



# **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.

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**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>.

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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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**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/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](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

### This chapter includes the following:

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- 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 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

Acronym	Expansion
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

# Overview

**This chapter includes the following:**

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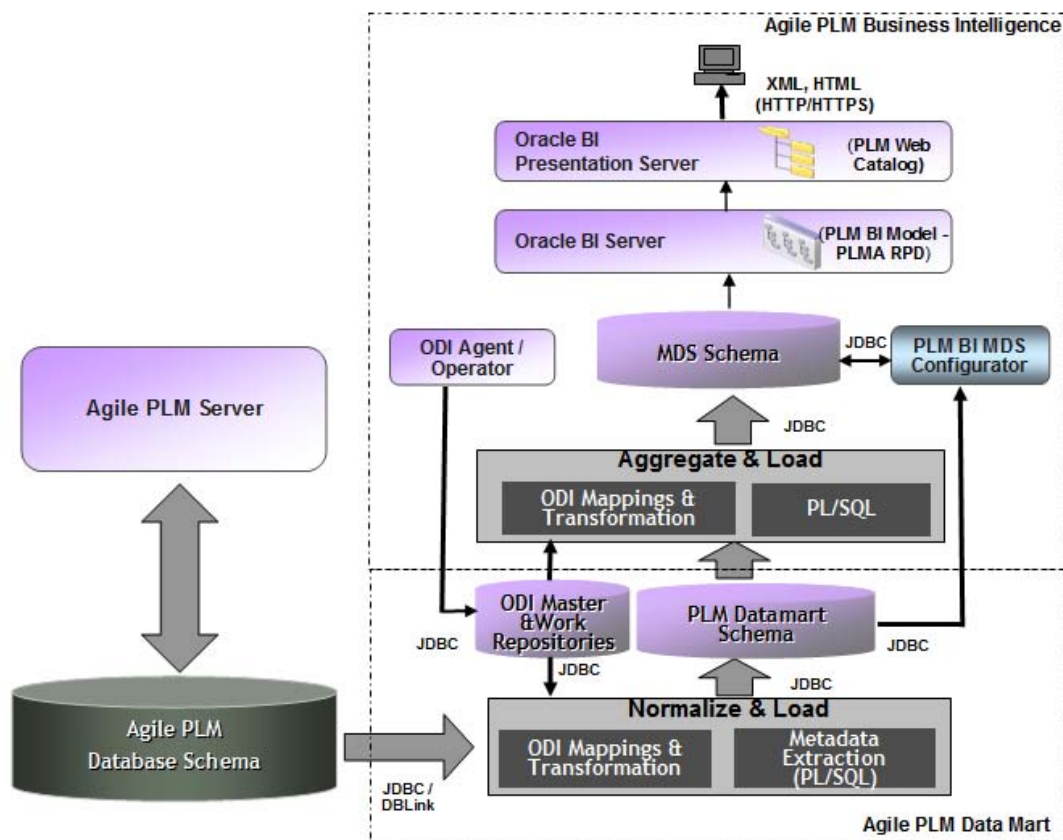
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## Introduction

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.

## Agile PLM Business Intelligence Architecture

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



The various components in PLM Business Intelligence 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 (PLMA.RPD)
- PLM BI Web Catalog



## BI Architectural Components

The following table describes the major components in Agile PLM Business Intelligence 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.
Agile PLM 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.
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 on Windows

	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
Data Mart	Agile PLM Data Mart	3.0.2
Software Development Package	Java Development Kit	1.5
Operating Systems	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 )
Data Source	Agile PLM Releases	9.2.2
		9.2.2.1
		9.2.2.2
		9.2.2.4
		9.2.2.5
		9.2.2.6
		9.3

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**Note** Refer to the OBIEE Installation Guide for install options specific to various Web servers.

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## 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	4 times Agile PLM DB size
Production (PROD)	4	8 GB	4 times Agile PLM DB size

<b>Important</b> Ensure at least 4GB of free disk space is available on the computer server before you begin the installation of Agile PLM BI.
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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.

<b>Note</b> 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

**This chapter includes the following:**

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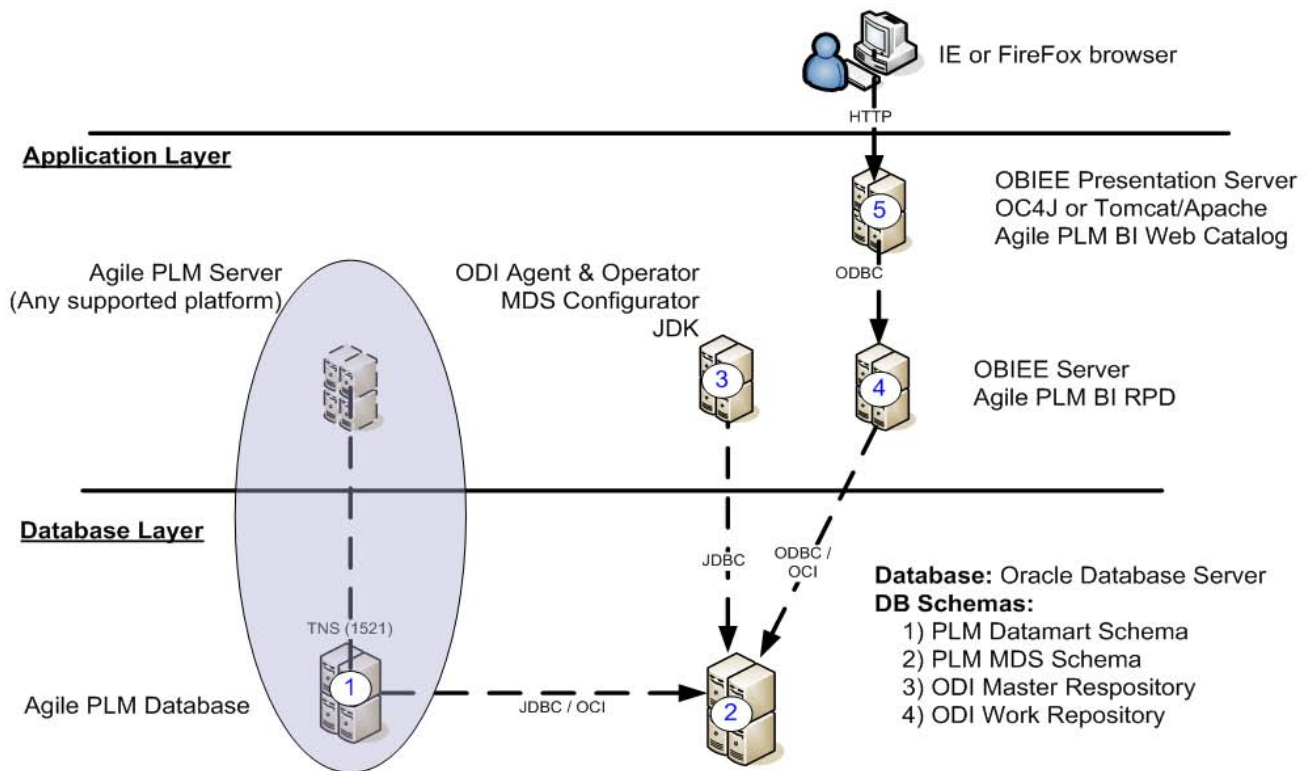
## Deployment Configuration

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 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		✓			✓					✓

	Deployment Configuration	Small		Medium			Large				
	Servers S1, S2, S3, S4 S5	S1	S2	S1	S2	S3	S1	S2	S3	S4	S5
Software	Agile PLM Database	✓		✓			✓				
	Oracle Data Integrator 10.1.3.5		✓		✓				✓		
	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
<b>COMMON</b>				
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
<b>PC</b>				
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
<b>PQM</b>				
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	4 GB	6 x Agile PLM Database Size
		2	4 GB	10 GB
Production	Database, ODI, and OBIEE Servers	4	4 GB	6 x Agile PLM Database Size
		2	4 GB	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	
Disk Space	12 GB		24 GB	
Memory ( Windows)	4 GB		4 GB	
Memory (Linux)	4 GB		4 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	
Default Extent Size	512K		1024K	
Default Next Size	256K		512K	
Datafile Size	512M		1024M	
Redo Log file Size	50M		100M	
Processes	100		150	
Shared_Pool_Size	200000000		250000000	
Sort_Area_Size	10000000		15000000	
Log_Buffer	1000000		1500000	

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
<b>Minimum Memory Size</b>	128 MB		128 MB	
<b>Maximum Memory Size</b>	256 MB		512 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)