



Agile PLM Integration Pack for Oracle E-Business Suite

Design to Release 2.2 - Capacity Planning White
Paper

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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 the Agile Web Client and the 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

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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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Capacity Planning Overview

This chapter includes the following:

- Glossary..... 1

The performance and scalability results published through this document are highly dependent upon a number of factors, including workload, specific application requirements, and implementation. Results under other conditions may vary significantly.

Implementation may be possible with a configuration that differs from the one followed, and with less or more hardware. The most reliable method for sizing suitable implementation architecture is to run a proof of concept or pilot prior to full implementation. This will allow the implementation team to assess the likely success of their implementation architecture and adjust the specifications accordingly if they need to do so, as demonstrated by the results.

The suggested hardware configuration in this document is based on the user scenarios covered – the details of which, and the various variables, are documented.

The document is based on the out of the box solution offering and does not account for any specialized or customized solutions. There might be a lot of performance dependencies on custom applications or on applications outside of the scope of the displayed components that affect the performance of the overall solution. For example, if a custom application is using a lot of resources and is deployed on a machine hosting another component, it might utilize resources that were calculated to be dedicated to that component.

Glossary

Term	Definition
PLM	PLM Product Lifecycle Management – the process of taking parts/documents from inception to production to phase-out, and all the stages in-between
AML	Approved Manufacturer Parts List – list of approved manufacturer parts associated with an item
AI	Affected Items tab on Change objects in Agile
BOM	Bill of Materials. It is a hierarchical representation of a product that is made up of other products.
ECO	Engineering Change Order. It is an object that carries with it all the proposed changes to a product and/or its BOM. It can be approved and implemented to make the proposed changes effective.
FMW	Fusion Middle Ware URL: http://www.oracle.com/technology/products/middleware/index.html
BPEL	Business Process Execution language URL: http://www.oracle.com/technology/products/ias/bpel/htdocs/orabpel_faq.html

EBS Enterprise Business Service

URL: <http://www.oracle.com/technology/products/integration/esb/index.html>

Hardware Sizing

This chapter includes the following:

- Use Case Scenarios 3
- Recommended Hardware Configuration 7

The goal of hardware sizing is to balance the hardware costs with user response times. Based on several factors including the potential volumes in the targeted industries, business scenario challenges and so forth, a few Business Use Case Scenarios were identified for a thorough performance analysis and benchmarking.

Since the integration depends heavily on interaction with two major enterprise applications, its performance is subject to performance constraints of the individual enterprise applications themselves. However, the integration also performs a number of operations that are independent of the enterprise applications. This document lays out the acceptable performance benchmarks for each process covered by the integration.

The requirements are primarily driven by the need to fulfill or exceed the Key Performance Indicators (KPI) gathered from our customers against each of these.

Use Case Scenarios

The following are some of use case scenarios identified for a detailed performance analysis & benchmark PLM PIP 2.2 product.

1. Processing Change Orders with 2000+ affected items

Releasing an ECO having 2000, 5000 & 7500 Affected Items.

Results (Throughput/Response Time)

DataSet	Response Time	No of Line Items	Memory Usage on SOA Server
2000	630 Secs	2000	1.0 GB
5000	3024 Secs	5000	1.3 GB
7500	4320 Secs	7500	1.5 GB

Note Average CPU Usage on SOA server is reported as 15% in all the above scenarios.

2. Processing Change Orders with 500+ BoM redlines

Releasing and ECO having 500, 1000 Affected Items with large number of BoM redlines

Results (Throughput/Response Time)

DataSet	Response Time	No of Line Items	Memory Usage on SOA Server
500 AI's with 100 BoM redlines	194 Secs	600 (500 AI's + 100 redlines)	630 MB
500 AI's, each with 3 BoM redlines	660 Secs	2000 (500 AI's + 1500 redlines)	1.0 GB
1000 AI's, each with 5 BoM redlines	3600 Secs	6000 (1000 AI's + 5000 redlines)	1.4 GB

Note Average CPU Usage on SOA server is reported as 15% in all the above scenarios.

3. Processing Change Orders with Affected Items having sites mapped

Releasing an ECO having 100, 1000 AI's with sites mapped to orgs in EBS.

Results (Throughput/Response Time)

DataSet	Response Time	No of Line Items	Memory Usage on SOA Server
1000 AI's each with 1 site mapped to 5 Orgs	2043 Secs	N/A	1.2 GB
1000 AI's each with 1 site mapped to 10 Orgs	3900 Secs	N/A	1.5 GB
1000 AI's each with 3 sites mapped to 4 Orgs	1841 Secs	N/A	1.0 GB

Note Average CPU Usage on SOA server is reported as 15% in all the above scenarios.

Analysis

Considering all the test results that are executed as part of sizing effort, here is the final summary of the total line items that FMW server will be processed per sec. i.e., updating the items all the way from Agile PLM to Ebiz.

Category	Total Line Items	No. of Line Items processed per Sec
1	<=300	0.8
2	>300 & <=2500	3.1
3	>2500	1.7

Note:

- This table holds well only on change orders without sites.
- For releasing change orders with sites, please refer this table in Use Case Scenarios section for the end user response times and the memory usage on SOA Server.
- Refer this table on how the total line items will be calculated on a given change order.

Formula to calculate the end user response times for a given change order

Total line items / No. of line items processed per sec = End user response time to process an ECO.

Examples:

1. Time taken to release an ECO with 10 AI's, each having 3 BoM redlines.

Calculate the total line items in this change order -

$$10 \text{ AI's} + 30 (10 \text{ AI's} \times 3 \text{ BoM redlines on each}) = 40 \text{ line items}$$

Since the total line items are less than 300, it falls under the category 1 (as shown in the table above). As per category 1, 0.8 line items can be processed per sec.

Hence, a change with 40 line items will take approximately $40 / 0.8 = 50$ Secs (i.e., total line items / no. of line items processed per sec) to update all the items from Agile PLM to Ebiz.

2. Time taken to release and ECO with 10 AI's, each having 100 new BoM components.

Calculate the total line items in this change order -

$$10 \text{ AI's} + 1000 (10 \text{ AI's} \times 100 \text{ new BoM components on each}) = 1010 \text{ line items}$$

As the total line items are more than 300 and less than 2500, it falls under category 2 (as shown in above table). As per category 2, 3.1 line items can be processed per sec.

So, a change with 1010 line items will take approximately $1010 / 3.1 = 325$ Secs (i.e., total line items / no. of line items processed per sec) to update all the items from Agile PLM to Ebiz.

Performance Laboratory Hardware Configuration Used

Following is the hardware configuration used for testing the above mentioned use case scenarios.

Setup Configuration

Hardware

Tier	CPU	Memory
Agile App	2x3.1 GHz Intel Xeon	2.0 GB
Agile DB	4x3.1 GHz Intel Xeon	2.0 GB
SOA Suite (BPEL + ESB Server + DB) & AIA FP	2x3.1 GHz Intel Xeon	4.0 GB
EBS	2x3.1 GHz Intel Xeon	4.0 GB

Software

Tier	Software
Agile App	Agile 9.2.2.4
Agile DB	Oracle 10g R2
SOA Suite / AIA FP	SOA Suite 10.1.3.3 / 2.2
EBS	11.5.10 CU2

Tests Topology

All the above tests were performed on two different topologies as specified below:

1. Servers hosted in the same subnet without any latency
2. Servers hosted in different geographies on HIGH LATENCY NETWORK. i.e., Agile PLM and FMW in one location and EBS in other location with a network latency of 300 Milliseconds.

End user response times remain the same in both the above tested topologies (with latency and without latency).

Recommended Hardware Configuration

FMW / SOA Suite

Based on the above analysis, the following hardware configuration is recommended to deploy PLM PIP.

Tier	CPU	Memory
SOA Suite	2x3.1 GHz Intel Xeon	4 GB

Since the average CPU usage on SOA server is reported as only 15% in all the test scenarios and considering the fact that change orders will be processed sequentially on SOA server, this clearly indicates that PLM PIP is NOT CPU bound but it has more to do with the memory usage (java heap).

Note More the number of line items in a change consume more heap memory on SOA Server as this proportionally increases the payload size. Hence, it is always advisable to set the heap memory to its max based on the operating system and also increase the transaction time out values accordingly.

Note Refer [Performance Tips](#) on page 9 for setting up the transaction timeout values and optimum JVM Parameters.

Agile App & EBS

For hardware sizing of Agile App and EBS, please refer to their corresponding capacity planning/sizing documents.

Performance Tips

Setting Transaction Timeout Values

The transaction-timeout values is specified in four places:

Location	Property to modify	Sample Value
<SOA_ORACLE_HOME>/bpel/domains/<domain_name>/config/domain.xml	syncMaxWaitTime	120
<SOA_ORACLE_HOME>/integration/esb/config/esb_config.ini	xa_timeout	120
	jms_receive_timeout	120
<SOA_ORACLE_HOME>/j2ee/<domain_name>/application-deployments/orabpel/ejb_ob_engine/orion-ejb-jar.xml	transaction-timeout	120
<SOA_ORACLE_HOME>/j2ee/<domain_name>/config/transaction-manager.xml	transaction-timeout	120

Note The sample value is for 100 Affected Items being created in Ebiz through a Change Order released from Agile. It is always recommended to set these values to large number as it will not have any impact on system performance.

Note All values are in seconds.

Optimum JVM Parameters

After running several tests on Linux machines with various amounts of loads for the components, the following parameters have been identified to improve out-of-box system performance.

```
-server -XX:MaxPermSize=256M -ms2048M -mx2048M
```

Note We cannot increase the heap size memory on windows box to 2 GB due to 32-bit limitation of O.S. Hence, it is recommended to set the max memory (1 GB) on windows box.

Setting the Logging Level

It is advisable to set the logging levels to appropriate values in production environment, as this will have impact on system performance and consumption of disk space.

The following needs to be taken care in production environment:

From BPEL Console

1. Login to BPEL Console
2. Click on Manage BPEL Domain
3. Go to Configuration tab
4. Set auditLevel value to *Production*
5. Go to Logging tab
6. Set all values to fatal