Oracle® MICROS Simphony

Server Sizing Guide

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ORACLE

Oracle MICROS Simphony Server Sizing Guide, Release 19.1

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Contents

Preface

Purpose

This document is designed to offer guidance on the topics involved in sizing a server for a Simphony version 19.1 system, as well as provide minimum specifications for hardware purchases. The server configurations published in this document are based on analysis of data collected in lab and production environments and designed to offer the best possible performance.

Due to the fact that many environments have nuances specific to them, these guidelines should be used as a starting point when selecting server hardware. Once a system has gone live in the production environment, it may be necessary to modify the server configuration to account for customer specific requirements and conditions.

Audience

This document is intended for users of Simphony.

Customer Support

To contact Oracle Customer Support, access My Oracle Support at the following URL:

https://support.oracle.com

When contacting Customer Support, please provide the following:

- Product version and program/module name
- Functional and technical description of the problem (include business impact)
- Detailed step-by-step instructions to re-create
- Exact error message received
- Screenshots of each step you take

Documentation

Oracle Hospitality product documentation is available on the Oracle Help Center at http://docs.oracle.com/en/industries/food-beverage/.

Acronyms and Abbreviations

The following acronyms and abbreviations are used throughout this document:

Table 1 Acronyms and Abbreviations

Acronym	Full Text
CPU	Central Processing Unit
IIS	Internet Information Service

Table 1 (Cont.) Acronyms and Abbreviations

Acronym	Full Text
NLB	Network Load Balancing
RAID	Redundant Array of Inexpensive Disks
RAM	Random Access Memory
SAN	Storage Area Network
CAPS	Check and Posting Service
DTS	Data Transfer Service
DPS	Direct Posting Service

Revision History

Table 2 Revision History

Date	Description of Change
January 2020	• Initial Publication • Update to Simphony Server Specifications topic tables; Added Shared Server descriptions
April 2020	• Updated several areas to reference the *Oracle Food and Beverage Compatibility Matrix* and *Oracle MICROS Simphony Release Notes*, rather than listing database platforms/versions. • Reformatted Simphony Server Specifications tables.
July 2020	• General updates. • Updated *Simphony Server Specifications*; reorganized chapter.

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Simphony Server Sizing

Review the Simphony Server Sizing information outlined below:

Purpose

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Due to the fact that many environments have nuances specific to them, these guidelines should be used as a starting point when selecting server hardware. Once a system has gone live in the production environment, it may be necessary to modify the server configuration to account for customer specific requirements and conditions.

Server Sizing Methodology

There are three main components to servers:

- Central Processing Unit (CPU)
- Random Access Memory (RAM)
- Storage

Each component has factors that determine proper sizing. At a high level, CPU and memory are driven by the number of users and the type of processing, for example, transaction processing versus report generation. Disk configuration is driven by data retention length, system configuration (revenue centers, menu items, and employees), resiliency and necessity for speed of access. Long-term storage of such data belongs in a warehouse such as Reporting and Analytics. The price of memory has gone down considerably in the last few years, as of the writing of this document, so the price of RAM is not a major factor. Ideally, memory on a database server should be sized to keep index objects and/or table objects in the buffer cache. This reduces IO latency and reduces the wait for reads.

In addition to the physical attributes of the server, it is necessary to select the correct versions of database and operating system software. At a minimum, the versions chosen for these items must be able to support the hardware that is going to be purchased.

A Note on Virtualization

All recommendations put forth herein regarding the resource requirements for hardware when sizing a Simphony platform are applicable to Virtualized environments as well as physical ones when current Virtualization technologies such as Oracle Virtualbox are used. Current technologies incur no real overhead cost, and therefore do not require separate consideration when choosing resource requirements.

Disk Capacity Sizing

The amount of disk space necessary for a system is driven by the amount of historical data, backups, and database log files retained on the drives. There are two areas that account for the majority of the database growth:

- Check details used for online transaction access (Transaction Data)
- Simphony Reporting and Analytics data

By default, the system automatically purges checks and their associated details that are used for online check access after six (6) weeks from the transaction database.

The Simphony Reporting and Analytics data accumulates for as long as desired. The reporting database contains check detail, totals, and electronic journal information.

The following values can be used as a guideline to determine how much space a database uses. It should be noted that testing used for these figures was based on fast transactions averaging 10 line items per check. Sites with multiple rounds or large check sizes experience more database growth.

- Database Objects used for Simphony

Database Objects used for Simphony

The reporting database grows at rate of approximately 20 MB per 1000 checks. Those numbers are approximate values and may vary depending on individual setup and configuration.

The following databases/schemas/tablespaces* are used in a Simphony environment.

Table 1-1 Simphony Tablespaces

Database/ Schema Name	Purpose	Auto Extend	Max Size	Initial Size	Growth Expectation
** TRANSACTIONDB	Transaction staging DB	Yes	Unlimited	128MB	*** Medium
** SECURITYDB	Security Key Storage	Yes	Unlimited	128MB	Negligible
COREDB	Configuration of Users and Organizations (Reporting & Analytics)	Yes	Unlimited	128MB	Negligible

Table 1-1 (Cont.) Simphony Tablespaces

Database/ Schema Name	Purpose	Auto Extend	Max Size	Initial Size	Growth Expectation
LOCATION_ACTIVITY_DB	Historical data DB (Reporting & Analytics)	Yes	Unlimited	128MB	Significant
PORTALDB	Configuration of the Portal Website (Reporting & Analytics)	Yes	Unlimited	128MB	Negligible
RTA	RTA agent DB (Reporting & Analytics)	Yes	Unlimited	128MB	Negligible

When working with Oracle Database, the schema is the name of the logical place where tables are stored, the tablespace is the definition of the physical file that is given size parameters.

** Names of these databases (schemas) are chosen during installation. There is no standard naming convention.

*** The size of the TRANSACTIONDB remains relatively consistent as older transactions are purged; adding workstations or revenue centers typically causes the size to grow to a new consistent level.

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Local Disk and RAID Configurations

From an application perspective, Simphony does not require any type of Redundant Array of Inexpensive Disks (RAID) configuration. In fact, the application is oblivious to the physical configuration of the disks. However, some form of redundancy such as RAID is strongly recommended for local storage on Database servers.

Depending on the performance and disaster recovery requirements for a customer, there are a wide number of possible hard drive configurations available. Users should consult a current reference, for example https://en.wikipedia.org/wiki/RAID, and their storage manufacturer's recommendations before selecting a configuration.

RAID may allow for hardware redundancy and performance enhancements depending on what solution is chosen. Some of the solutions are more costly than others. In every situation, it is recommended that the RAID controller have a battery backed read/write cache.

> **Note:**
>
> For high volume deployments, it might be necessary to utilize a storage system or two RAID controllers, so that the loads for transaction databases are being separated from the reporting databases. If magnetic hard drives are used, it is that only SAS type hard disks with 10k or 15k rpm should be used; SATA type hard disks are currently not considered sufficient. Alternatively, some or all of the local storage can be retained on Solid State drives (SSD); these are significantly more expensive, but provide much higher I/O speeds.

Storage Area Networks

Some large scale customers may wish to implement a Storage Area Network (SAN) instead of using local hard drives. SANs are typically used with database servers to house the data files and logs.

This option, while more costly than local drives, becomes necessary as soon as high availability (HA) and database redundancy options are considered (such as Oracle RAC). A SAN also allows customers to have an option to put the data on an infrastructure that can be shared amongst other servers and can be expanded more easily than if the data were stored on local drives.

Simphony Customers that wish to use a SAN are required to configure their server hardware according to the size recommendations that are provided. Oracle Hospitality is not responsible for installing and setting up an on premise SAN.

Operating System Version Options

The *Oracle Food and Beverage Compatibility Matrix* provides more information on supported operating systems for Simphony servers and database servers. The specific edition of Microsoft Windows Server selected depends on several factors. For more details on Microsoft Windows Server edition differences, refer to this Microsoft webpage.

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Database Options

The *Oracle Food and Beverage Compatibility Matrix* and *Oracle MICROS Simphony Release Notes* provide more information on supported databases.

Oracle Hospitality recommends the use of Oracle Database 18c.

Customers upgrading from 9700 HMS to Simphony who are running earlier versions of either Microsoft SQL Server or Oracle Database must upgrade to a currently supported database platform.

Microsoft SQL Server

Beginning with Simphony version 19.1, Microsoft SQL Server is no longer supported as a database platform for the Simphony Enterprise application server. It is still supported for CAPS clients.

Which Version of Database Should be Used?

The server configuration tables that appear later in this guide include a minimum version of Oracle Database that needs to be used in order to make use of the hardware resources recommended for the server. A more recent version (up to the maximum listed above) may be used whenever desired. Also, when selecting a database platform and version, make certain not to waste hardware resources by selecting a version that cannot utilize all of the server's memory or CPU capabilities.

Oracle Database

Common practices for the Oracle Database platform:

1. B-tree indexes are useful for queries that are highly selective, highly filtered on the column(s) that are indexed.
2. Do not use Oracle bitmap queries on Simphony or Reporting & Analytics. Bitmap queries are designed for nightly batch-loaded systems, not for either real-time operational systems or for real-time reporting.
3. Collect statistics each night.
4. Rebuild indexes monthly or perhaps even weekly.
5. As with any database, perform capacity planning based not on expected or average load, but on the once-a-year peak time.

6. It is crucial to keep your data correctly purged; failure to do so can slowly turn an operational transaction system into a multi-year historical reporting database.

Server Replication and Clustering

In addition to building servers that have hardware redundancy solutions for individual components, it may be desirable to also have multiple servers of the same type. For instance, in the event of a complete server failure (not just a hard drive), the system can readily function on a backup server.

Oracle Real Application Cluster (RAC)

Oracle RAC is available for customers who have experience implementing and managing Oracle RAC configurations. It is expected that the customer is able to install and configure the Oracle RAC and provide on-going management of the database if this configuration is used.

The Simphony installation media is not Oracle RAC aware.

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Simphony Server Specifications

This section contains server count recommendations and server hardware recommendations. Keep the following in mind:

- Not Applicable (N/A) indicates the option is not available
- Storage Area Networks (SANs) can be used instead of HDD for 500 or more workstations. The required storage space depends on the size, number of checks, and how long you store them.

The *Enterprise Back Office Server Sizing Guide* provides more information on Reporting and Analytics server sizing information.

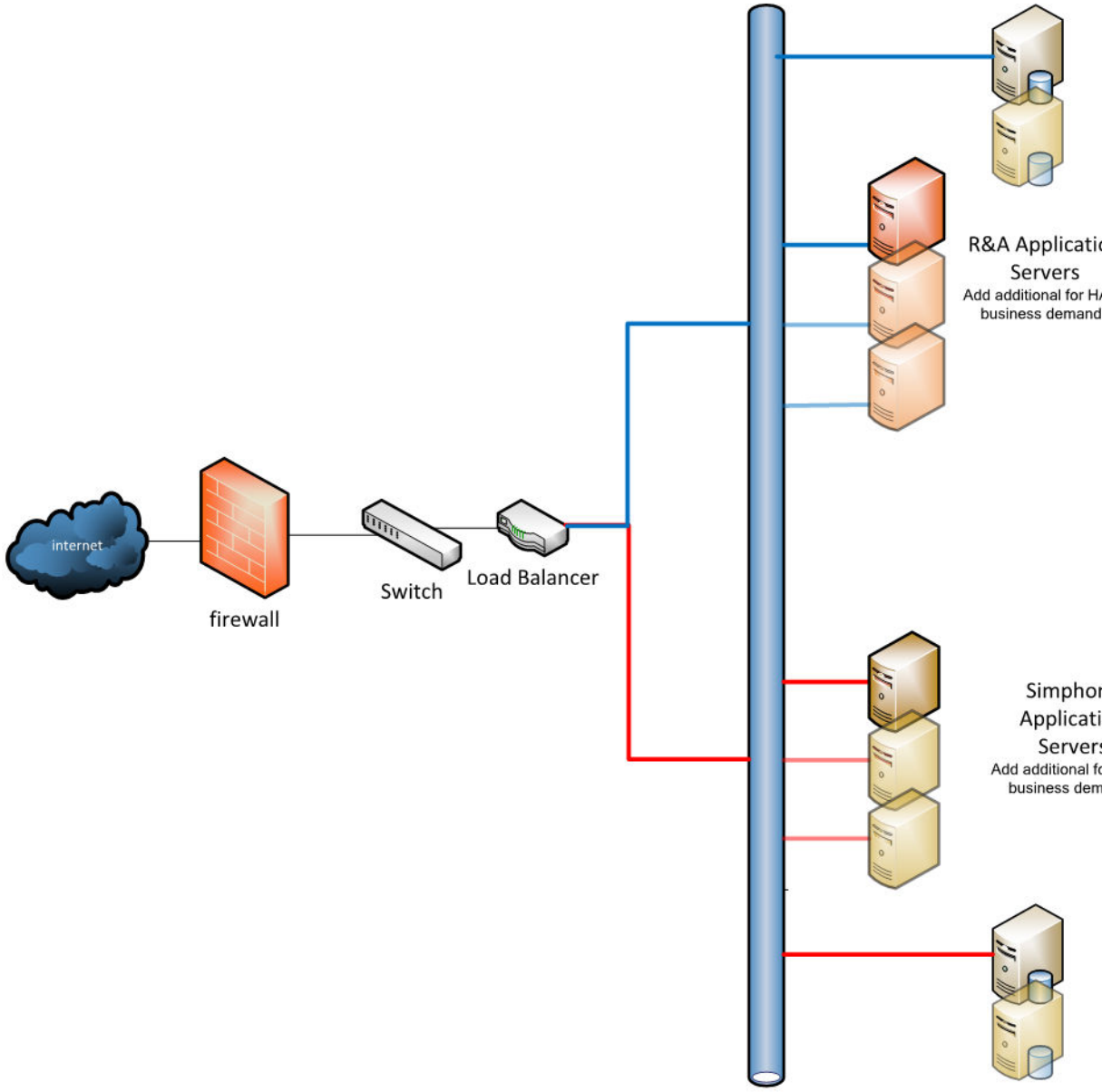
Server Counts: Shared Server

Server Type	Up to 50 Workstations	51+ Workstations
Simphony Shared Server	1	N/A

Server Counts: Standard Availability and High Availability

Server Type	Up to 200 Workstations	201–500 Workstations	501–1000 Workstations	1001–2000 Workstations	2001–4000 Workstations	4001+ Workstations
Simphony Application Server	1 x Level 1 or higher	2 x Level 1 or 1 x Level 2 or higher	N/A	N/A	N/A	N/A
Simphony Database Server	1 x Level 1 or higher	2 x Level 1 or 1 x Level 2 or higher	N/A	N/A	N/A	N/A
High Availability Simphony Application Server	2 x Level 1 or higher	3 x Level 1 or 2 x Level 2 or higher	3 x Level 2 or higher	3 x Level 3 or higher	4 x Level 3 or higher	5 x Level 3 or higher
High Availability Simphony Database Server	2 x Level 1 or higher	3 x Level 1 or 2 x Level 2 or higher	3 x Level 2 or higher	3 x Level 3 or higher	3 x Level 3 or higher	3 x Level 3 or higher

The following figure shows a basic network configuration. Incorporating a DMZ into the network allows for an additional layer of security.



High Availability Recommendations

The high availability server counts allow for the number of servers required to run the system plus one server. This count ensures there is no degradation of service if a server is unavailable. Use of a high availability solution for systems of 500 or more workstations is recommended.

Services Recommendations

All Simphony services run on all application servers with the exception of the Sequencer Service. If the application server that runs the Sequencer Service becomes unavailable in a multi-server environment, reassign it and enable it on a different server to maintain Start Of Day functionality.

Load Balancing Recommendations

Use a load balancer to distribute traffic across multiple application servers. Network Load Balancing provides more information. Multiple database servers require the use of Oracle Real Application Clusters (RAC).

EMC Recommendations

For systems that have a large number of workstations, properties, or configuration items, add one or more application servers for access exclusively by the EMC.

Simphony Shared Server Hardware Specifications

- CPU: 4 Intel Xeon cores
- RAM: 32 GB
- HDD:
  - OS: 100 GB
  - Apps: 200 GB
  - DBs: 500 GB
  - Redo Logs: 500 GB

All-in-one systems on Simphony 19.1 must use Reporting and Analytics 9.1 and Oracle Database 12c R1.

All-in-one systems do not support Suites Management, Simphony Venue Management, Gift and Loyalty, or Simphony ServiceHost, as all of these require a MS SQL Database. A maximum of one property is recommended when using a Shared Server.

Simphony App Server Level 1 Hardware Specifications

- CPU: 4 Intel Xeon cores
- RAM: 16 GB
- HDD:
  - OS: 100 GB
  - App: 200 GB

Simphony App Server Level 2 Hardware Specifications

- CPU: 4 Intel Xeon cores
- RAM: 32 GB
- HDD:
  - OS: 100 GB
  - App: 200 GB

Simphony App Server Level 3 Hardware Specifications

- CPU: 8 Intel Xeon cores
- RAM: 64 GB

- HDD:
  - OS: 100 GB
  - App: 200 GB

Simphony DB Server Level 1 Hardware Specifications

- CPU: 16 Intel Xeon cores
- RAM: 48 GB
- OS: 200 GB
- Data: 500 GB
- Redo: 100 GB
- CRS: 24 GB

Simphony DB Server Level 2 Hardware Specifications

- CPU: 16 Intel Xeon cores
- RAM: 64 GB
- OS: 200 GB
- Data: 1 TB
- Redo: 100 GB
- CRS: 24 GB

Simphony DB Server Level 3 Hardware Specifications

- CPU: 32 Intel Xeon cores
- RAM: 128 GB
- OS: 200 GB
- Data: 2 TB
- Redo: 200 GB
- CRS: 24 GB

Large Configurations (50+ Workstations)

Configurations larger than 50 workstations are not supported on a shared server. This type of configuration must be split across a minimum of two servers, with application and database on dedicated servers. Additional servers may be added as necessary for resiliency purposes.

Application Server Sizing

Application servers do not typically consume a large amount of server resources in the Simphony platform. Database servers are where most of the I/O and CPU/RAM usage occurs. That being said, application servers still need to be configured with the proper resources to handle the workload, primarily through IIS and various other Simphony web services. Oracle Hospitality recommends that customers operate all of the web services which are capable of being load balanced on every application server and to place a load balancer (either a software load balancer or a hardware device) in front of the application servers to distribute the load. It is also possible to dedicate individual servers to do some, or even individual jobs needed by the application. For example, a single server, or even multiple servers that only run the Direct Posting Service. Servers that run only the EGateway service and no other services. This all depends on the requirements of the enterprise and how the customer wants to distribute the application load. The inherent extensibility and both the horizontal and vertical scalability of the architecture allow infinite combinations of services to meet the needs of an enterprise only limited by the hardware available (both real and virtual).

As for disk sizing, the only growth items on an application server are the log files when it comes to the Simphony application. The Simphony application itself is not very I/O intensive on the disk side of the hardware. The size of the enterprise does not impact the disk usage to the point where different recommendations must be made for larger customers.

RAM is a crucial resource. RAM requirements for large enterprises are where the application servers can greatly vary, based primarily upon the number of menu items and employees configured in the system. The application server caches data for use by the EMC and Database Download Handlers. The cached data is used to speed up the performance of the system in those applications. Other processes such as the posting handler, Data Transfer Service (DTS) and Direct Posting Service (DPS) also require RAM.

Since application servers are load balanced, it is possible for a request for any of the processes to come to an application server, it is necessary to load the servers with enough RAM to handle everything on all of the servers; or as mentioned above, to split the application servers even further into even more specialized servers that handle specific tasks within the enterprise. When deciding upon how much memory to put into an application server, it is important to consider what the operating system is actually capable of supporting.

Database Server Size

When enterprises become larger than 5000 workstations, it is hard to predict just how much CPU, RAM and disk space is required. In many of these enterprises, there is a wide variance in the quantity of menu items, employees, and content stored in the database. Additionally, the volume of checks coming in and the average size of those checks vary greatly; only general guidance can be provided.

Minimally, a Dual Quad Core CPU based server is recommended as a baseline for really large systems. Depending upon how much farther over 5000 workstations the system is going to go, consideration should be given up front to purchasing server hardware with the ability to add up to four CPUs, even if only two are purchased initially. The option to add CPUs can be exercised over time, as the load dictates.

When it comes to RAM, beginning with a minimum of 64 GB and having room to grow is prudent. At a relatively low cost, it is possible to procure servers today that are capable of expanding to hundreds of gigabytes. The amount of RAM consumed by the database grows as an enterprise grows. Careful monitoring needs to take place to ensure that the database servers do not become memory starved. Customers should be prepared to add RAM as the system grows over time.

Disk space usage grows as new properties are brought on line and more transactions start flowing in. Expect to see the transaction database grow and plateau as a result of each property coming on line. When a property comes online, there is new configuration data stored in the database. By default, check storage is disabled in Simphony. When the check storage option is enabled, up to 30 days worth of transaction data can be stored.

The Simphony reporting database also continues to grow based on the same rules that apply to smaller systems. For large reporting systems that keep multiple years of historical transactional data — which can grow up to 10-20TB of disk space — it may be advisable for customers to persist their Simphony data on a SAN, where additional resources can be added when needed. Installing the Simphony database files onto local hard drives limits the systems growth potential.

Database Server Quantity

The Oracle HA database solution for fault tolerance and load balancing is called the Real Application Cluster (RAC). This technology is used by the Oracle hosting center today. One of the advantages of RAC is that it provides load balancing. RAC processes database requests against the database and there is no down time as a passive instance is brought on line if the primary server fails. If the load on the database servers increases over time, more servers can be added to the cluster to gain computing power.

Additional Assistance

For additional assistance with large configurations, contact your Account Manager and provide the following information:

- Number of Workstations by Types (WS5a, WS6, Workstation 2015, Tablets, etc.)
- Total Number of Properties
- Total Number of Revenue Centers
- Total Number of Employees
- Total Number of Employees running reports
- Total Number of Menu Items
- Average Checks per Day (indicating peak business throughput)

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Network Load Balancing

In previous Oracle MICROS POS products, solutions such as Double Take and Legato provided fault tolerance if the application server failed. These products are not supported for use with Simphony. Instead, you can use network clustering and load balancing to achieve a degree of resiliency through redundancy, in addition to their primary function of improved throughput. There are two primary means to implement this solution.

The Microsoft Windows Server software contains a feature called Network Load Balancing (NLB) which may be used to cluster the application servers together. This option does not require any additional licensing costs.

Hardware solutions can also be used to handle this functionality. These solutions are more expensive than implementing the Microsoft Windows based solution, but can provide a higher degree of flexibility and configuration options.

Network load balancing detects server failure and balances the load on the remaining configured application servers. Network load balancing does not detect failure of services (including IIS).

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Reporting Application Servers

Implementing a dedicated reporting server or an additional application server should be considered when the number of users simultaneously running reports exceeds 11. By moving the Simphony Reports web server to different hardware than the transaction application servers, it is possible to isolate reporting activities from negatively impacting transaction performance.

The *Oracle Hospitality Enterprise Back Office Server Sizing Guide* provides more information on Reporting Application Servers.