

# ORACLE IDENTITY MANAGER SIZING GUIDE

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## Note

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## Introduction

This document provides an outline of sample Oracle Identity Manager (OIM) hardware and software requirements for deployment of Oracle Identity Manager. The document considers three deployment scenarios and provides hardware and software sizing recommendations for the same. Architects and Implementation teams should consider the recommendations as a “rule of thumb” and perform a sanity check while planning a product deployment.

The document makes certain assumptions regarding the OIM deployment

- Customer desires a highly available environment.
- Customer is following RDBMS-specific best practices for high availability, backup and recovery.
- Sizing requirements for the Design Console are not part of the scope of this document. It is assumed that developers and Administrators have the Design Console installed on their Windows desktops.

## Architecture

Oracle Identity Manager is built on a J2EE-based, N-tier deployment architecture that separates the platform's presentation, business logic and data tiers. This separation of tiers means that Oracle Identity Manager can rapidly scale with the performance needs of the customer. The architecture is able to leverage the most flexible and supported cross-platform J2EE services available: A combination of Java, XML and object technologies. This architecture makes Oracle Identity Manager a scalable, fault-tolerant solution. Figure 1 below illustrates a sample architecture for deploying Oracle Identity Manager. The various tiers of Oracle Identity Manager are

- Dynamic Presentation Logic Layer – Typically, a web server farm serving JSPs, Servlets, XML, XSL etc., to support the different kinds of browsers and presenting the UI content in a meaningful way.
- Business Logic Layer – All the business logic of the enterprise application is implemented in the middle tier using a J2EE application server which uses EJBs (Enterprise Java Beans) and other J2EE technologies to deploy the application as scalable and distributed granular components and services.
- Data Access Layer – This layer typically contains data access beans and other data access components to connect to the relational databases. This layer also manages the pool of JDBC connections. It can be conceptualized as an object oriented wrapper around relational databases implemented as distributed and reusable components.
- Backend System Intergration Layer – The backend tier typically consists of a distributed set of relational databases, which is integrated to the middle tier using Java Database Connectivity (JDBC). This layer can also be used to access a wide variety of databases in a uniform way. This tier could also contain other legacy systems, which integrate to the application using a variety of technologies depending upon the exact nature of the backend system.

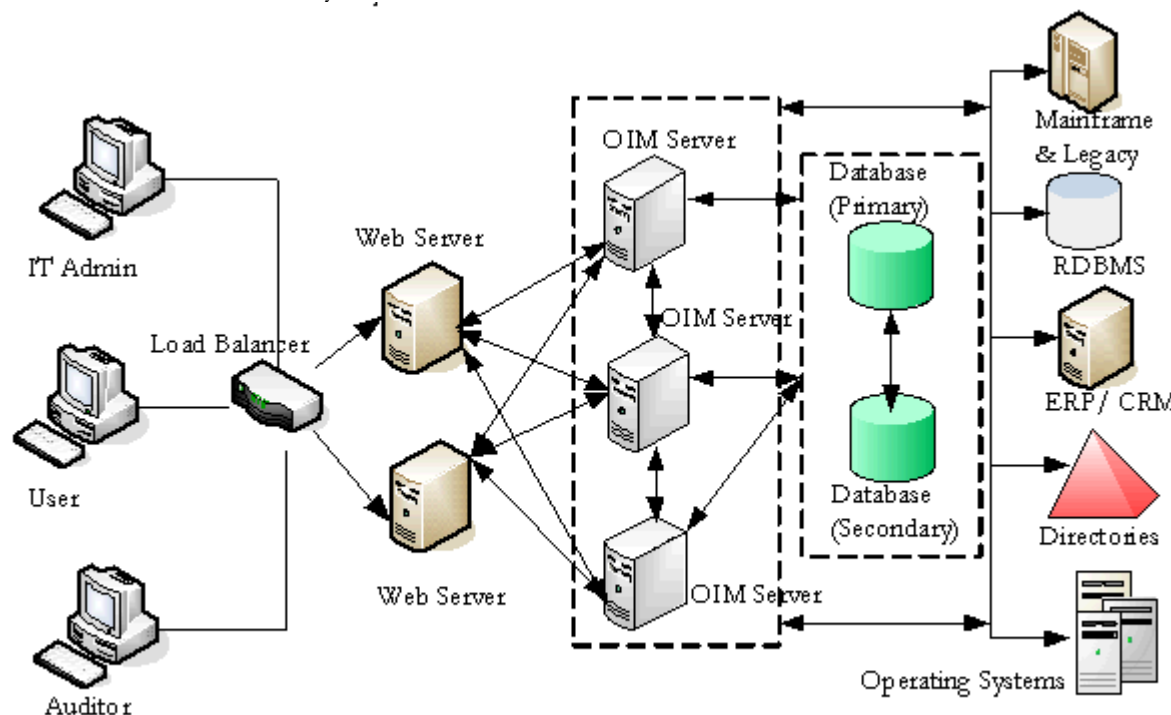


Figure 1: Sample architecture for Oracle Identity Manager

*Note: In the Oracle Identity Manager (OIM) deployment diagrams shown in this document, an OIM Server refers to a single deployment of Oracle Identity Manager. A physical server may contain multiple deployments of Oracle Identity Manager grouped together in a J2EE cluster.*

Typical Oracle Identity Manager deployments comprise of the following components

1. Two or more Web Servers deployed in the DMZ and load balanced using a Load Balancing Router (LBR). The web servers act as a reverse proxy for the Oracle Identity Manager deployment. End-users and End-user administrators interact with Oracle Identity Manager through these web servers.
2. Two or more Oracle Identity Manager instances deployed on a J2EE application server cluster. The application servers are deployed in a secure zone behind the firewall. Each Oracle Identity Manager instance comprises of
  - a. A Struts/ Tiles – based Web application (also known as the web client), which accepts user requests for profile maintenance, password management, provisioning and delegated administration. The web application also handles workflow requests and allows approvers to manage requests assigned to them.
  - b. A J2EE server application, which uses J2EE components such as EJBs, JMS, JDBC and JNDI to process requests and execute business logic. Provisioning activities, Reconciliation and Request processing and processing of scheduled jobs is carried out by this application.

**Note:** The above break out of components is for illustrative purposes only. Please note that from a deployment and support perspective, the server and web application are part of the same deployment module.

3. Optionally, an Oracle Identity Manager instance that is dedicated for executing scheduled processes.
4. Oracle Identity Manager, typically, uses the JMS message provider offered by the application server on which it is deployed. Many customers seek to leverage their existing investment in 3<sup>rd</sup> party JMS messaging infrastructure and desire the JMS queues used by Oracle Identity Manager to be hosted on this infrastructure. In such cases, sizing and performance of the external messaging infrastructure becomes another consideration.
5. In most cases, Oracle Identity Manager uses “agent-less” connectors. This means that no code is required to be deployed on the target system. However, in some cases, e.g.
  - a. Advanced Mainframe Connectors – IBM RACF, CA ACF2 etc
  - b. Active Directory Password Synchronization

the deployment requires an agent, called as the Remote Manager, to be deployed on the target. This is an optional component and is required only if the target does not offer APIs that can be invoked remotely or if the target’s security model requires it.

6. A RDBMS that contains the Oracle Identity Manager repository. Typically, the RDBMS instance and the Application Servers are co-located in the same secure zone and are in close proximity (from a network perspective).

Additional infrastructure such as reporting databases, Single Sign on servers are not considered as part of the deployment.

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## Deployment Considerations

Performance of the Oracle Identity Manager deployment depends on the load faced by each of the tiers above and their response characteristics. In the following sections, we will try to identify factors that can affect performance and must be kept in mind while sizing the Oracle Identity Manager deployment.

### Oracle Identity Manager Web Client

The performance of the web client is affected by the number of concurrent users accessing the system and carrying out account management and request-based activities. Concurrent user activity affects the sizing of both the CPU and memory of the application server. Often, customers deploy a re-branded web client with changes to the various UI elements (adding additional lookups, additional fields, altering form field behavior). Since these UI elements interact with the business layer, their performance impacts the web client as well.

A key feature of Oracle Identity Manager is policy-based provisioning and context-driven access to resources and entitlements. Access Policies (sometimes known as Provisioning Policies) and group memberships rely on rules, which can be based on a user's profile, to decide whether to grant or revoke accounts and entitlements in target systems and privileges within the web client. These policies take effect in real time and in some cases can re-evaluate the entire user population. As a result, the number of users, user groups, provisioning policies, rules and resources are key factors to consider while sizing and procuring hardware for the Oracle Identity Manager deployment.

### Oracle Identity Manager Server

The Oracle Identity Manager Server is the J2EE server application that carries out orchestration of the provisioning processes, reconciliation of identity and account profiles and entitlements, workflow processing and identity administration. The server uses standard J2EE technologies such as JDBC, JNDI, JMS to interact with the end-users (by accepting and processing web client requests), with target systems, remote managers and with the Identity Manager metadata repository. Maintaining optimal server performance is crucial in ensuring that the Oracle Identity Manager deployment functions within expected service level agreements (SLA) and provides the desired level of functionality and benefits.

There are two areas of server operation that need to be considered while sizing the deployment infrastructure.

#### 1. Reconciliation

Reconciliation is the process of comparing and synchronizing accounts information in a target system with Oracle Identity Manager. Reconciliation can be carried out to create/update identity profiles (user accounts in Oracle Identity Manager), or to create/update account profiles for users existing in Oracle Identity Manager.

Reconciliation involves

- a. Querying a target system (or authoritative source) for changes to user account,
- b. Extracting the user/ account information corresponding these users,
- c. Creating reconciliation events for each user,
- d. Processing the changes

Reconciling a large number of users can place resource constraints on the database e.g. increasing usage of the UNDO tablespace, increasing space usage in the tablespaces containing the Oracle Identity Manager repository and the application server e.g. increasing resource usage of the Application server.

To ensure that reconciliation does not become a bottleneck, architects must keep the following recommendations in mind:

- a. Ensure that reconciliation is done during off-hours.
- b. The data to be reconciled is batched. E.g. Instead of trying to extract 100K users from the corporate directory and processing them one user at a time (which can cause the LDAP server to timeout), consider filtering the reconciliation and take one organizational unit at a time.
- c. Ensure that there are no other jobs or processes running that can compete for application server or database resources.
- d. Following RDBMS best practices for managing high transaction processes.
- e. If required, consider setting up Oracle Identity Manager instances that are dedicated to processing reconciliation.

## 2. Workflow and Request processing

Oracle Identity Manager deployments who

- a. have a large user population with a large number of resources (10 or higher) and intend to make extensive use of workflow,
- b. have a medium to large user population with medium to large number of resource and intend to make use of workflow e.g. multiple levels of approval, dynamic determination of approvers based on business logic,
- c. have a small to medium user population but have workflow processes that make extensive use of external rule or role management engines or external systems to help drive workflow

should factor in the increased load while specifying the infrastructure.

A consideration common to both reconciliation and workflow is the retention duration of the reconciliation and workflow data in the Identity Manager repository. Architects must ensure that deployments implement the appropriate archival processes to prune the request and reconciliation history.

Another important consideration while planning the Identity Manager deployment is auditing and reporting. Oracle Identity Manager allows archival of auditing and reporting data to be stored in an external RDBMS. This ensures that the repository contains only the information necessary of day-to-day operation and minimizes the performance impact of running large operational or historical reports.

It is recommended that the archived data, auditing and reporting data be stored in a database that is different from the Oracle Identity Manager repository and is on a separate server. As a result, while sizing and procuring hardware, architects need to factor in the additional hardware and software required.

## Deployment Categories

We have grouped OIM deployments into three deployment categories, small, medium and large. Some factors to keep in mind while considering these deployment categories are given below. These factors directly influence the final hardware and software configuration for the OIM deployment.

For the purpose of this discussion, the three deployment categories are

### 1. Small

Number of Users	2000
Number of Groups	200
Number of Organizations	10
Number of requests per day	5
Total number of approvers	50
Number of Access Policies	200

### 2. Medium

Number of Users	25000
Number of Groups	1000
Number of Organizations	50
Number of requests per day	100
Total number of approvers	1000
Number of Access Policies	1000

### 3. Large

Number of Users	100000 and higher
Number of Groups	5000
Number of Organizations	1000
Number of requests per day	200
Total number of approvers	2000
Number of Access Policies	5000

## Deployment Architectures

Based on actual customer deployments and the sizing metrics mentioned in the previous section, suggested deployment architectures are given below for each of the deployment types. Names of hardware vendors and specific model numbers of servers and CPU chipsets are for illustrative purposes only.

### 1. Small Deployment

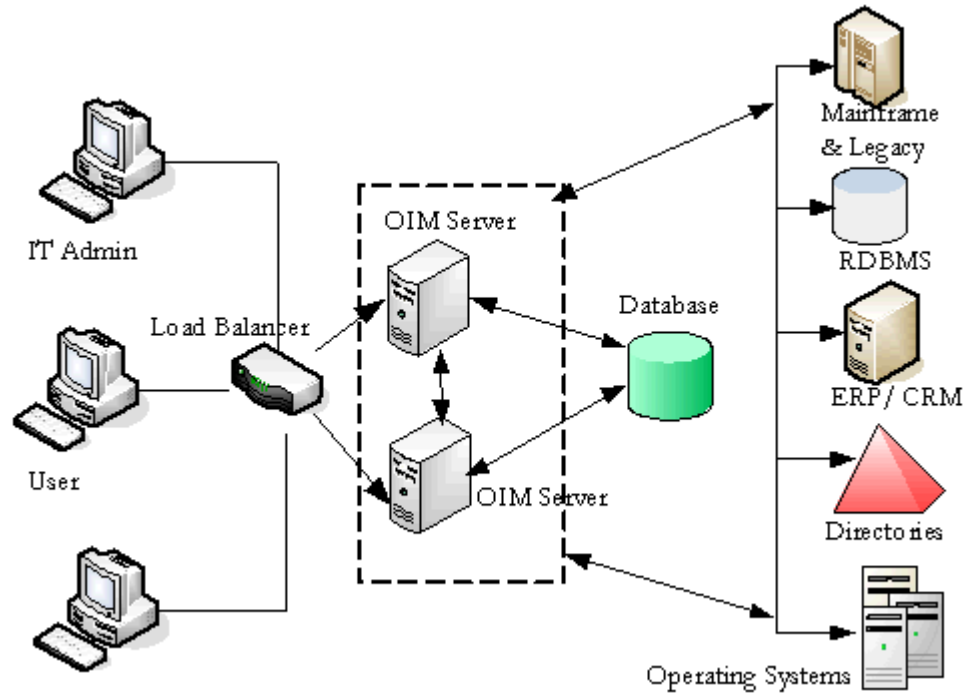


Figure 2: Highly Available OIM Deployment

#### Application Server Configuration

	Configuration 1	Configuration 2
Hardware	Sun V210	Dell PowerEdge/ Windows 32 bit (Windows 2003 EE)
CPU/ No. of CPUs	SPARC 1.3 GHz / 2 CPU per node	x86 2.8 - 3 GHz / 1 CPU per node
RAM	2 GB per node	2 GB per node

#### Database Server Configuration

	Configuration 1	Configuration 2
Hardware	Sun V210	HP ProLiant BL460C

CPU/ No. of CPUs	SPARC 1.3 GHz / 2 CPU per node	AMD Opteron 8000 / 4
RAM	4 GB per node	4-8 GB per node
Approx. DB size	4 GB	4 GB
Total SGA size	1 GB	1 GB
Shared Pool size	512 MB	512 MB
Java Pool size	150 MB	150 MB

## 2. Medium-sized Deployment

A key feature in the medium/ mid-size deployment is the separation of the task scheduler and reconciliation on to a dedicated Oracle Identity Manager instance. This type of deployment is called as a partitioned deployment.

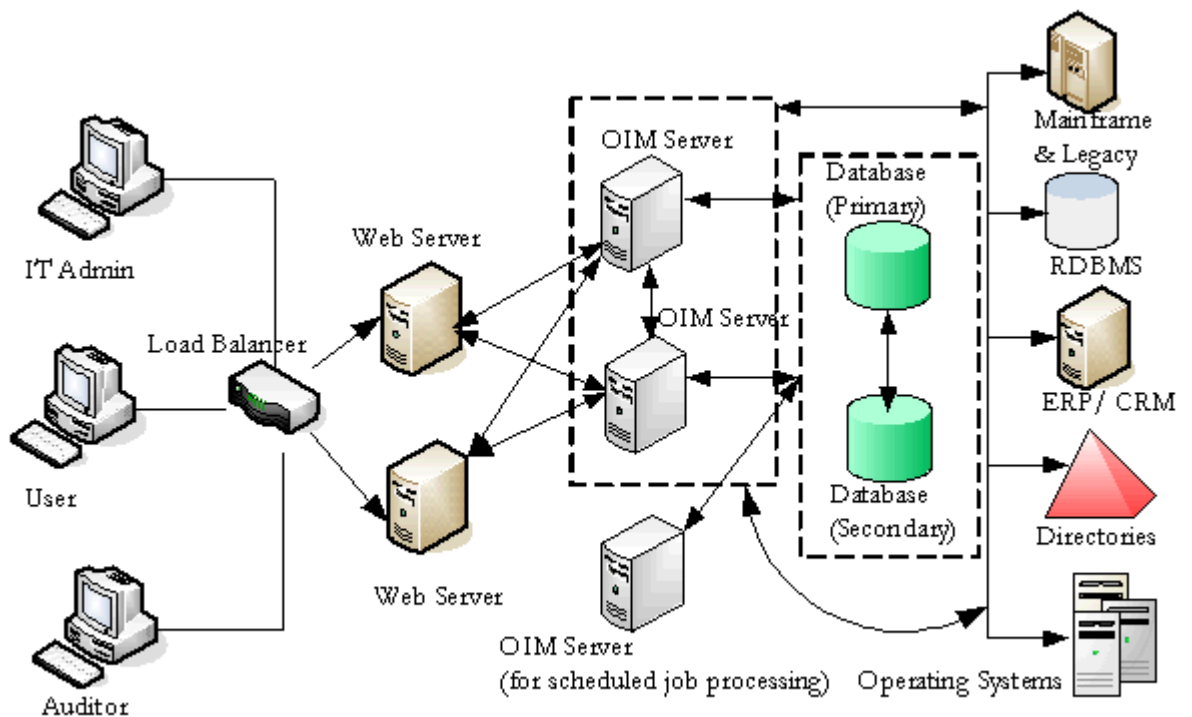


Figure 3: Highly Available OIM Deployment with a dedicated instance for scheduled jobs

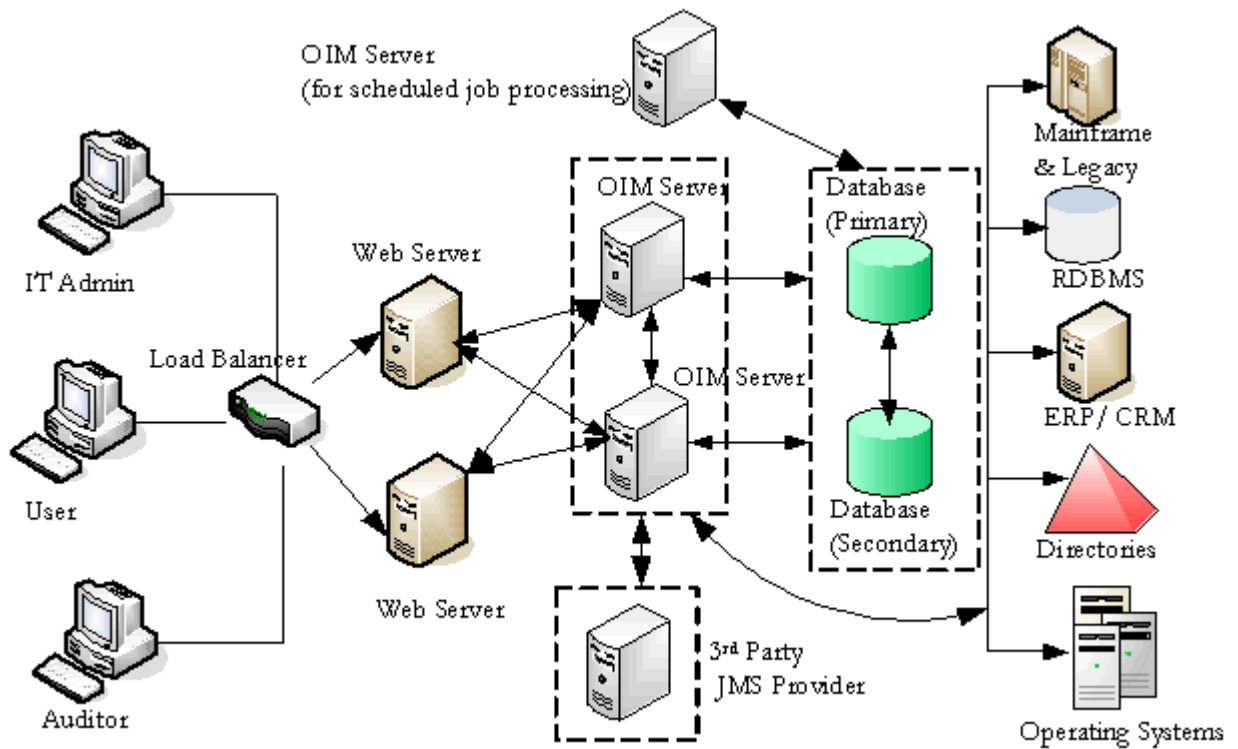


Figure 4: Highly Available Deployment (with external JMS Provider)

#### Application Server Configuration

	Configuration 1	Configuration 2
Hardware	Sun V210	Dell PowerEdge/ Windows 32 bit (Windows 2003 EE)
CPU/ No. of CPUs	SPARC 1.3 GHz / 2 CPU per node	x86 2.8 - 3 GHz / 2 CPU per node
RAM	2 GB per node	2 GB per node

#### Database Server Configuration

	Configuration 1	Configuration 2
Hardware	Sun Fire X4500	IBM p690
CPU/ No. of CPUs	SPARC 1.3 GHz / 2 (dual core)	Power PC / 4
RAM	8 - 16 GB	8 - 16 GB
Approx. DB size	100 - 200 GB (after an year in production)	100 - 200 GB (after an year in production)
Total SGA size	4-8 GB	4-8 GB

Shared Pool size	600 MB	600 MB
Java Pool size	200 MB	200 MB

### 3. Large Deployment

A large OIM deployment typically involves

- a. Large reconciliation data sets,
- b. Large amounts of request processing.
- c. Large number of active users,
- d. High concurrent activity

To handle this load, it is suggested that customers horizontally scale out (add more nodes) and setup a dedicated cluster to handle reconciliation. Oracle Identity Manager deployments typically use 1-1.5 GB of physical memory for the JVM Heap. Customers who invest in higher end servers for the application server can run multiple Oracle Identity Manager deployments on the same application server (assuming that the Operating System has adequate physical memory and CPU), instead of scaling out horizontally.

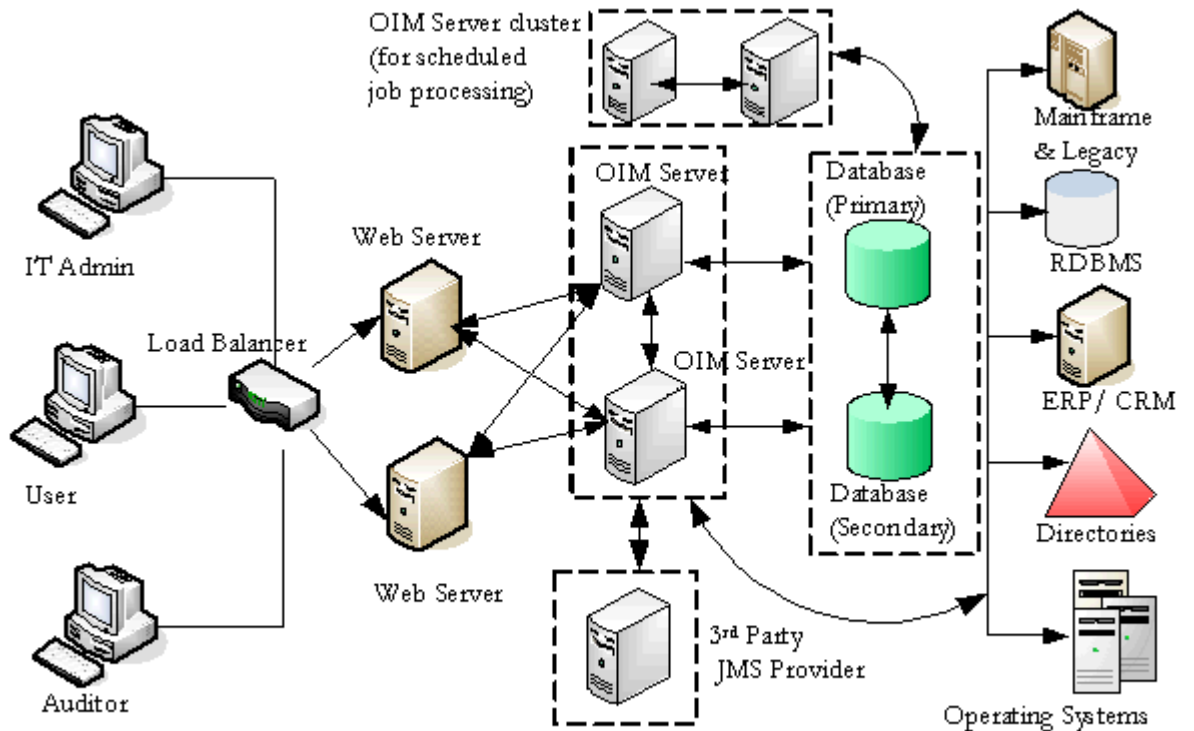


Figure 5: Highly available and partitioned OIM deployment

### Application Server Configuration

	Configuration 1	Configuration 2
Hardware	IBM pSeries p690	Sun V210
CPU/ No. of CPUs	PowerPC/ 2 x 1.65 GHz	SPARC 1.3 GHz / 2 CPU per node
RAM	4 GB per node	4 GB per node

### Database Server Configuration

	Configuration 1	Configuration 2
Hardware	IBM p5/ 595	Sun Fire E25K
CPU/ No. of CPUs	Power PC / 8	Ultra SPARC IV/ 2 CPU (four core)
RAM	16- 32 GB	16 GB
Approx. DB size	200 GB+ (after an year in production)	200 GB+ (after an year in production)
Total SGA size	16 GB	16 GB
Shared Pool size	600 MB	600 MB
Java Pool size	200 MB	200 MB

## Deployment Case Studies

Deployment recommendations given in the previous sections were made keeping certain user population, activity levels, provisioning requirements in mind. To give Oracle Identity Manager architects and deployment planning teams a sense of infrastructure that is being used by customers, three customer case studies are given below.

### 1. Small Deployment

#### Customer Profile

Customer is involved in the development and manufacturing of high-bandwidth semiconductors and develop products that are using the storage devices, high-definition multimedia interfaces and consumer electronics.

#### Line of Business

Semiconductor Industry

#### OIM Deployment Information

Current Status	In Production
Total number of users	1000
Growth Rate	8 users per month
Number of Resources/ Targets	11
Number of Groups	235
Number of Organizations	96
Number of accounts provisioned per day	1-2
Application Server Details	
Application Server Vendor	JBoss
Application Server version	4.0.2
Clustered (Y/N)	Yes
# of nodes in cluster	2
Server Make	Sun V210
CPU Type	Sun SPARC 1.2 GHz
# of CPUs	2 x 1 CPU per node
RAM	4 GB (2 X 2 GB)
Storage	2 x 72 GB SCSI
Database Server Details	
Database Server Vendor	Oracle
Database Server version	10.2.0.1
Server Make	Sun V210
CPU Type	Sun SPARC 1.2 GHz
# of CPUs	1 x 2 CPU per node
RAM	4 GB (1 X 4 GB)
Storage	2 x 72 GB SCSI
Current DB size	1.8 GB
Current SGA size	1 GB
Shared Pool size	600 MB
Java Pool size	400 MB

### 2. Medium Deployment

### Customer Profile

Customer is a large Fortune 500 company serving the financial needs of corporations, governments, institutional investors and high net worth individuals..

### Line of Business

Financial Services

### OIM Deployment Information

Current Status	In Production
Total number of users	25000
Growth Rate	1000 users per year
Number of Resources/ Targets	1000
Number of Groups	10000
Number of Organizations	10
Number of accounts provisioned per day	~ 5000
Application Server Details	
Application Server Vendor	BEA
Application Server version	Weblogic 8.1 SP3
Clustered (Y/N)	Yes
# of nodes in cluster	6
Server Make	Dell PowerEdge
CPU Type	Intel Xeon/x86/ 2.8 GHz
# of CPUs	6 x 2 CPU per node
RAM	12 GB (6 X 2 GB)
Storage	2 x 30 GB SCSI per App Server
Database Server Details	
Database Server Vendor	Oracle
Database Server version	10.2.0.1
Server Make	Solaris
CPU Type	SPARC
# of CPUs	1 x 8 CPU per node
RAM	16 GB (1 X 16 GB)
Storage	2 x 72 GB SCSI
Current DB size	28 GB
Current SGA size	8 GB
Shared Pool size	600 MB
Java Pool size	208 MB

### 3. Large Deployment

#### Customer Profile

Customer is a large European bank providing full service consumer, retail and institutional banking services and other financial services.

#### Line of Business

Financial Services

#### OIM Deployment Information

Current Status	In Production
Total number of users	140000
Growth Rate	2800 per year
Number of Resources/ Targets	5
Number of Groups	30,000
Number of Organizations	35,600
Number of accounts provisioned per day	~ 50
Application Server Details	
Application Server Vendor	IBM
Application Server version	WebSphere 5.1
Clustered (Y/N)	Yes
# of nodes in cluster	5
Server Make	P690
CPU Type	PowerPC/ 1.65 GHz
# of CPUs	4 x 2 CPU per node
RAM	8 GB (4 X 2 GB)
Storage	2 x 36GB SCSI
Database Server Details	
Database Server Vendor	Oracle
Database Server version	10.2.0.1/ RAC
Server Make	Sun E25K
CPU Type	SPARC/ 4 Core
# of CPUs	4 Core
RAM	8 GB (1 X 8 GB)
Storage	SAN
Current DB size	200 GB
Current SGA size	3 GB
Shared Pool size	500 MB
Java Pool size	200 MB

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## References

1. Oracle Application Server high availability at [http://www.oracle.com/technology/products/ias/hi\\_av/index.html](http://www.oracle.com/technology/products/ias/hi_av/index.html)
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4. IBM WebSphere high availability at <http://www.redbooks.ibm.com/abstracts/sg246688.html>
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