



Agile PLM Business Intelligence

Capacity Planning Guide

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Preface

The Agile PLM documentation set includes Adobe® Acrobat PDF files. The [Oracle Technology Network \(OTN\) Web site](http://www.oracle.com/technology/documentation/agile.html) <http://www.oracle.com/technology/documentation/agile.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 7.0 or later. This program can be downloaded from the [Adobe Web site](http://www.adobe.com) <http://www.adobe.com>.

The [Oracle Technology Network \(OTN\) Web site](http://www.oracle.com/technology/documentation/agile.html) <http://www.oracle.com/technology/documentation/agile.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 [support](http://www.oracle.com/agile/support.html) <http://www.oracle.com/agile/support.html> (<http://www.oracle.com/agile/support.html>) for assistance.

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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/technology/documentation/agile.html) <http://www.oracle.com/technology/documentation/agile.html>

Agile Training Aids

Go to the [Oracle University Web page](http://www.oracle.com/education/chooser/selectcountry_new.html) 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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About this Guide

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 Agile PLM Business Intelligence Application. 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
- Datawarehousing 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 Agile PLM BI 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.

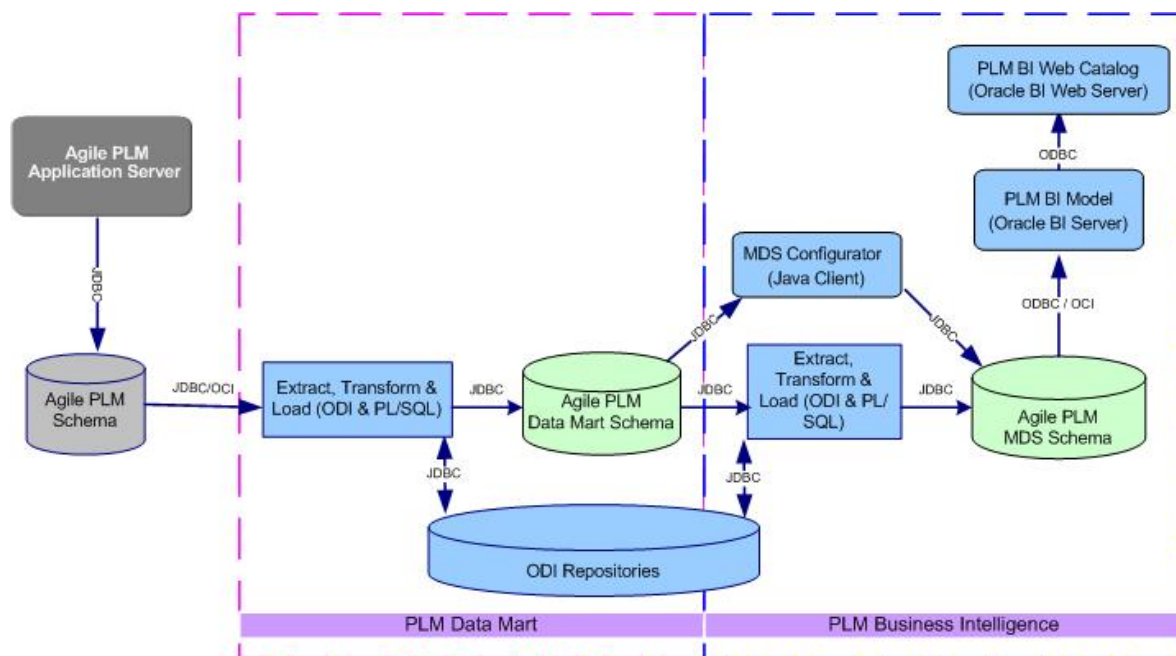
Acronym	Expansion
BI	Business Intelligence
DM	Data Mart
ETL	Extract-Transform-Load
MDS	Multi-Dimensional Schema
OBIEE	Oracle Business Intelligence Enterprise Edition
ODI	Oracle Data Integrator
PLM	Product Lifecycle Management
PLM DM	Product Lifecycle Management Data Mart
PQM	Product Quality Management
PC	Product Collaboration

Introduction

PLM BI Applications are comprehensive, pre-built BI solutions that deliver pervasive intelligence and provide key insights into your Product Lifecycle Management (PLM) data. PLM BI Applications provide an integrated view of Product, enabling greater alignment across Product organizations. Agile PLM Business Intelligence application is built on Oracle Business Intelligence Enterprise Edition (OBIEE) Analytics platform and Oracle Data Integrator (ODI) ETL platform.

BI Architecture

The following illustration of PLM BI architecture depicts the positioning of various modules:



Components

The various components in PLM BI Component Architecture are as follows:

- Oracle Data Integrator (ODI)
- Agile PLM Data Mart Schema

- ODI Repositories
- Agile PLM Multi-Dimensional Schema(MDS)
- PLM BI Configurator
- PLM BI Model
- PLM BI Web Catalog

Oracle Data Integrator

Oracle Data Integrator is an application which uses Extract-Transform-Load process to transform data from one schema to another. ODI uses ODI Interface and PL SQL procedures to implement the Extract- Transform-Load process.

Agile PLM Data Mart Schema

This is an Operational Data Store built from Agile PLM OLTP (Online Transaction Processing) database.

ODI Repositories

ODI Repositories maintain all information related to definition and execution of ETL processes.

Agile PLM BI MDS

This Star Schema contains Fact and Dimension tables that enable you to create Analytical Reports using any Reporting application.

PLM BI 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 ETL installation, in the same machine.

PLM BI Model

PLM BI 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.

PLM BI Web Catalog

PLM BI Web Catalog component presents organized information in the form of Reports on PLM BI Interactive Dashboards.

Software Requirements

The following are the software requirements for Agile PLM BI installation:

Software Component	Name	Version
Browsers	Internet Explorer	6.0 or 7.0 for Windows Operating System
	Firefox	1.5.x or higher. 2.0 for Apple Mac O.S 10.x and Sun Solaris
Oracle Business Intelligence – BI server and Presentation services	Enterprise Edition	10.1.3.4.0
Database server	Oracle Enterprise Edition	10g R2, 11g
Data Integration Component	Oracle Data Integrator	10.1.3.5
Software Development Package	Java Development Kit	1.5

Note Refer OBIEE Installation Guide for Install Options specific to different various Web servers.

Agile PLM Business Intelligence application is certified and supported on the following Operating System platforms:

- Microsoft Windows Server 2003 (32 bit and 64 bit)
- Red Hat Linux AS 5.0 (32 bit and 64 bit)
- Oracle Enterprise Linux 5.0 (32 bit and 64 bit)
- Sun Solaris 10 (SPARC 64 bit)

Supported Agile PLM Sources

Agile PLM Business Intelligence Application supports following software releases of Agile PLM application to extract data from and load it into MDS Schema:

- Agile PLM Release 9.2.2.4
- Agile PLM Release 9.2.2.5
- Agile PLM Release 9.2.2.6

Note Agile PLM Business Intelligence requires Datamart 3.0.1 release for extracting Agile PLM data into staging layer.

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 Data Mart Database schema and BI Database Schema:

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

Important	Ensure at least 4GB of free disk space is available on the computer server before you begin the installation of Agile PLM BI 9.2.1.5
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Do not install any software which occupies a lot of disk space, on the systems that have Agile PLM BI.

Do not include any other data base schema on the computer systems that have Agile PLM BI 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 PLM BI, Agile PLM Data Mart 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.
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Capacity Planning

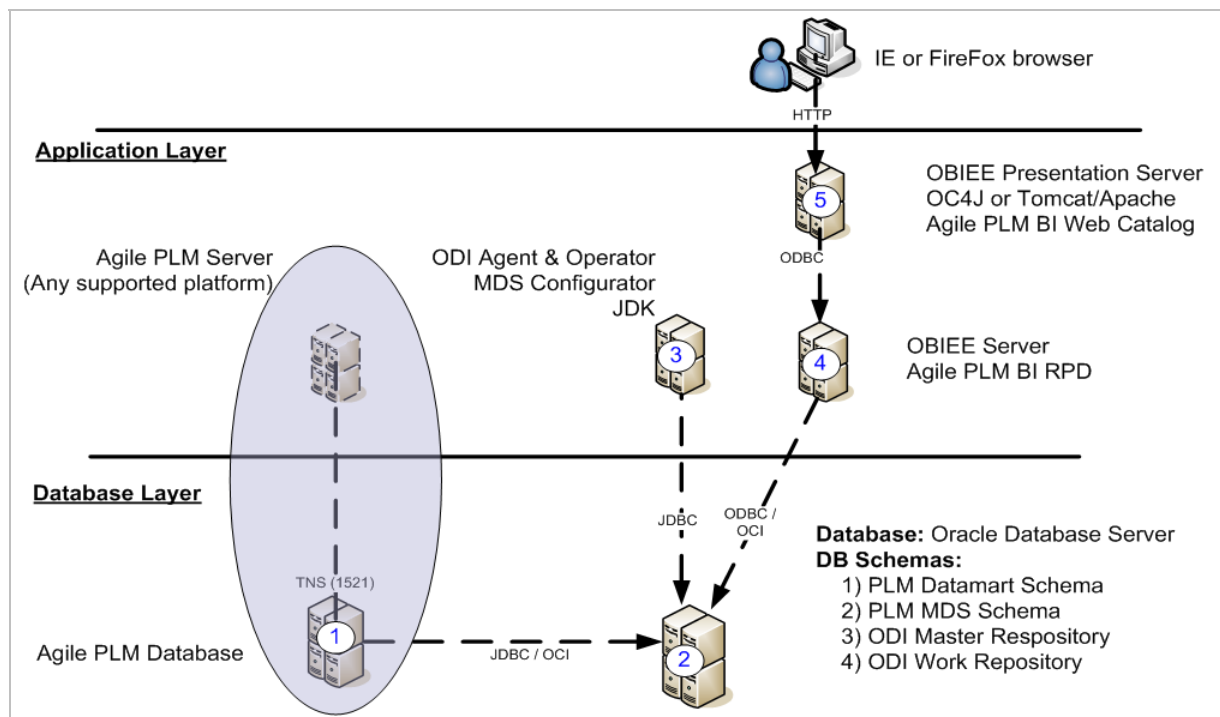
Deployment Configuration

Deployment of the PLM BI 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 PLM Data Mart and PLM BI applications 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.

An illustration of the Deployment Configuration in Large Customer base is as follows:



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:

- Agile PLM Database
- Oracle Data Integrator 10.1.3.5.0
- Oracle 10g R2 or Oracle 11g
- PLM Datamart Schema
- PLM MDS Schema
- ODI Master Repository
- ODI Work Repository

Application layer

Application Layer consists of the following components distributed across servers:

- ODI Agent and Operator

- PLM BI Configurator
- JDK 1.5
- OBIEE 10.1.3.4.0 Presentation Server
- OC4J or Tomcat/Apache
- Agile PLM BI Web Catalog
- OBIEE 10.1.3.4.0 Server
- Agile PLM BI 9.2.1.5 RPD
- Internet Explorer 6.0 onward or Firefox 2.0 browser

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 Database	✓		✓			✓				
	Oracle Data Integrator 10.1.3.5		✓		✓				✓		
	Oracle 10g R2		✓		✓			✓			
	PLM Datamart Schema		✓		✓			✓			
	PLM MDS Schema		✓		✓			✓			
	ODI Master Repository		✓		✓			✓			
	ODI Work Repository		✓		✓			✓			
	ODI Agent and Operator		✓		✓				✓		
	PLM BI Configurator		✓		✓				✓		
	JDK 1.5		✓		✓				✓		
	OBIEE 10.1.3.4.0 Server		✓			✓				✓	
	Agile PLM BI RPD		✓			✓				✓	
	OBIEE 10.1.3.4.0 Presentation Server		✓			✓					✓
	OC4J or Tomcat/Apache		✓			✓					✓
	Agile PLM BI 9.2.1.5 Web Catalog		✓			✓					✓
	Internet Explorer or Firefox browser		✓			✓					✓

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.

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 table below.

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
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
Activities / Year	< 75,000	> 75,000	> 500,000	> 1,000,000
Decisions / Year	< 1500	> 1500	> 10,000	> 20,000

Root Programs / Year	< 500	> 500	> 5,000	> 10,000
Avg Team size per Program	<10	>10	>50	>75

Hardware Requirement Guidelines

This section describes the hardware requirements for Agile PLM Business Intelligence Application. 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 Agile PLM Business Intelligence Applications

Environment	Servers	CPU	RAM	Disk Space
Development	Database, ODI, and OBIEE Servers	4	4 GB	6 x Agile PLM Database Size
Testing	Database, ODI, and OBIEE Servers	4 2	4 GB 4 GB	6 x Agile PLM Database Size 10 GB
Production	Database, ODI, and OBIEE Servers	4 2	4 GB 4 GB	6 x Agile PLM Database Size 10 GB

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

Memory and Disk Spaces	Customer Size			
	Small	Medium	Large	Extra Large
Agile PLM Database Size	< 2 GB	< 4 GB	< 8 GB	> 8 GB
Disk Space	12 GB	24 GB	48GB	64 GB
Memory (Windows)	4 GB	4 GB	6 GB	8 GB
Memory (Linux)	4 GB	4 GB	6 GB	8 GB

Tablespace Requirements

Database Initialization Parameters

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

NLS_LENGTH_SEMANTICS = CHAR

NLS_CHARACTERSET = UTF8

MDS Database Tablespace Parameters

	Customer Base			
	Small	Medium	Large	Extra Large
Disk Space	12GB	24GB	48GB	64GB
Default Extent Size	512K	1024K	2048K	4096K
Default Next Size	256K	512K	1024K	2048K
Datafile Size	512M	1024M	2048M	4096M
Redo Log file Size	50M	100M	200M	400M
Processes	100	150	200	250
Shared_Pool_Size	200000000	250000000	300000000	350000000
Sort_Area_Size	10000000	15000000	20000000	25000000
Log_Buffer	1000000	1500000	2000000	2500000

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	256 MB	512 MB
Maximum Memory Size	256 MB	512 MB	1024 MB	2048 MB

OBIEE Application Server Capacity Recommendations

The following table provides OBIEE Server Capacity Recommendations:

Configuration	Capacity Recommendation
x86 machine with Dual Core 2-CPU's 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)

