

Oracle® Agile

Engineering Data Management

Hardware Sizing Guide for Agile e6.1.3.0

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Preface

The Oracle documentation set includes Adobe® Acrobat™ PDF files. The Oracle Technology Network (OTN) Web site (http://www.oracle.com/technology/documentation/agile.html) contains the latest versions of the Oracle Agile EDM PDF files. You can view or download these manuals from the Web site, or you can ask your Agile administrator if there is an Oracle Documentation folder available on your network from which you can access the documentation (PDF) files.

Note To read the PDF files, you must use the free Adobe Acrobat Reader™ version 7.0 or later. This program can be downloaded from the Adobe Web site (http://www.adobe.com).

Note Before calling Agile Support about a problem with an Oracle Agile EDM manual, please have the full part number ready, which is located on the title page.

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Oracle provides dedicated Text Telephone (TTY) access to Oracle Support Services within the United States of America 24 hours a day, 7 days a week. For TTY support, call 800.446.2398. Outside the United States, call +1.407.458.2479.

Readme

Any last-minute information about Oracle Agile EDM can be found in the Release Notes file on the Oracle Technology Network (OTN) Web site (http://www.oracle.com/technology/documentation/agile_eseries.html)

Agile Training Aids

Go to the Oracle University Web page (http://www.oracle.com/education/chooser/selectcountry_new.html) for more information on Agile Training offerings.

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Chapter 1

Introduction

This manual is intended to help you in sizing an Agile e6.1.3.0 installation. It gives information about the sizing on different programs and services running in Agile e6.1.3.0, the optimization of the service performance, and security. This includes information on the recommended CPU, hard disk.

Before you start reading this document, please study the Architecture Guide for Agile e6.1.3.0 to understand the possible Agile e6 standard installation architectures.

The following topics are part of this document:

- Database
- Agile e6 server components
- Agile e6 Clients
- File server
- View Server
- Remote components

Chapter 2

Hardware Sizing

General Recommendations

When sizing the hardware for an Agile e6.1.3.0 installation, keep the following in mind:

- Use scalable hardware as you might want to add additional users and functionality in the future. The memory, disk space, and CPU should be larger than needed for the initial installation.
- Check the specific restrictions of the selected operating system. Especially the Windows Server has a specific behavior.

Note The Agile e6.1.3.0 server should not be a combination of domain controller, email, print, and file server.

Note A Windows machine should not run out of physical memory. Otherwise, sever server problems will occur. In case of no physical memory, the Oracle database will crash when the instance tries to allocate additional memory.

General Database Server Sizing

Small databases (dump size) are usually fast. The more data is in use, the slower the application performs and the more resources are needed on the database server.

In general, the database instance uses less CPU than the EDM server process (30:70 or 40:60).

The database performance is defined by four parameters:

1. Number and performance of CPUs.
2. Main memory used for the database.
3. Disk I/O.
4. Client – Server connection speed.

Network

We recommend a 1 GBit connection between the Database and the Application server.

Essential is the speed of the connection, not the throughput. 1 GBit LAN only defines the throughput. If the connection is heavily loaded, the elapsed time for each IP packet is high and the connection will be slow.

Note To connect the Database Server with the Application Server do not use WAN.

If database and application are on the same machine, the connection is faster than on separate machines.

Sizing the Oracle Database Server

Oracle provides preconfigured Database templates that should be used to setup an Agile e6 specific Database. The table below shows an overview of the available templates.

Database Template	Number of concurrent Users	Table space in GB	Memory in GB
Demo	80	3	0.8
Small	100	18	2.5
Medium	300	41	6
Large	600	77	12
XLarge	1000+	138+	20+

The following table gives an overview of the required disc space, memory, and number of CPU's depending on the selected template.

Template / Table spaces	plm_demo size (GB)	plm_prod_small size (GB)	plm_prod_medium size (GB)	plm_prod_large size (GB)	plm_prod_XLarge size (GB)
EDB	0.5	5	10	20	40
EDB_IDX	0.5	5	10	20	40
EDB_LOB	0.15	1	4	8	15
EDB_TMP	0.15	1	4	8	15
EDB_TMPIDX	0.15	1	4	8	15
SYSTEM	0.5	1	2	3	3

Template / Table spaces	plm_demo size (GB)	plm_prod _small size (GB)	plm_prod _medium size (GB)	plm_prod _large size (GB)	plm_prod_XLarge size (GB)
SYSAUX	0.3	1	2	3	3
TEMP	0.15	1	2	3	3
TOOLS	0.1	0.1	0.1	0.1	0.1
UNDOTBS 1	0.15	1	2	3	3
USERS	0.1	0.1	0.1	0.1	0.1

CPU

Database Template	Number of CPUs (Dual and Quad Core)
Demo	1
Small	2
Medium	4
Large	4-8
XLarge	>8

Memory

For an Oracle database, the memory allocation is determined by the init-parameters, which can be altered in the server parameter file (spfile<SID>.ora) or the selected template.

To increase database performance, we recommend fitting the machines with more physical memory than necessary.

Server memory for Oracle database 11g:

- 10 MB per connected user.
- RAM - depending on the database size.

Note Disk I/O reduces when more memory is allocated for the database. Some activities are buffered in the database memory.

Database Template	Number of Users	Memory in GB
Demo	80	0.8
Small	100	2.5
Medium	300	6

Database Template	Number of Users	Memory in GB
Large	600	12
XLarge	1000+	20+

Note The maximum memory values have to be increased if the expected number of concurrent sessions exceeds the number defined sessions for the template, or the dump size is higher.

Hard Disk

Write intensive parts of the database (e.g. undo, redo log, temp) and system swap or page file have to be on separate disks. We recommend using different disks for the database and the operating system to avoid any impact on the database. Each service (file service, swap, etc) which uses disk I/O can affect the database performance.

As I/O is most critical to the database, it is recommended to use four to six physically separated disks, or an equivalent performing controller base RAID shelf (RAID 0/1) exclusively for the database. Add a separate disk for the operating system. RAID 5 has to be used for archived redo log files.

Data file	Contents	RAID Level
edb.dbf	Table data	1/0
edb_idx.dbf	Index data	1/0
edb_lob.dbf	LOB data	1/0
edb_tmpidx.dbf	Temporary index data	1/0
edb_tmp.dbf	Application temporary data	1/0
temp.dbf	Temporary database table space	1/0
undo.dbf	Undo database table space	1/0
system.dbf	SYSTEM table space	1/0
sysaux.dbf	SYSAUX table space	1/0
tools.dbf; users.dbf	Table space for small user's and tool's data	10
Archived redo log files	Archived redo logs needed for db recovery	5
control01.dbf, control02.dbf, control03.dbf	Database control files	1/0 (a separated disk for each copy)
Redo01-05.log	Database redo log files	1/0

The database server needs enough free disk space for:

- Database backups – database exports (hot backup) and file image backup (cold backup)
- Database logs
- Case of emergency – complete image backup (db files)
- Copies of the database dump for production, training, development, testing, upgrade, etc

The productive Oracle database runs in archive log mode. The backup strategy includes a backup of all database files (cold backup) and the archive logs produced during backup. In addition, Oracle exports are performed daily (hot backup).

For the archive log, we recommend to provide disk space six times the size of the dump. The database will stop when the disk space for the log is used up.

Note Old archived logs have to be backed up once a week.

It is recommended to have the last database backup (both hot and cold) on the server machine, in order to reduce the recovery time.

If the database raises a media error (defect of file), recovery has to be performed using the cold backup that is kept on the server machine. If missing, restore copied files back to temporary disk location.

Calculate with the size of two cold database backups to have enough disk space for the recovery process. Do not use the free space for file storage. In case of emergency, you will not be able to recover your database in time.

	Factor	*	Single Size	=	Total
DB dump size			1		
Data files	3	*	1	=	3
Cold backup	2	*	3	=	6
Hot backup	2	*	1	=	2
Archive log files	6	*	1	=	6
Oracle 11g Database Software		*			5
Database Server logs		*			3
Operating system		*			1
Swap		*			2,5
Total					28,5

The database server requires at least 30 GB disk space at the beginning.

Database growth has to be monitored over time and actions to be taken if more space is needed, e.g. after 6 months.

EDM Server Components

The two mandatory application server types are:

- EDM Server
- J2EE Server with installed Oracle WebLogic Server

Sizing the EDM Servers

CPU

- Windows:

  2 to 3 processors (Dual or Quadcore) should be able to support up to 100 active concurrent users.

- UNIX:

  2 processors.

Note Depending on how you use the application, this can differ.

Note Additional CPUs are needed for using Enhanced Change Management.

Memory

80 MB physical memory for each concurrent user (Windows / UNIX).

For frequent use of complex functions such as BOM (structure size), copy or large amount of data in one operation, the memory requirements are considerably higher.

The first connection, after starting the EDM Server, will consume more physical memory on this server.

- Windows:

  We recommend the following server structure:

  - Separate database server for installation of up to 50 concurrent users.
  - One application server for every 100 concurrent users.

Depending on the installed operating system version, installed components, for example, Terminal Server software, the maximum number of concurrent users can be restricted to a lower value (approx. 70).

We recommend verifying the maximum number of users by running stress tests on your particular environment.

- For additional users, an additional server has to be considered (1-n).
- For more than one server, an NLB cluster setup can be used, or a load balancer software.

For bigger installations (e.g. 400 users), UNIX could be the preferred server operating system. However, this decision is made by the system administration.

- UNIX:

  With UNIX, a large amount of users can be administered.

  Solaris and HP-UX use additional swap space, which can grow up to 150% of the physical memory for each concurrent user.

Hard Disk

Space required: Minimum 3 GB

Note Provide enough disk space for the Agile e6.1.3.0 application, the Oracle WebLogic software, and several environments, including the loader and log files.

Temporary unused memory is paged out. Many of the Agile e6 processes remain inactive because the user works with different software (CAD, office), or memory allocated for bigger reports is not currently used.

The EDM server needs swap space or page file for the inactive memory pages:

- 3 * RAM: RAM < 500 MB
- 2 * RAM: 500 < RAM < 2000
- 1 * RAM: RAM > 2000

Use the operating system manual to define the swap space. Some operating systems have maximum sizes for the swap space.

Note Compared to Windows, a UNIX system will have more swap space but less main memory.

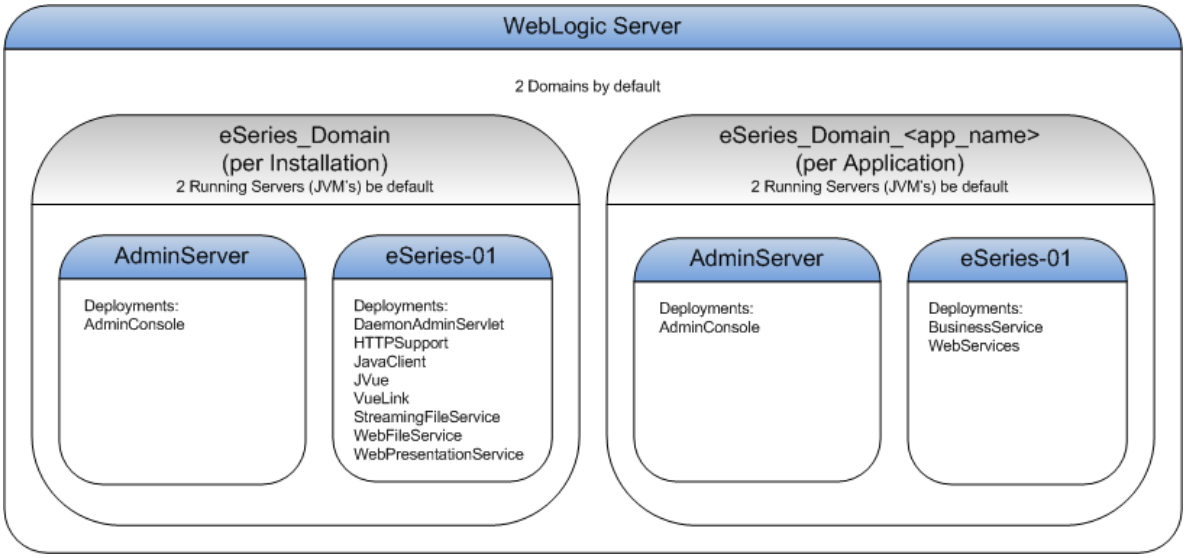
Network

The Agile e6.1.3.0 process holds one database connection, and generally one client connection. The database connection has 10 times the throughout and much more round trips. Thus, a fast network connection, especially to the database server, is necessary (no WAN).

Sizing the Oracle WebLogic Server

It is recommended to run the Oracle WebLogic Server on the same machine where the EDM server is running.

The following graphic shows the WebLogic deployment architecture after an Agile e6.1.3.0 installation.



There are two domains:

1. eSeries_Domain – this domain is one per installation.

2. eSeries_Domain_<app_name> - this domain is per Application.

If there are two or more applications installed, for instance, prod, test, dev, etc., then there will be one eSeries_Domain and few application domains.

For example, eSeries_Domain_prod, eSeries_Domain_dev, etc.

For more information about the Agile e6.1.3.0 architecture, refer to the Architecture Guide for Agile e6.1.3.0.

For more information about Oracle WebLogic domains structure, refer to the Oracle WebLogic Server documentation in the Oracle Fusion Middleware Documentation Library.

Only a 64-bit JVM is supported to avoid running out of memory.

The maximum heap size of the JVM is practically unlimited and depends on the maximum memory available on the machine. It is recommended to use a 64-bit JVM and the JVM's maximum heap size should be set to 3GB for each server in a domain.

For example, if there are production, test, and development applications installed, total memory required is 2 x 3GB for eSeries_Domain plus 3 x 2 x 3GB for eSeries_Domain_prod, eSeries_Domain_dev ,and eSeries_Domain_test. This totals to 24GB.

For applications with extra huge number of concurrent user sessions, at least 4GB has to be considered as a JVM's maximal heap size per domain.

Sizing the Clients

The following three clients can all be sized:

- Java Client
- Windows Client
- Web Client

For more information on the Agile e6.1.3.0 clients refer to the Architecture Guide for Agile e6.1.3.0.

CPU

We recommend at least a Dual Core CPU on Windows.

Memory

We recommend at least 2 GB RAM.

Hard Disk

An Agile e6.1.3.0 client installation requires approximately 180 MB disk space.

Network

Note When sizing the network, consider the network load produced by the client and for file transfer when using the File Server.

Java or Windows Clients produce an average of about 2.5 to 4 Kbytes (10 to 32 KB) network load.

For the Web Client a 256 KB connection will usually not be under full load. A 128 KB connection acts slower, and a 64 KB connection is possible but the performance decrease is remarkable.

20 times more information is sent to the Web Client (browser) than received back.

Add Network load according to expected documents and drawings etc. shared via WAN. You can check existing WAN connections for already existing network loads.

File transfer uses the total capacity of a network connection. If a network line is under heavy load the elapsed time of the IP-packages is long. Make sure to enable a fast file transfer (< 10 sec) as the connection will slow down during file transfer. The network connection must have enough spare bandwidth.

Sizing Other Servers

FMS Servers

There are no special requirements for the Agile e6.1.3.0 File Server. The machine should not be swapped, and enough free memory should be available for file buffer. The throughput of the File Server is determined by the network connection. Usually, the possible disk I/O is higher than the throughput of the network interface. For the File Server identical operating system versions are used as the Agile e6.1.3.0 server. It is not necessary to have the same operating system as the client. You can install on mixed operating systems.

- Clients on all Windows platforms
- File Servers are Windows, and/or UNIX

CPU

No special requirements. CPU is needed for the TCP/IP stack and File I/O.

Memory

At least 512 MB of free memory for a dedicated server is required.

The process allocates 1 MB. Each connection uses main memory to buffer the transmission. So enough free memory should be available.

If Web Fileservice is running as an application on WebLogic Server, the server where the WebLogic application is running needs a fast connection to the File Server.

It is possible to install the Web Fileservice in a Tomcat on the File Server if:

- DFM is used
- No Oracle Application Server at the DFM site

This requires an additional free memory of 512 MB on this server, resulting in a total of at least 1GB free memory.

Hard Disk

The File Server installation needs 1 MB of disk space. Estimate the necessary disk space for the stored documents.

- How much disk space is required for the next month and years?
- What is the concept to raise disk space and backup volume?
- Is it possible to add new disks to the system?

The File Server stores the files in vaults. An electronic vault is a directory and its contents. One directory is limited by the partition size. The maximum capacity of an electronic vault is the size of the partition. If the vault is running out of disk space you can create a new vault on a second partition or you have to shift the vault to a bigger partition. The directory must be moved to the bigger partition with preserved file permissions (Windows!!) and the vault definition must be changed in the Agile e6.1.3.0 System.

Agile e6.1.3.0 only supports local file systems. File systems, in particular NFS, commit the file write in a state where the file is still in the file cache and not completely written on the remote server. If the File Server machine crashes in this situation, the file is corrupt. If storage systems (e.g. SAN) are utilized, you have to exclude this issue. This is the same security reason why a database only uses local file systems.

A RAID5 shelf is recommended for security and capacity reasons.

Network

A fast connection to the Agile e6 client reduces time to store and load files. The Network is the bottleneck of the File Server. The disk system is generally faster than the network and CPU load is not high on the server. If clients are in different network segments you can use more than one network card or use multiple File Server. But the vault definition only has one hostname (IP-address) and can only be reached over one network card.

You can combine the File Server with the Agile e6.1.3.0 Server, Oracle Application Service. The File Server needs primarily disk I/O, while the other services need CPU.

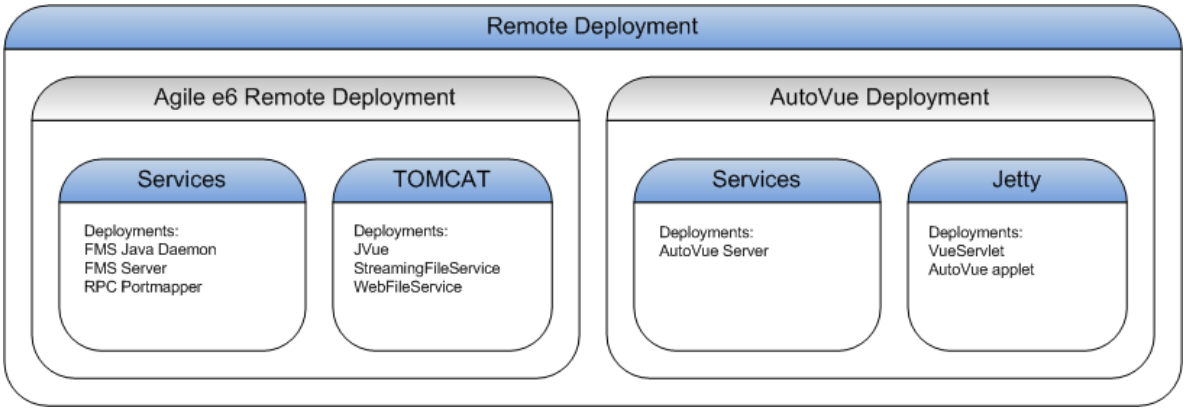
View Server

For further information, please refer to the Oracle AutoVue Installation and Configuration Guide. The FAQ section of that manual contains example configuration.

Note Please consider disk space for the AutoVue cache.

Chapter 3

Sizing Components for Remote Sites



For more information about the deployments typically made on a remote site, please refer to the Architecture Guide for Agile e6.1.3.0.

For more information about the AutoVue deployment, please refer to the Oracle AutoVue Installation and Configuration Guide.