricing catalog of a service provider (charges, charge plans), try to determine the number of modified counters during the charging operations. If prepaid accounts are configured in the subscriber accounts, the impacted prepaid balances must be added.	Consult our experts
Session-based charging: storage of sessions	During the implementation project phase, keep in mind that session-based charging is different from event-based charging. Estimate the number of concurrent sessions during peaks. Check the chargeable item for unneeded properties.	Consult our experts

SAP CC 4.0 Sizing Guidelines

System Landscape for SAP CC

Introduction

Business Requirements to Sizing

Before You Start

System Landscape and Landscape Configurations

- **Overview**
- **Landscape Configurations (TINY, SMALL, LARGE)**

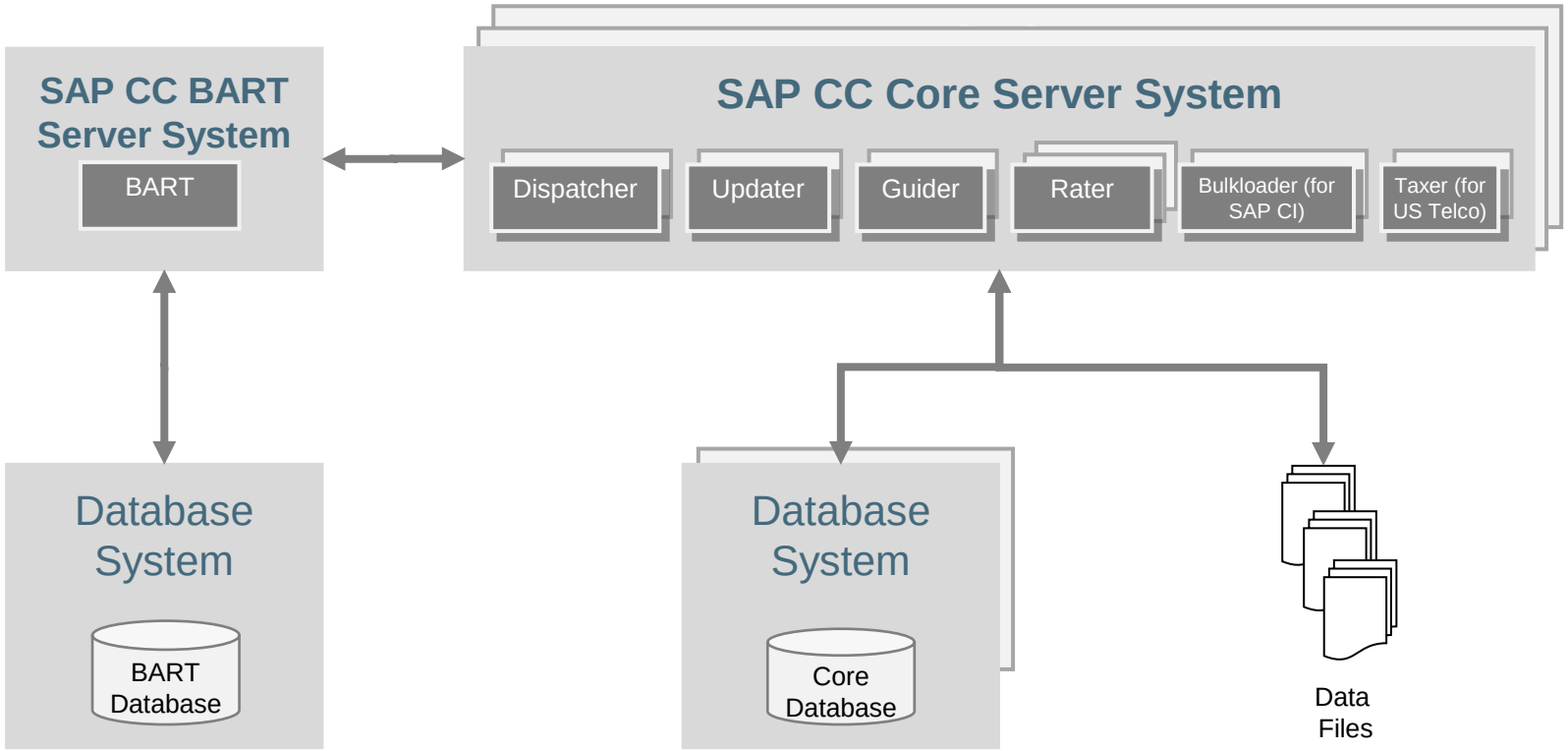
Sizing Guidelines

Detailed Sizing Rules for LARGE Configuration

Use Cases

Appendices

SAP CC 4.0 System Landscape Overview



Landscape Overview (2)

Recommendations by SAP

- Use this document to determine the appropriate configuration for your system landscape following the SAP Customer and the need of performance
- For each configuration, we provide mandatory distribution rules and few important recommendations

Landscape Configurations of SAP CC 4.0

Three landscape configurations are defined for SAP CC for your business requirements:

Landscape Configuration Definition					
Landscape Configuration	**Sizing Conditions (*)**		**Distribution Rules**	**Sizing Rules**	**Guidelines**
	Subscriptions or Provider Contracts	**Throughput**			
TINY ■ Very Small SAP Customer ■ No performance required	Less than **50 K**	Less than **500 TPS**	Simplified rules for two host machines	Basic rules based on A1 hosts	See Slide 22
SMALL ■ Small SAP Customer ■ No performance required	Less than **100 K**	Less than **1,000 TPS**	See the TINY configurations	Basic rules based on A3 hosts	See Slide 26
LARGE ■ Large SAP Customer ■ Good performance required	More than **100 K Subscriptions or Provider Contracts OR** more than **1,000 TPS**		Reference rules for distributing the system among the host machines	Detailed rules	See Slide 30

Note: (*) The conditions for each landscape configuration are based on the dimensioning axes described in the Before You Start section in this document.

SAP CC 4.0 Sizing Guidelines

Sizing Guidelines for SAP CC

TINY Configuration: Sizing Guidelines (No HA)

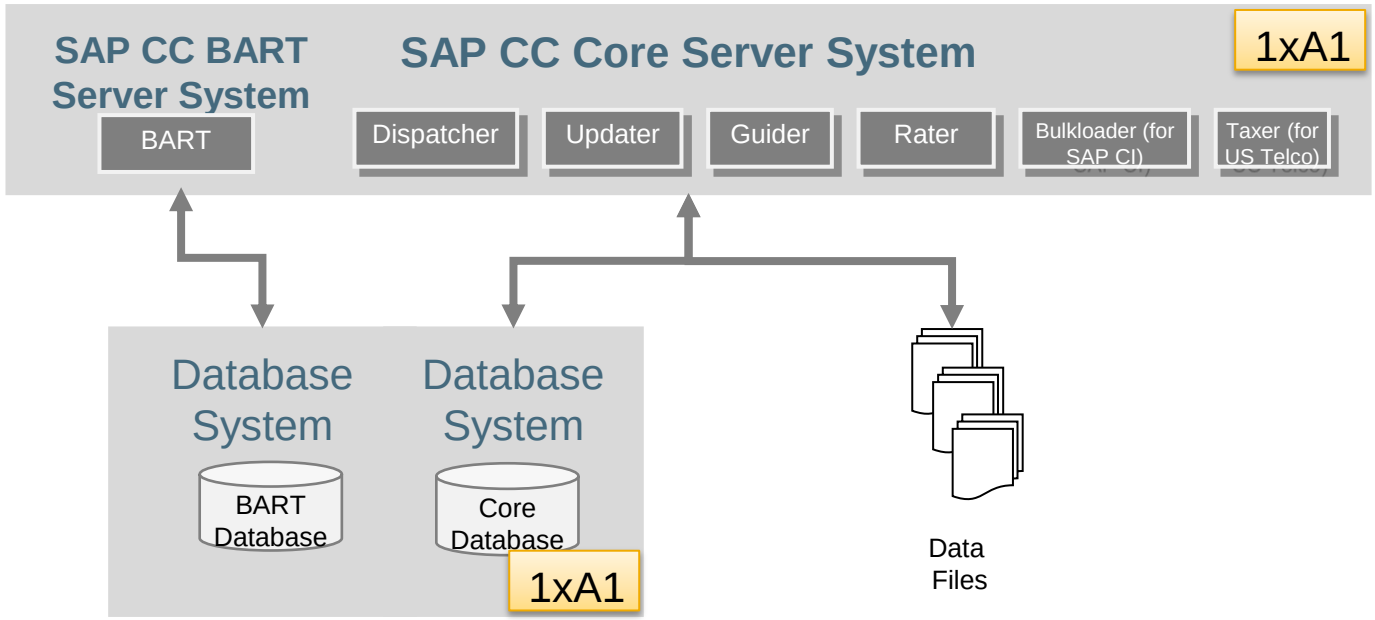
TINY

- **Sizing Conditions**
  - Data volume: Less than **50 K** subscriptions or provider contracts ***and***
  - Throughput: Less than **500 TPS** for the online charging process

- **Distribution Rules (Simplified)**
  - No CC server system, no instance is colocalized with database
  - SAP CC Core Server system: Each type of instance is installed on the same host (1x Dispatcher, 1x Rater, 1x Guider, 1x Updater + Optional: 1x Taxer (US Telco), 1x Bulkloader)
  - The SAP CC BART Server system is installed on the same host as the CC Core Server system

TINY Configuration: Sizing Guidelines (No HA)

TINY



- **Sizing Rules**
  - No HA Setup

SAP CC Systems - CC Core Server (All Instances) - CC BART Server	
Required Host	**1x A1 (8G)**
Database System	
RDBMS Third Party	**Oracle EE / MS SQL Server EE / IBM DB2 / Sybase ASE**
Required Host - CC Core Database - CC BART Database	**1x A1 (4GB)**
Database Storage	**Internal HD Storage 60GB (*)**
TOTAL #Hosts / #Cores	**2 / 4**

TINY Configuration: Sizing Guidelines (HA)

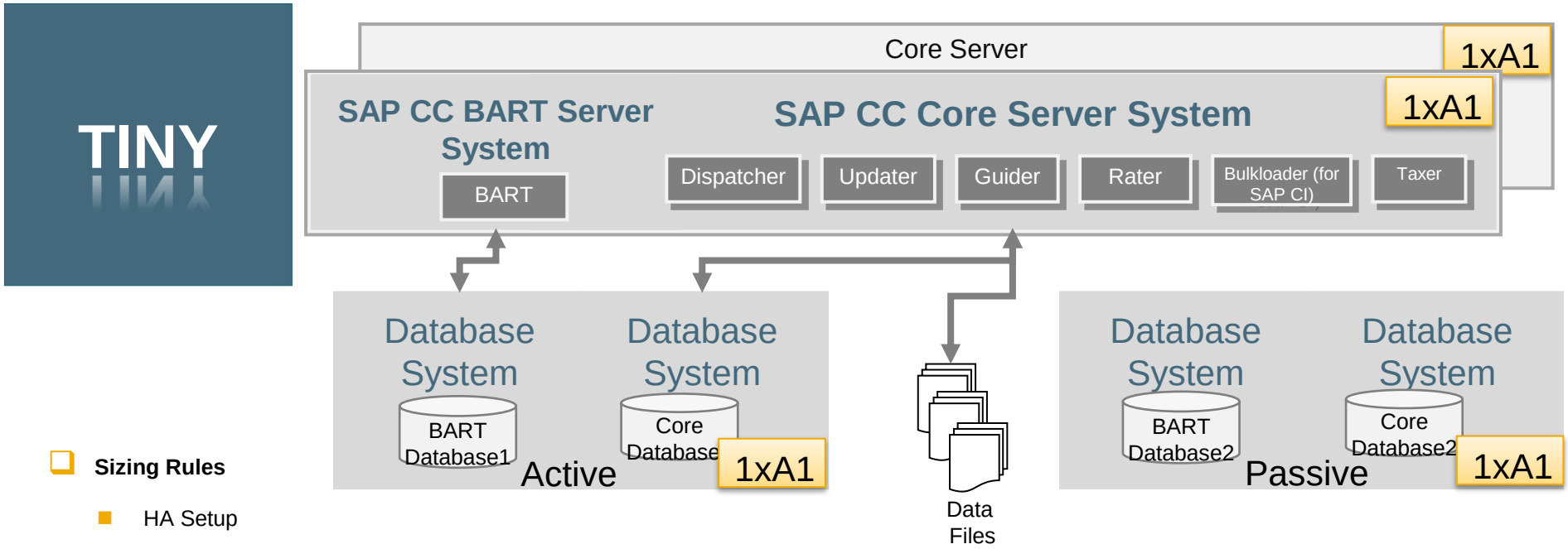
TINY

- **Sizing Conditions**
  - Data volume: Less than **50 K** subscriptions or provider contracts ***and***
  - Throughput: Less than **500 TPS** for the online charging process

- **Distribution Rules (Simplified)**
  - No CC server system, no instance is colocalized with database(s)
  - SAP CC Core Server system: Each type of instance is installed on the same host (1x Dispatcher, 1x Rater, 1x Guider, 1x Updater + Optional: 1x Taxer (US Telco), 1x Bulkloader)
  - The SAP CC BART Server system is installed on the same host as the CC Core Server system
  - High Availability (Active/Passive) is required:
    - The SAP CC Core Server system is distributed among the 2 hosts;
      A host includes an instance of each type
    - Two SAP CC BART Server systems are installed (one on each host)

Note (*): The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.

TINY Configuration: Sizing Guidelines (HA)



- **Sizing Rules**
  - HA Setup

SAP CC Systems - CC Core Server (All Instances) - CC BART Server (running) - CC BART Server (not running)	
Required Hosts	**2x A1 (8GB)**
Database System	
RDBMS Third-Party	**Oracle EE / MS SQL Server EE / IBM DB2 / Sybase ASE**
Required Hosts - CC Core Database - CC BART Database	**2x A1 (4GB)** **Host 1: Rating DB + BART DB (Active)** **Host 2: Rating DB + BART DB (Passive)**
Database Storage	**SAN Storage 60GB (*)**
TOTAL #Hosts / #Cores	**4 / 8**

Note (*): The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.

SMALL Configuration: Sizing Guidelines (No HA)

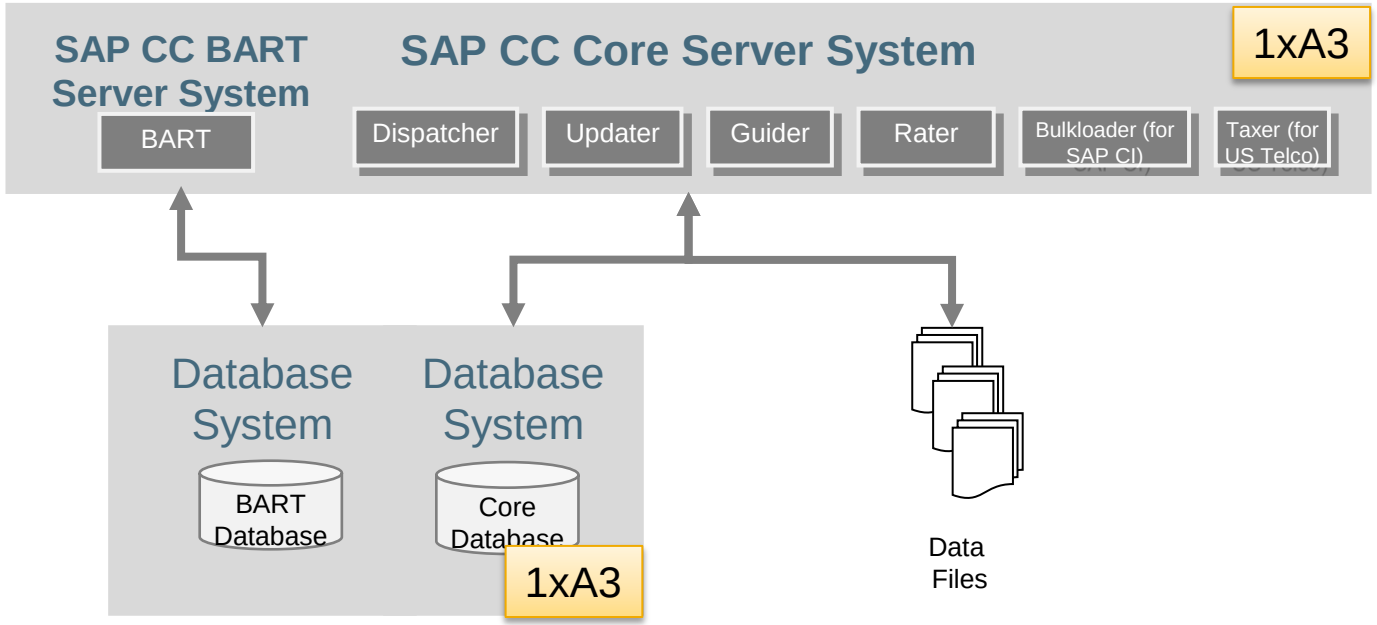
- **Sizing Conditions**
  - Data volume: Less than **100 K** subscriptions or provider contracts ***and***
  - Throughput: Less than **1,000 TPS** for the online charging process

- **Distribution Rules (Simplified)**
  - No CC sever system, no instance is co-localized with database(s)
  - SAP CC Core Server system: Each type of instance is installed on the same host (1x Dispatcher, 1x Rater, 1x Guider, 1x Updater + Optional: 1x Taxer (US Telco), 1x Bulkloader)
  - The SAP CC BART Server system is installed on the same host as the CC Core Server system

Note (*): The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.

SMALL Configuration: Sizing Guidelines (No HA)

SMALL



- **Sizing Rules**
  - No HA Setup

SAP CC Systems - CC Core Server (All Instances) - CC BART Server	
Required Host	**1x A3 (8G)**
Database System	
RDBMS Third-Party	**Oracle EE / MS SQL Server EE / IBM DB2**
Required Host - CC Core Database - CC BART Database	**1x A3 (8GB)**
Database Storage	**SAN Storage 120GB (*)**
TOTAL #Hosts / #Cores	**2 / 8**

Note (*): The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.

SMALL Configuration: Sizing Guidelines (HA)

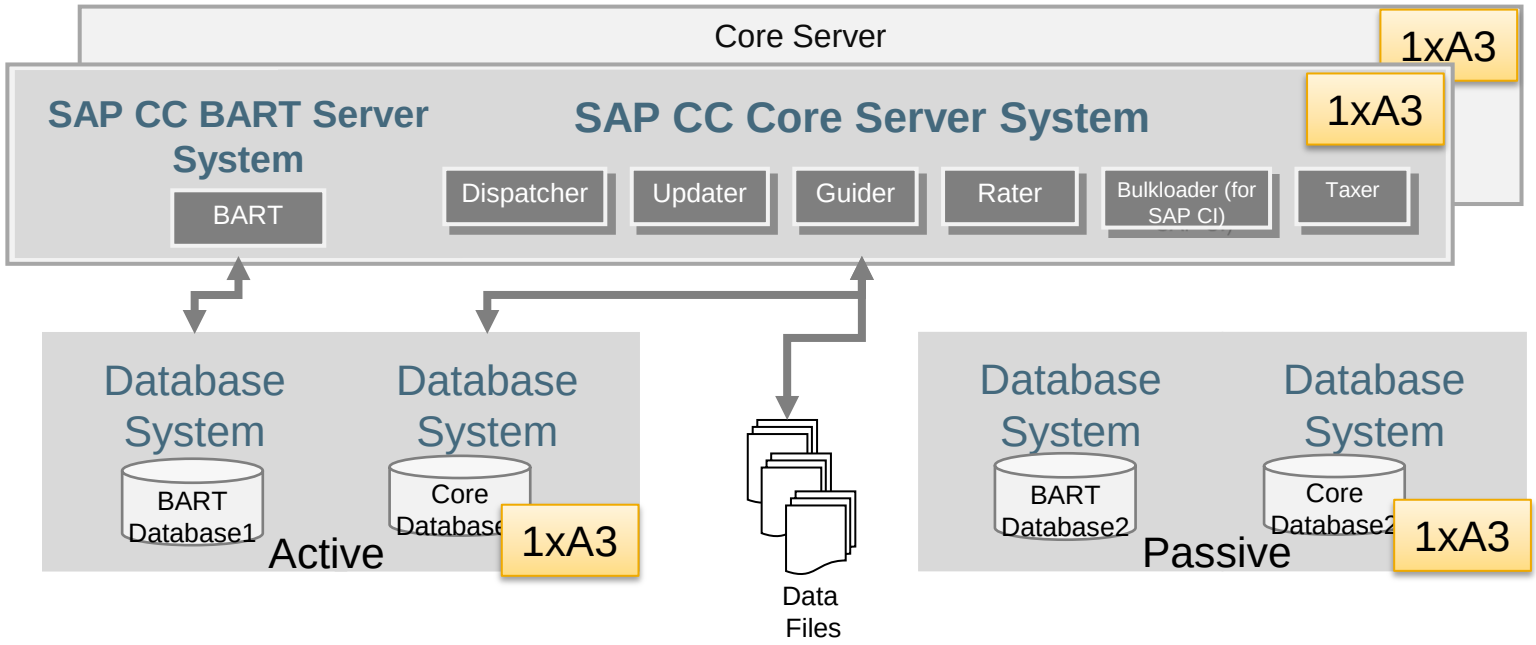
SMALL

- **Sizing Conditions**
  - Data volume: Less than **100 K** subscriptions or provider contracts ***and***
  - Throughput: Less than **1,000 TPS** for the online charging process

- **Distribution Rules (Simplified)**
  - No CC sever system, no instance is colocalized with database
  - SAP CC Core Server system: Each type of instance is installed on the same host (1x Dispatcher, 1x Rater, 1x Guider, 1x Updater + Optional: 1x Taxer (US Telco), 1x Bulkloader)
  - The SAP CC BART Server system is installed on the same host as the CC Core Server system
  - High Availability (Active/Passive) is required:
    - The SAP CC Core Server system is distributed among the 2 hosts; A host includes an instance of each type
    - Two SAP CC BART Server systems are installed (one on each host)

SMALL Configuration: Sizing Guidelines (HA)

SMALL



- **Sizing Rules**
  - HA Setup

SAP CC Systems - CC Core Server (All Instances) - CC BART Server (running) - CC BART Server (not running)	
Required Hosts	**2x A3 (8GB)**
Database System	
RDBMS Third-Party	**Oracle EE / MS SQL Server EE / IBM DB2**
Required Hosts - CC Core Database - CC BART Database	**2x A3 (8GB)** **Host 1: Rating DB + BART DB (Active)** **Host 2: Rating DB + BART DB (Passive)**
Database Storage	**SAN Storage 120GB (*)**
TOTAL #Hosts / #Cores	**4 / 16**

Note (*): The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.

LARGE Configuration: Sizing Guidelines (1)

LARGE

- **Sizing Conditions**
  - Data: More than **100 K** subscriptions or provider contracts ***or***
  - Throughput: More than **1,000 TPS** for online charging process
  - Throughput: Less than **1,000 TPS** for online charging with US telecommunication taxes
- **Distribution Rules**
  - Reference rules (Slide 31)
  - Advanced rules for hardware budget optimization (Slide 32)
- **Sizing Rules**

SAP CC Component	Sizing Elements	Sizing Rules
Core Server	All Instances of the system ▪ Host CPU Power and Memory (RAM) ▪ File Storage	See Slide 33
CC Core Database	RDBMS ▪ Third Party ▪ Edition	See Slide 34
	Oracle and Oracle RAC ▪ Host Category and Memory Precision ▪ Failover Mechanism	See Slide 35 RAC see Slide 36
	MS SQLServer ▪ Host Category and Memory Precision ▪ Partitioning	See Slide 37
	IBM DB2 ▪ RDBMS Edition	See Slide 38
	Database Storage Space	See Slide 39
CC BART Server	Host CPU Power and Memory (RAM)	See Slide 40
CC BART Database	▪ RDBMS ▪ Host Category ▪ Data Storage Space	See Slide 41

LARGE Configuration: Sizing Guidelines (2) Reference Distribution Rules

Distribution Rules (Reference)

- No SAP CC server system, no instance is colocalized with database system
- The CC Core Database and the CC BART Database are installed on different database management systems (RDBMS) and on different hosts
- Maximum 2 instances on the same host
- When High Availability is required:
  - At least 2 instances of each type are distributed among 2x hosts
- By default: one instance per host
- Specific rules for certain types of system instances apply:

Instance Types	Specific Distribution Rules	Maximum
Rater	▪ Use 1x rater instance / 10 million of subscriptions or provider contracts ▪ Maximum: 20 rater instances for an SAP CC system ▪ Maximum 1x rater instance per host ▪ If bulkloading is used, one bulkloader is inevitably located with the rater on the same host	20
Bulkloader	▪ A bulkloader instance must be installed for each rater instance and localized on the same host	20
Guider	▪ Use 1x guider instance for 2x rater instances ▪ Maximum 1x guider instance per host ▪ A guider can be localized with a dispatcher instance	10
Updater	▪ A host must be dedicated to an updater instance ▪ Maximum 1x updater instance per host	
Dispatcher	▪ A dispatcher instance can be localized with a guider instance ▪ 3000 TPS < Throughput → Install a second dispatcher instance at least	
Taxer	▪ A host must be dedicated to a taxer instance ▪ Maximum 1x taxer instance per host ▪ 500 TPS < Throughput < 1,000 TPS → Install a second taxer instance at least	
BART Server	N/A: A host must be dedicated to BART Server	

SAP CC 4.0 Sizing Guidelines

Detailed Sizing Rules for LARGE Configuration

LARGE Configuration Guidelines – Sizing Rules
Host Sizing / CC Core Server

SAP CC 4.0 Core Server System				
CC Core Server Instances	**Sizing Conditions**	**Sizing Rules**		
		File Storage	**CPU**	**Memory (RAM)**
Rater instance	Throughput =< 1,000 TPS	70 GB in a local RAID1 hard drive (or a SAN)	DC1	2GB / 1 Million of contracts (*)
	1,000 TPS < Throughput < 5,000 TPS	70 GB in a SAN	QC1	
Guider instance	Throughput =< 2,000 TPS		DC1	1.25GB / 1 Millions of accesses
	2,000 TPS < Throughput < 5,000 TPS		QC1	
Updater instance	Master data =< 1 million of contracts (*)		QC1	2 GB
	1 < Master data < 5 millions of contracts (*)		DC2	4 GB
	5 < Master data < 10 millions of contracts (*)		QC2	8 GB
	10 < Master data < 20 millions of contracts (*)		QC2	> 8 GB
Dispatcher instance	Throughput =< 2000 TPS		DC1	512 MB
	2,000 TPS < Throughput < 3,000 TPS		QC1	
	3,000 TPS < Throughput < 5,000 TPS		2 instances on 2 Host DC2 each	
Bulkloader instance	Throughput =< 1,000 TPS		DC1	1 GB
	1,000 < Throughput < 2,000 TPS		QC1	
	2,000 TPS < Throughput < 5,000 TPS		QC2	
Taxer instance	Throughput < 500 TPS		QC1	1 GB
	500 TPS =< Throughput < 1,000 TPS		QC2	
	1,000 TPS > Throughput		*Consult our experts*	

(*) Provider contracts or subscriptions size ~ 2 Kbytes

IMPORTANT NOTES

- No more than one QC2 per host machine
- In case of colocalization of 2 instances with different types on a host, consider the sum of CPU choices per Instances
- The Counters updated with Allowances require 20% more CPU consumption to have the same performance that Counters updated by charge component. It is needed to change the CPU category in this case (i.e DC1 → QC1; DC2 → QC2; QC1 → QC2)
- If the Allowances are used and Rerating required, the Size of Memory must be twice as big as mentioned in the table above (i.e 2GB → 4GB)

LARGE Configuration Guidelines – Sizing Rules RDBMS / CC Core Database

Sizing Conditions	Sizing Rules	
	RDBMS Third-Party	RDBMS Edition
0.1 M < Data < 10 Millions of contracts (*)	MS SQL Server	Enterprise Edition (EE)
	Oracle	See the 3 next slides to determine the RDBMS edition
	Oracle RAC	
10 M < Data < 20 M of contracts (*)	Oracle	
	Oracle RAC	
(Online Charging) Throughput	See the 3 next slides to determine the RDBMS edition	
High Availability (HA)	Oracle RAC is mandatory	Enterprise Edition (EE)

(*) Provider contracts and subscriptions

LARGE Configuration Guidelines – Sizing Rules
Host Sizing / CC Core Database (Oracle)

The sizing of the CC Core Database is valid until 20 counters per subscription or provider contract. With more than 20 counters, please consult SAP support.

Subscriptions or Provider Contracts	Required Host Category for Oracle 11g (SE or EE)										Memory (GB)
	100 TPS	200 TPS	500 TPS	750 TPS	1,000 TPS	1,500 TPS	2,000 TPS	2,500 TPS	3,000 TPS	5,000 TPS	
1 M	DC1	DC1	DC1	DC1	DC1	DC1	DC2	DC2	DC2	DC2	4
2 M	DC1	DC1	DC1	DC1	DC1	DC1	DC2	DC2	DC2	DC2	8
3 M	DC1	DC1	DC1	DC1	QC1	QC1	QC1	QC1	QC1	QC1	12
4 M	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	16
5 M	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	QC1	20
6 M	QC1	QC1	QC1	QC1	QC2	QC2	QC2	QC2	A5	A5	24
7 M	QC1	QC1	QC1	QC1	QC2	QC2	QC2	QC2	A5	A5	28
8 M	QC1	QC1	QC2	QC2	QC2	QC2	QC2	QC2	A5	A5	32
9 M	QC1	QC1	QC2	QC2	QC2	QC2	QC2	QC2	A5	A5	36
10-15 M	QC1	QC1	QC2	QC2	QC2	QC2	QC2	QC2	A5	A5	40
15-20 M	QC1	QC2	QC2	QC2	QC2	QC2	A5	A5	A5	A5	60
> 20M	**Please consult SAP support**										

Throughput

Oracle 11g Standard Edition (SE) without partitioning

Oracle 11g Enterprise Edition (EE) with partitioning

(*) Not tested

LARGE Configuration Guidelines – Sizing Rules
Host Sizing / CC Core Database (Oracle RAC)

The sizing stays valid until 20 counters per Subscription or Provider Contract. With more than 20 counters, please consult SAP support. The recommendation for HA is to have two RAC nodes. For the higher levels (performance or HA) the number of nodes can be increased and is given by the database specification.

Subscription or Provider Contract	Host Type To Install										Memory (GB)
1 M	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	4
2 M	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	8
3 M	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	12
4 M	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xDC1	2xQC1	16
5 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	20
6 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	24
7 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	28
8 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	32
9 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC2	2xQC2	36
10-15 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC2	2xQC2	2xQC2	2xQC2	40
15-20 M	2xQC1	2xQC1	2xQC1	2xQC1	2xQC1	2xQC2	2xQC2	2xQC2	3xQC2	3xQC2	60
> 20M	**Please consult SAP support / R&D**										
	100 TPS	200 TPS	500 TPS	750 TPS	1,000 TPS	1,500 TPS	2,000 TPS	2,500 TPS	3,000 TPS	4,000 TPS	*Throughput*

Oracle 11g RAC SE: the failover (active/passive) is based on a PRIMARY and a BACKUP RAC instance

Oracle RAC EE: the failover is based on 2 active RAC instances each instance being the BACKUP of the other one

(*) Not tested

LARGE Configuration Guidelines – Sizing Rules Host Sizing / CC Core Database (SQL Server)

The sizing of the CC Core Database is valid until 20 counters per subscription or provider contract. With more than 20 counters, please consult SAP support.

Subscriptions or Provider Contracts	Required Host Category for MS SQL Server 2008 EE									Memory (GB)
	100 TPS	200 TPS	500 TPS	750 TPS	1,000 TPS	1,500 TPS	2,000 TPS	2,500 TPS	3,000 TPS	*Throughput*
1 M	DC1	DC1	DC2	DC2	DC2	QC1	QC1	QC1	QC1 (*)	4
2 M	DC1	DC1	DC2	DC2	QC1	QC1	QC1	QC1	QC1 (*)	8
3 M	DC1	DC1	DC2	DC2	QC1	QC1	QC1	QC2	QC2 (*)	12
4 M	QC1	QC1	QC1	QC1	QC1	QC1	QC2	QC2	QC2 (*)	16
5 M	QC1	QC1	QC1	QC1	QC1	QC2	QC2	QC2	QC2 (*)	20
6 M	QC1	QC1	QC1	QC1	QC2	QC2	QC2	QC2	QC2 (*)	24
7 M	QC1	QC1	QC1	QC2	QC2	QC2	QC2	QC2	QC2 (*)	28
8 M	QC1 (*)	QC1 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	A5 (*)	A5 (*)	32
9 M	QC1 (*)	QC1 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	A5 (*)	A5 (*)	36
10 M	QC1 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	QC2 (*)	A5 (*)	A5 (*)	40
> 10M	**Please consult SAP support / R&D**									

SQL Server 2008 Enterprise Edition without partitioning

SQL Server 2008 Enterprise Edition with partitioning

(*) Not tested

LARGE Configuration Guidelines – Sizing Rules Host Sizing / CC Core Database (IBM DB2)

- The IBM DB2 is supported but the Sizing Guidelines are not yet available.

Consult our experts for more information.

LARGE Configuration Guidelines – Sizing Rules Database Storage Space / CC Core Database

Sizing Rules for Data Storage Space

Apply the formula:

- Storage Size (in GB) (*) = Number of subscriptions or provider contracts x Unit Cost
- Unit Cost (in Bytes) = (2 x Subscription or Provider Contract average size in database (in KBytes)) + (number of Counters per Subscription or Provider Contract / 2) + (number of Accesses per Subscription or Provider Contract)

Subscriptions or Provider Contracts	Initial Conditions	Example 1	Example 2	Example 3	Example with Assumptions
	▪ Average size per Subscription or Provider Contract: 2KBytes ▪ Counters per subscription or provider contract ▪ Accesses per subscription or provider contract	1x Counter 1x Access	1x Counter 10x Accesses	20x Counters 1x Access	**20x Counters** **10x Accesses**
1 M	▪ Oracle ▪ MS SQL Server ▪ Oracle RAC	1M x (2x2+1/2+1)→ **5.5 GB**	**14.5 GB**	**15 GB**	**24 GB**
2 M	▪ Oracle ▪ MS SQL Server ▪ Oracle RAC	2M x (2x2+1/2+1) → **11 GB**	**29 GB**	**30 GB**	**48 GB**
10 M	▪ Oracle ▪ MS SQL Server ▪ Oracle RAC	10M x (2x2+1/2+1) → **55 GB**	**145 GB**	**150 GB**	**240 GB**
20 M	▪ Oracle ▪ Oracle RAC	20M x (2x2+1/2+1) → **110 GB**	**290 GB**	**300 GB**	**480 GB**
> 20 M					

(*) The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks (for example, in Oracle, there is 10% of free space in the block).
This storage size represents the minimal space required.

LARGE Configuration Guidelines – Sizing Rules
Host Sizing / CC BART Server

Depending on the daily business traffic and the average throughput, the following table defines the CPU power and the memory required for acquiring your traffic events offline and for rating them in batch processing.
The following table shows the total treatment time required for processing all the events during a limited period of time. About 4 hours are expected to complete the offline charging for a business day.

Daily Business Traffic (in CDRs)	Required Host CPU							Memory (GB)
	DC1	DC1	QC1	QC1	QC2	QC2		
1 M	**4 Hours**	48 mn	24 mn	16 mn	12 mn	< 10 mn		**1**
5 M	N/A	**4 Hours**	2 Hours	1.33 Hours	1 Hour	48 mn		**1**
10 M	N/A	8 Hours	**4 Hours**	~3 Hours	2 Hours	~1 ½ Hours		**2**
15 M	N/A	12 Hours	6 Hours	**4 Hours**	3 Hours	~2 Hours		**3**
20 M	N/A	N/A	8 Hours	~ 5 ½ Hours	**4 Hours**	~3 Hours		**4**
25 M	N/A	N/A	10 Hours	~ 6 ½ Hours	5 Hours	**4 Hours**		**5**
> 25 M								
	250,000 TPH (70 TPS)	1.25 M TPH (347 TPS)	2.5 M TPH (694 TPS)	3.75 M TPH (1.042 TPS)	5 M TPH (1.389 TPS)	6.25 M TPH (1.736 TPS)	10 M TPH	
Requirement for SAP CC Core Server:	140 TPS (SMALL Configuration)	694 TPS (LARGE Configuration)	1,389 TPS	2,083 TPS	2,778 TPS	3,472 TPS		

Note: (*) The conditions for each landscape configuration are based on the dimensioning axes described in the Before You Start section in this document.

LARGE Configuration Guidelines – Sizing Rules
Host Sizing / CC BART Database

Sizing Rules for Data Storage Space

- Apply the formula:
  Storage Size (in Bytes) (*) = (Number of CDRs charged per day) x (Average size of a CDR (in Bytes)) x Retention days (***)
- Example: 1M x 1.024 x 40 = 40GB and 25M x 1.024 x 40 = 1 TB

Daily Business Traffic (in CDRs)	Host Type To Install		Memory (GB)	Data Storage Space (*)	
	Oracle EE	MS SQL Server EE		Example 1 Average CDR size: 1KByte Retention time: 40 days (***)	Example 2 Average CDR size: 1KByte Retention time: 70 days (***)
1 M	DC1	DC1		40 GB	70 GB
2 M	DC1	DC1		80 GB	140 GB
3 M	DC2	DC2		120 GB	210 GB
5 M	DC2/QC1	DC2/QC1		200 GB	350 GB
7 M	QC1	QC1		280 GB	490 GB
10 M	QC1	QC1		400 GB	700 GB
15 M	QC2	QC2(**)		600 GB	1.05 TB
20 M	QC2	QC2(**)		800 GB	1.40 TB
25 M	QC2	QC2(**)		1 TB	1.75 TB
> 25 M					

Enterprise Edition

(*) The effective size excludes the disk space required by data redundancy (RAID) and does not take into account the non used space that can exist in the database blocks.
(**) Not tested
(***) By default the value is 40 retention days (extendable to 70 days)

SAP CC 4.0 Sizing Guidelines

Use Cases

Typical Use Cases
Online Charging (10M Contracts) within C2C

Host Machine	Example 1 2,200 TPS	Example 1HA 2,200 TPS with High Availability	Example 2 5,000 TPS	Example 2HA 5,000 TPS with HA
Business requirements ▪ Data volume ▪ Online charging throughput ▪ Others	▪ 10M contracts ▪ 2,200 TPS	▪ 10M contracts ▪ 2,200 TPS ▪ High Availability	▪ 10M contracts ▪ 5,000 TPS	▪ 10M contracts ▪ 5,000 TPS ▪ HA
Host #1	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader
Host #2	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Slave)	1x Guider 1x Dispatcher (Slave)
Host #3	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)
Host #4		1x Guider 1x Dispatcher (Slave)	1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)
Host #5		1x Rater 1x Bulkloader		1x Rater 1x Bulkloader
Host #6		1x Updater (Backup)		1x Updater (Backup)

Typical Use Cases
Online Charging (20M Contracts) within C2C

Host Machine	Example 3 2,200 TPS	Example 3HA 2,200 TPS with High Availability	Example 4 5,000 TPS	Example 4HA 5,000 TPS with HA
Business requirements ▪ Data volume ▪ Online charging throughput ▪ Others	▪ 20M contracts ▪ 2,200 TPS	▪ 20M contracts ▪ 2,200 TPS ▪ High Availability	▪ 20M contracts ▪ 5,000 TPS	▪ 20M contracts ▪ 5,000 TPS ▪ HA
Business context	Integrated Scenario with SAP CI	Integrated Scenario with SAP CI	Integrated Scenario with SAP CI	Integrated Scenario with SAP CI
Host #1	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader
Host #2	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader	1x Rater 1x Bulkloader
Host #3	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Slave)	1x Guider 1x Dispatcher (Slave)
Host #4	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)
Host #5		1x Guider 1x Dispatcher (Slave)	1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)
Host #6		1x Rater 1x Bulkloader		1x Rater 1x Bulkloader
Host #7		1x Rater 1x Bulkloader		1x Rater 1x Bulkloader
Host #8		1x Updater (Backup)		1x Updater (Backup)

Typical Use Cases
Online Charging (10M Contracts)

Host Machine	Example 1 2,200 TPS	Example 1HA 2,200 TPS with High Availability	Example 2HA 5,000 TPS	Example 2 5,000 TPS with HA
Business requirements ▪ Data volume ▪ Online charging throughput ▪ Others	▪ 10M contracts ▪ 2,200 TPS	▪ 10M contracts ▪ 2,200 TPS ▪ High Availability	▪ 10M contracts ▪ 5,000 TPS	▪ 10M contracts ▪ 5,000 TPS ▪ HA
Host #1	1x Rater	1x Rater	1x Rater	1x Rater
Host #2	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Slave)	1x Guider 1x Dispatcher (Slave)	1x Guider 1x Dispatcher (Slave)
Host #3	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)
Host #4		1x Guider 1x Dispatcher (Master)	1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)
Host #5		1x Rater		1x Rater
Host #6		1x Updater (Backup)		1x Updater (Backup)

Typical Use Cases
Online Charging (20M Contracts)

Host Machine	Example 3 2,200 TPS	Example 3HA 2,200 TPS with High Availability	Example 4 5,000 TPS	Example 4HA 5,000 TPS with HA
Business requirements ▪ Data volume ▪ Online charging throughput ▪ Others	▪ 20M contracts ▪ 2,200 TPS	▪ 20M contracts ▪ 2,200 TPS ▪ High Availability	▪ 20M contracts ▪ 5,000 TPS	▪ 20M contracts ▪ 5,000 TPS ▪ HA
Host #1	1x Rater	1x Rater	1x Rater	1x Rater
Host #2	1x Rater	1x Rater	1x Rater	1x Rater
Host #3	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)	1x Guider 1x Dispatcher (Slave)	1x Guider 1x Dispatcher (Slave)
Host #4	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)	1x Updater (Active)
Host #5		1x Guider 1x Dispatcher (Slave)	1x Dispatcher (Master)	1x Guider 1x Dispatcher (Master)
Host #6		1x Rater		1x Rater
Host #7		1x Rater		1x Rater
Host #8		1x Updater (Backup)		1x Updater (Backup)

SAP CC 4.0 Sizing Guidelines
Appendices

CPU Power and Host Machine Categories

To facilitate the sizing activities and simplify the sizing rules, this document defines the following categories of processors (DC1, QC1, and so on). It defines also some typical hosts (A1, A2, …) used as references for the sizing. They optimize your hardware budget.

CPU Category	Definition
	CPU Power
DC1	**1xCPU dual core** (Intel x64 3 GHz or equivalent)
QC1	**1xCPU quad core** (Intel x64 3 GHz or equivalent)
DC2	**2xCPU dual core** (Intel x64 3 GHz or equivalent)
QC2	**2xCPU quad core** (Intel x64 3 GHz or equivalent)

Host Category	Definition (*)		
	CPU Category	Physical Memory (RAM)	HD
A1	DC1	8 GB (*)	70GB Internal HD in RAID1
A2	DC2	8 GB (*)	
A3	QC1	12 GB (*)	
A4	QC2	At least 16 GB	
A5	High multi CPU	More than 32 GB	

Note (*): The definition of the hosts includes information about the physical random access memory (RAM). The sizing rules provided by this document may redefine the memory necessary for your landscape configuration.

Storage Categories

To facilitate the sizing activities and simplify the sizing rules, this document defines the following categories of processors (DC1, QC1, and so on). It defines also some typical hosts (A1, A2, and so on) used as references for the sizing.

Storage Category	Description	Definition	Usage
SAN Storage	For a LARGE landscape configuration, the required performance and volume of data implies the implementation of a storage area network (SAN)	Minimum cache size 2 GB	Database Output data files
		4 volumes for redo logs in RAID 1, size: the smallest	
		1 volume for transaction files in RAID 1 or 1 volume RAID 1 per rater host	
		At least 1 volume for Rating data in RAID 5.	
Internal HD Storage	For the SMALL and the TINY landscape configurations, internal hard drives is used	Internal hard drives 1 volume RAID5 per database ➔ Min 2 disks per database system Example: Up to 6 disks can be required for BART + Core DB.	

Determining the Sizes of the Data Caches

To determine the sizes of the data caches:

- See the SAP CC 4.0 Implementation and Configuration Guide → Technical Features → Implementation → Determining the cache sizes

Abbreviations

Abbreviation	Description
CDR	Consumption Detail Record
CPU	Central Processing Unit
DB	Database
GB	Gigabytes
HD	Hard Drive
RAM	Random Access Memory
RAID	Redundant Array of Inexpensive Disks
SAN	Storage Area Network
TB	Terabytes

Special Disclaimer

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