Agile Product Lifecycle Management

Capacity Planning Guide

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Preface

Oracle's Agile PLM documentation set includes Adobe® Acrobat PDF files. The Oracle Technology Network (OTN) Web site http://www.oracle.com/technetwork/documentation/agile-085940.html contains the latest versions of the Agile PLM PDF files. You can view or download these manuals from the Web site, or you can ask your Agile administrator if there is an Agile PLM Documentation folder available on your network from which you can access the Agile PLM documentation (PDF) files.

Note	To read the PDF files, you must use the free Adobe Acrobat Reader version 9.0 or later. This program can be downloaded from the Adobe Web site http://www.adobe.com.

The Oracle Technology Network (OTN) Web site http://www.oracle.com/technetwork/documentation/agile-085940.html can be accessed through **Help** > **Manuals** in both Agile Web Client and Agile Java Client. If you need additional assistance or information, please contact My Oracle Support (https://support.oracle.com) for assistance.

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

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Readme

Any last-minute information about Agile PLM can be found in the Readme file on the Oracle Technology Network (OTN) Web site http://www.oracle.com/technetwork/documentation/agile-085940.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.

Accessibility of Code Examples in Documentation

Screen readers may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, some screen readers may not always read a line of text that consists solely of a bracket or brace.

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Chapter 1

About this Guide

This chapter includes the following:

- Acronyms 5

Capacity planning enables you to predict the hardware and software configuration required in your installation base to handle application needs. This book contains the definitive list of system requirements, supported platforms, supported configurations and capacity planning guidelines for multiple deployment configurations of Oracle Product Lifecycle Analytics. These capacity planning guidelines were derived based on testing performed on Windows hardware.

The target audience for this document includes:

- Information Technology Architects
- Database Administrators
- Data warehousing and Business Intelligence Implementation experts

The most reliable method to gauge the suitable sizing for your implementation is to run a proof of concept or a pilot, prior to the implementation. This process enables the implementation team to assess correctness of the deployment architecture.

If the results of the pilot run suggest modifications in the configuration specification, the implementation team can regulate the configuration specifications accordingly. The Implementation in your production environment may require a lower or higher hardware configuration.

The capacity planning recommendations provided in this document are based on out-of-the-box product configuration. This does not include considerations related to any specialized or customized solutions or configurations. Your implementation may have a lot of performance dependencies on applications outside the scope of Oracle Product Lifecycle Analytics components, custom hardware configuration, network bandwidth, database and other system parameters. These dependencies can affect the overall performance efficiency.

For example, if you have installed a component in the same machine as a custom application, the application might utilize resources that you had calculated to be dedicated to the component. Such an implicit dependency requires a change in the capacity planning calculation in your production environment.

Acronyms

A list of acronyms used in this document is provided here for your reference.

Acronym	Expansion
BI	Business Intelligence
DM	Data Mart
ETL	Extract-Transform-Load

Acronym	Expansion
GSM	Global Specification Management
MDS	Multi-Dimensional Schema
NPD	New Product Development
OBIEE	Oracle Business Intelligence Enterprise Edition
ODI	Oracle Data Integrator
PLA	Product Lifecycle Analytics
PLM	Product Lifecycle Management
PQM	Product Quality Management
PC	Product Collaboration
PPM	Product Portfolio Management

Chapter 2

Overview

This chapter includes the following:

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Introduction

Oracle Product Lifecycle Analytics enables you to analyze business data thoroughly from multiple perspectives, assess business impact and take timely decisions. Trend analysis helps you to become aware of business demands, identify costly processes, foresee risks, and monitor product performance.

Architectural Components

The following table describes the major components in the Oracle Product Lifecycle Analytics architecture:

Component	Description
Oracle Data Integrator	Oracle Data Integrator (ODI) is an application which uses the Extract-Transform-Load process to transform data from one schema to another. ODI uses the ODI Interface and PL/SQL procedures to implement the Extract- Transform-Load process.
Data Mart Schema	This is an Operational Data Store built from the Agile PLM OLTP (Online Transaction Processing) database.
ODI Repositories	ODI Repositories maintain all information related to the definition and execution of ETL processes.
MDS Schema	This Star Schema contains Fact and Dimension tables that enable you to create analytical reports using any reporting application.
Configurator	This component enables you to associate configurable PLM data to the MDS depending on various individual user PLM configurations. It gets installed as part of the Oracle PLA installation, in the same machine.

Component	Description
Oracle PLA Model	The Oracle PLA Model is a metadata repository that has metadata of the MDS tables, the business rules such as measure, formulae, hierarchical dimensions, and user-specific roles and privileges that are required to create analytics reports.
Oracle PLA Web Catalog	The Oracle PLA Web Catalog component presents organized information in the form of reports on Oracle PLA Interactive Dashboards.

Software Requirements

The following are the software requirements for the Oracle Product Lifecycle Analytics installation:

Software Component	Name	Version
Oracle Business Intelligence – BI server and Presentation services	Enterprise Edition	10.1.3.4.1
Database server	Oracle Enterprise Edition	10g R2*, 11g R1, 11gR2
	Microsoft SQL Server (Agile PLM for Process only)	2005 SP2, 2005 SE
Data Integration Component	Oracle Data Integrator	10.1.3.5, 10.1.3.6.2
Software Development Package	Java Development Kit	1.5.x or 1.6 **Note** Agile PLM for Process requires JDK 1.6 or higher
Operating Systems	Microsoft Windows Server	2003 SP2 (32 bit and 64 bit)
	Oracle Enterprise Linux	5.4 (32 bit and 64 bit)
	Sun Solaris	10 (SPARC 64 bit)
	AIX	6.1
	HP-UX	11.31

Software Component	Name	Version
Data Source	Agile PLM Releases	9.3 9.3.0.1 9.3.0.2 9.3.1
	Agile PLM for Process	6.0.0.3 with EP 2.4.1**
*System performance may improve if Oracle Database patch 10.2.0.4 is installed on a 64-bit operating system. **EP 2.4.1 is only needed if you are going to extend or customize your BI solution to use fields from the Extended Attribute Denormalization capability of the source database.		

Note Refer to the *Oracle Business Intelligence Infrastructure Installation and Configuration Guide* for install options specific to various Web servers.

Hardware Requirements

When you choose hardware configuration, it is important to consider details such as the total number of users, the number of concurrent users, the size of your database, the number of Engineering Change Orders processed per day, and the number of transactions in the data base.

The following are the minimum hardware requirements for the Database Server that hosts the Oracle Product Lifecycle Analytics Database Schema:

Environment	CPU	RAM	Minimum Disk Space
Development (DEV)	2	4 GB	4 times Agile PLM or Agile PLM for Process DB size
Testing or Staging (STAGE)	2	4 GB	4 times Agile PLM or Agile PLM for Process DB size
Production (PROD)	4	8 GB	4 times Agile PLM or Agile PLM for Process DB size

Important Ensure at least 4GB of free disk space is available on the computer server before you begin the installation of Oracle Product Lifecycle Analytics.

Do not install any software which occupies a lot of disk space, on the systems that have Oracle Product Lifecycle Analytics.

Do not include any other data base schema on the computer systems that have Oracle Product Lifecycle Analytics database and schema.

Do not use Agile Host server as the Primary Domain Controller (PDC) or Dynamic Host Configuration Protocol (DHCP) server.

Do not enable Disk Compression on Agile computer systems.

Note We recommend that the computer systems on which you install the Oracle Product Lifecycle Analytics and Oracle Database, have at least two physical drives or two disk partitions. This enables you to install the Operating system and the Agile/Oracle installation components on separate drives/partitions, thus ensuring better performance.

Chapter 3

Capacity Planning

This chapter includes the following:

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- Agile PLM Database Sizing 14
- Hardware Requirement Guidelines 15
- Tablespace Requirements 16
- ODI and JVM Memory Requirements 18
- OBIEE Application Server Capacity Recommendations 18

Deployment Configuration

Deployment of the Oracle Product Lifecycle Analytics differs on the basis of the Operating Environments. For example, the deployment configurations for testing and production work environments are different. The installation includes components specific to Oracle Product Lifecycle Analytics along with the OBIEE and ODI products.

You can deploy these components on a single system or distribute them across systems on the basis of the strength of the customer base.

Configuration Complexity	Reference
Minimum	Basic configuration recommended for development environments. In this configuration Database and BI server are hosted on same machine.
Medium	Recommended deployment configuration for most customers whose PLM dataset size is less than 6GB and that have no restrictions on hosting Java based ODI server components on database servers. In this configuration the Database and BI server are hosted on separate machines.
Large	Recommended deployment configuration for customers whose PLM dataset size is greater than 6GB or if the database server environments have restrictions on hosting Java based ODI server components. In this configuration the Databases, Oracle Data Integrator (ODI) and BI server are hosted on separate machines.

Note Oracle Product Lifecycle Analytics reports execute database queries against the Data Mart schema. If the reports are not cached by the OBIEE server, the reports may not perform as expected, throw errors, or show inconsistent data if they are run while Full or Incremental ETL tasks are bulk loading data into the Data Mart schema. You should consider the OBIEE platform features to cache reports or use a replicated Data Mart schema to minimize any impact to users while ETL tasks are scheduled to run.

The following are the two main layers in Deployment:

- Database Layer
- Application Layer

Database Layer

Database Layer consists of the following components distributed across servers:

- Source Database
  - Agile PLM Database on Oracle
  - Agile PLM for Process Database on SQL Server
- Target Data Mart Database (Oracle Enterprise Database Server only)
  - Staging Schema
  - MDS Schema
- ODI ETL Repositories (Oracle Enterprise Database Server only)
  - ODI Master Repository
  - ODI Work Repository

Application layer

Application Layer consists of the following components distributed across one or more server machines:

- Oracle Data Integrator Components (Refer to the ODI documentation for all ODI components)
  - ODI Agent
  - ODI Operator
- Oracle PLA Configurator
- JDK or JRE
- Oracle Business Intelligence Enterprise Edition components
  - Oracle PLA RPD on Oracle BI Server.

- Oracle PLA Web Catalog on Oracle BI Presentation Server
- Web Server: IIS, OC4J, Weblogic, Websphere, or Tomcat/Apache

- Browser Clients: Internet Explorer or Firefox

Note These browsers need not necessarily be available on the server.

The following matrix depicts the Deployment configuration for various customer bases:

	Deployment Configuration	Small		Medium			Large				
	Servers S1, S2, S3, S4 S5	**S1**	**S2**	**S1**	**S2**	**S3**	**S1**	**S2**	**S3**	**S4**	**S5**
Software Components	Agile PLM or Agile PLM for Process Database	✓		✓			✓				
	Oracle Data Integrator 10.1.3.5/10.1.3.6.2		✓		✓				✓		
	Oracle 10g R2* or 11g R1 or 11gR2		✓		✓			✓			
	PLM MDS Schema		✓		✓			✓			
	ODI Master Repository		✓		✓			✓			
	ODI Work Repository		✓		✓			✓			
	ODI Agent and Operator		✓		✓				✓		
	Oracle PLA Configurator		✓		✓				✓		
	JDK 1.5.x or 1.6		✓		✓				✓		
	OBIEE 10.1.3.4.1 Server		✓			✓				✓	
	Oracle PLA RPD		✓			✓				✓	
	OBIEE 10.1.3.4.1 Presentation Server		✓			✓					✓
	IIS or OC4J or Tomcat/Apache		✓			✓					✓
	Oracle PLA Web Catalog		✓			✓					✓
	*System performance may improve if Oracle Database patch 10.2.04 is installed on a 64-bit operating system.										

Note In Large Configurations, some customers do not permit installation of Java-based components, including ODI, on database server machines. In such scenarios, ODI component can be installed in a separate server S3, as illustrated in this deployment configuration matrix.

Agile PLM Database Sizing

The Agile PLM Customer Base is categorized into four sizes

1. Small
2. Medium
3. Large
4. Extra Large

The basis of this categorization is detailed in the following table:

Criterion	Small	Medium	Large	Extra Large
PLM Database Size	< 1 GB	1 - 5 GB	5 - 10 GB	> 10 GB
Number of Query Connections on PLM Data Mart	5 - 10	10 - 25	25 - 40	> 40
COMMON				
Users	<100	>100	>500	>1000
User Groups	<10	>10	>50	>100
Suppliers	< 600	> 1,000	> 2,500	> 5,000
Customers	< 100	> 100	> 5000	> 35,000
Discussions	< 1,000	> 10,000	> 50,000	> 75,000
Average Workflow steps for all Change objects (ECO, PSR and etc.)	<6	>6	>8	>12
Average Approvers for all changes	<5	>5	>10	>20
Transfer Orders / week	< 13,000	> 13,000	> 26,000	> 780,000
Files	< 250,000	> 250,000	> 500,000	> 1,000,000
Items	< 100,000	> 100,000	> 150,000	> 200,000
Manufacturers	< 1,500	> 1,500	> 4,000	> 6,500
PC				
Manufacturer Parts	< 15,000	> 15,000	> 80,000	> 150,000
BoM Rows	< 200,000	> 200,000	> 1,000,000	>10,000,000
AML Rows	< 100,000	> 100,000	280,000	>450,000
Initial Changes	< 10,000	> 10,000	> 40,000	> 70,000

Criterion	Small	Medium	Large	Extra Large
Changes / day (derived)	< 15	> 15	> 30	> 75
Avg Assembly BoM size	<20	>20	>100	>500
Avg AML / Item	<2	>2	>5	>10
Avg Affected Items / Change	<2	>2	>5	>10
PQM				
Initial Problem Service Requests	<10,000	>10,000	>50,000	>100,000
Problem Service Requests / week	< 2	> 2	> 80	> 400
Initial Problem Service Requests	<1,000	>1,000	>10,000	>20,000
Quality Change Request / week	< 2	> 2	> 25	> 100
Avg Items / PSR	<2	>2	>5	>10
Avg PSRs / PSR	<2	>2	>5	>10
Avg QCR / PSR	<2	>2	>5	>10
Avg PSRs / QCR	<2	>2	>5	>10
Avg Changes / QCR	<2	>2	>5	>10
PPM				
Activities / Year	10,000	40,000	125,000	250,000
Decisions / Year	< 1500	> 1500	> 10,000	> 20,000
Root Programs / Year	100	200	500	1,000
Avg Team size per Program	<10	>10	>50	>75

Hardware Requirement Guidelines

This section describes the hardware requirements for Oracle Product Lifecycle Analytics. Oracle has certified acceptable performance in these environments. However, performance is improved by using faster processors and additional memory, particularly in environments where users run multiple applications simultaneously.

Minimum Hardware Requirements for Oracle Product Lifecycle Analytics Applications.

Environment	Servers	CPU	RAM	Disk Space
Development	Database, ODI, and OBIEE Servers	4	4 GB	6 x Source Database Size

Environment	Servers	CPU	RAM	Disk Space
Testing	Database and ODI	4	4 GB	6 x Source Database Size
	OBIEE Servers	2	4 GB	10 GB
Production	Database and ODI	4	4 GB	6 x Source Database Size
	OBIEE Servers	2	4 GB	10 GB

Hardware sizing guidelines for Database server machine based on Agile PLM or Agile PLM for Process Dataset size

Memory and Disk Spaces	Customer Size			
	Small	Medium	Large	Extra Large
Agile PLM/Agile PLM for Process Database Size	< 1 GB	1-5 GB	5-10 GB	> 10 GB
Disk Space	12 GB	30 GB	60 GB	100 GB or 6 times the Agile PLM or Agile PLM or Process database size
Memory (Windows)	4 GB	8 GB	12 GB	16 GB or higher
Memory (Linux)	4 GB	8 GB	12 GB	16 GB or higher

Note The hardware sizing guidelines provided in this document make an assumption that no other processes or software components are sharing the recommended memory and disk space. It is important that appropriate data warehouse, ETL, and BI technical experts evaluate performance criteria and then size the hardware configuration, based on the source database size, volume of data changes in the source application, concurrent usage loads on the BI product, hardware/software fail-over and recovery requirements, IT network and infrastructure constraints, and any other business requirements.

Tablespace Requirements

Database Initialization Parameters

Database instance hosting Data Mart and MDS schemas should have the following Oracle Database initialization parameters:

NLS_LENGTH_SEMANTICS = CHAR

NLS_CHARACTERSET = UTF8

Data Mart Database Tablespace Parameters

	Customer Base			
	Small	**Medium**	**Large**	**Extra Large**
Disk Space	8 GB	12 GB	24 GB	24 GB
Default Extent Size	512K	512K	1024K	1024K
Default Next Size	256K	256K	512K	1024K
Datafile Size	512M	512M	1024M	2048M
Redo Log file Size	50M	50M	100M	100M
Processes	100	100	150	150
Shared_Pool_Size	200,000,000	200,000,000	250,000,000	250,000,000
Sort_Area_Size	10,000,000	10,000,000	15,000,000	25,000,000
Log_Buffer	1,000,000	1,000,000	1,500,000	25,000,000

For Large and Extra Large database sizes, it is recommended that two or more tempfiles are created for the temporary tablespace.

Example:

To add a tempfile:

```
SQL> ALTER TABLESPACE temp ADD TEMPFILE
'C:\oracle\product\10.2.0\oradata\orcl\temp02.dbf' SIZE 512m

  2  AUTOEXTEND ON NEXT 250m MAXSIZE UNLIMITED;
```

ODI and JVM Memory Requirements

The following table displays the recommended ODI and JVM Memory sizes:

JVM Settings	Customer Size			
	Small	Medium	Large	Extra Large
Minimum Memory Size	128 MB	128 MB	128 MB	128 MB
Maximum Memory Size	256 MB	256 MB	512 MB	1024 MB

OBIEE Application Server Capacity Recommendations

The following table provides OBIEE Server Capacity Recommendations:

Configuration	Capacity Recommendation
x86 machine with Dual Core 2-CPUs 6 GB of RAM 10+ GB of disk space	Single Core Baseline: ~250 Concurrent Users / CPU Dual Core: ~500 Concurrent Users / CPU
Solaris T2000 machine with UltraSPARC T1.1 8 Core CPU 16 GB of RAM 30 GB of Disk Space	For 32 bit: ~400 Concurrent Users / CPU (8 Core) For 64 bit: ~540 Concurrent Users / CPU (8 Core)