Oracle® Communications MetaSolv Solution

Planning Guide

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Preface

This guide contains information needed to plan for an Oracle Communications MetaSolv Solution (MSS) installation. It contains technical requirements for hardware and software needed to create an environment for MSS. The guide also provides estimates of equipment needed to run MSS for different size businesses. The estimates are general and are intended as a learning tool. Estimates on equipment and configuration settings cannot be exact because needs vary between MSS installations based on issues such as the number of users, the volume of transactions, whether the application is being used on a WAN, and so on. To ensure you have planned for the appropriate equipment and software, Oracle recommends contacting its Professional Services Organization before you proceed with an installation.

This guide includes some information on third-party software products used by MSS. However, this information is limited to information needed to install and perform initial configuration tasks. If you need additional information on a third-party software application, consult the third-party documentation.

Audience

This guide is intended for individuals responsible for installing, maintaining, and ensuring the software operations of MSS. This guide assumes that you have administrative and software experience in the following: Oracle DBA, WebLogic, Windows 2000 or higher, and JEE.

Related Documents

For more information, see the following documents in the MSS documentation set:

- *MSS Installation Guide*: Describes system requirements and installation procedures for installing MSS.

- *MSS System Administrator's Guide:* Describes postinstallation tasks and administrative tasks such as maintaining user security.

- *MSS Security Guide:* Provides guidelines and recommendations for setting up MSS in a secure configuration.

- *MSS Database Change Reference:* Provides information on the database changes in MSS releases.

- *MSS Network Grooming User's Guide:* Provides information about the MSS Network Grooming tool.

- *MSS Address Correction Utility User's Guide:* Provides information about the MSS Address Correction utility.

- *MSS Technology Module Guide:* Describes each of the MSS technology modules.

- *MSS Data Selection Tool How-to Guide:* Provides an overview of the Data Selection Tool, and procedures on how it used to migrate the product catalog, equipment specifications, and provisioning plans from one release of your environment to another.

- *MSS CORBA API Developer's Reference:* Describes how MSS APIs work, high-level information about each API, and instructions for using the APIs to perform specific tasks.

- *MSS Custom Extensions Developer's Reference:* Describes how to extend the MSS business logic with custom business logic through the use of custom extensions.

- *MSS Web Services Developer's Guide:* Describes the MSS Web Services and provides information about the MSS Web Service framework that supports web services, the various web services that are available, and how to migrate existing XML API interfaces to web service operations.

For step-by-step instructions for tasks you perform in MetaSolv Solution, log in to the application to see the online Help.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at
http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit
http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit
http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

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Preparing For MetaSolv Solution

This chapter contains setup information for MetaSolv Solution 6.3.*x* new and existing customers.

Skills Required to Set Up MetaSolv Solution

For best results installing this software product, Oracle recommends the following:

- Database tasks should be done by a database administrator who is familiar with Oracle software.

- Application server tasks should be done by a systems administrator who is familiar with Oracle WebLogic Server.

- For existing Oracle customers, the installation and configuration of the application server software and MetaSolv software should be done by an information technology specialist or another technical individual who is familiar with Oracle WebLogic Server and MetaSolv Solution.

- If you are a new customer installing for the first time, Oracle recommends that you contact Oracle Communications Consulting to set up the WebLogic Server and to migrate your data into the Oracle database.

Regardless of the platform you plan to use, considerable technical knowledge is required to set up and administer this software product. The application server needs a dedicated administrator who can oversee operations to ensure the system is running at its optimum capacity. This role is separate from that of the Oracle database administrator who maintains the database server and the integrity of the data.

If You Have MetaSolv Solution in Test or Production

This section contains information on tasks you must do or information you must review if you currently have a version of MetaSolv Solution that you plan on moving to the new release.

General Notes

- Because the Oracle WebLogic Server version is changing, the software upgrade is like a new installation. You must uninstall all MetaSolv Solution software and utilities before you can install the 6.3.*x* release.

- If you use ASR or LSR, you must reinstall the ASR or LSR software after MetaSolv Solution 6.3.*x* is installed. For information about the compatible ASR and LSR software versions, see Knowledge Article 1646326.1 - *Release Schedule Of Oracle Communications MetaSolv Solution Software ASR With Compatibility Information*.

- If you use LSR, you must upgrade to LSR 10.2 for MetaSolv Solution 6.3.*x*. For information about the compatible LSR software versions, see Knowledge Article 1646326.1 - *Release Schedule Of Oracle Communications MetaSolv Solution Software ASR With Compatibility Information*.

- If you have LSR 6 or LSR 9 orders currently open, those orders will be view only in MSS 6.3.*x*. To avoid this situation, close any open orders before you move to MSS 6.3.*x*, or upgrade the orders to LSOG 10 before or after installing MSS 6.3.*x*.

How MetaSolv Solution 6.3.*x* is Different from Previous Releases

- MSS 6.3.*x* requires WebLogic Server 12.2.1.2

- MSS 6.3.*x* requires Oracle Database 12cR1

Upgrade Path

- If you are doing a fresh installation of MSS 6.3.*x*, you must install Oracle Database 12cR1 and do a full installation of Oracle WebLogic Server 12.2.1.2 and the application server.

- If you have MSS 5.*x* installed, you must upgrade the database to MSS 6.0.2 first, and then upgrade the database to MSS 6.3.*x*. Then, do a full installation of the Oracle WebLogic Server 12.2.1.2 and the application server.

- If you have MSS 6.2.*x* installed, you can directly upgrade the database to MSS 6.3.*x*, and then do a full installation of the Oracle WebLogic Server 12.2.1.2 and the application server.

Supporting Documentation

When planning your upgrade to MetaSolv Solution 6.3.*x*, it will be helpful to refer to some 6.2.*x* documentation, in addition to the 6.3.*x* documentation.

The 6.2.*x* documentation provides information on database changes, new features, and fixed issues that were first delivered in 6.2.*x* maintenance releases. While these changes, features, and fixes are included in the 6.3.*x* release, they are not specifically called out in the 6.3.*x* documentation.

Refer to the appropriate sections of the following documents:

- 6.2.1 Database Change Reference

- 6.2.1 What's New

- 6.3 Release Notes

Some Helpful Terms

The following terms are used throughout this guide. They are basic terms necessary for the discussion of deploying an application intended for use over a network by many users.

Application server:

In a 3-tier client/server environment, the application server performs the business logic processing between the user's computer (first tier) and the database management system (third tier). A simple example is shown in Figure 1–1.

Figure 1–1   Application server
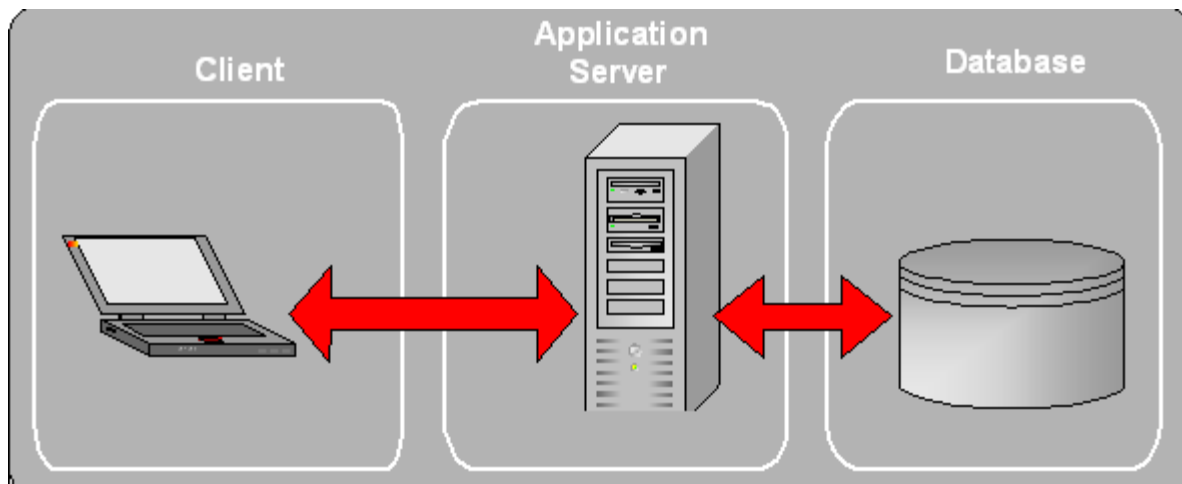
Oracle WebLogic Server handles the interaction between the client, MetaSolv Solution, and the database.

The MetaSolv Solution software is deployed on the WebLogic application server, which facilitates communication between the client and the database. The following list shows the benefits of using an application server approach:

- Processing tasks are moved from the client workstations to the application server computer, which saves resources.

- More users can be supported, and you can set up your system so processing continues if a server fails.

- Delay between the application and the database server is minimized, increasing the efficiency for processing requests.

- Finite resources like database connections are managed in a more structured manner.

WebLogic Domain:

A domain is a group of application servers managed as a single unit. The domain contains at least one instance of WebLogic Server. If multiple server instances exist in the domain, one instance is designated as the administrative server, and the rest become managed servers. Managed servers are controlled from the administrative server console.

WebLogic Administrative Server:

The administrative server enables you to manage other servers in a domain. This server has a console that enables you to shut down and start up other servers, monitor the environment, and manage activities like security and transaction processing.

WebLogic Managed Server:

A managed server is under the control of the administration server.

WebLogic Clustering:

A cluster is part of a domain dedicated to some specific processing duty (for example, MetaSolv Solution processing). A cluster is different than a domain but is a subset of a domain. A cluster generally includes several server instances, and the servers work together as if they were one application. A single cluster or multiple clusters can exist in a domain, but you cannot spread a cluster across more than one domain. One

advantage of clusters is their scalability; you can increase the number of servers in a cluster to handle increased processing needs. Clusters also give you high availability, which means if one server fails, another replaces it without the loss of data.

Client:

The client is the user workstation linked to MetaSolv Solution application so that a user can interact with the system to perform tasks. Some application code is loaded to the client to allow the execution of some MetaSolv Solution graphical features and other processing tasks.

JEE:

JEE is a standard for developing Java applications for a thin-client, multitiered environment. The conventions found in JEE help ensure applications are developed in such a way that communications are simplified between Java applications.

Machine or Computer:

The name of the physical computer that hosts an application server.

Setup Process

MetaSolv Solution contains three discrete software installation processes: database, application server, and client. The installation is completed in the following order:

1. Database installation

   For MSS 6.3.*x*, you must install Oracle Database 12cR1.

2. Application server installation

   The application server installation requires the most planning. You must decide which domain option you want for your installation and configure the application servers for the most benefit in terms of fail over, high availability, and scalability. Based on business and environment requirements, you should evaluate both hardware and software options for implementing your choice of the following domain options:

   - Single server

   - Administration server with managed servers in a cluster

   - Enable SSL

   You must determine which of these options applies to your business needs and meets the most secure operational fail over requirements.

   Oracle does not recommend the single server solution because it does not provide continuation of service if the server fails. There is no mechanism in this option to prevent the loss of data or service.

   For information on each of these options, see the documentation at:

   http://www.oracle.com/technetwork/middleware/weblogic/overview/index.html

3. Client installation

   The client files are bundled with the application server files in CAB files.

Where MetaSolv Solution Files Reside After Installation

In a MetaSolv Solution installation, application files are divided among the following locations:

- **Application server:** MetaSolv Solution software that controls business logic and processing is loaded to a designated computer or computers. This software is designed to work with the Oracle WebLogic server software and improve the speed and efficiency of the information flow between the client workstation and the MetaSolv Solution database.

- **Client workstation:** The files loaded to the client workstation include executable files that allow the operation of MetaSolv Solution for the user interface and INI files that configure the software. Initially, these files are loaded onto the application server in CAB files.

- **Citrix server (optional):** If you are using a Citrix server, the client workstation files are loaded onto the Citrix server, and the client workstations use a Citrix browser to interact with MetaSolv Solution.

Figure 1–2 shows a simple MetaSolv Solution configuration.

Figure 1–2   Simple MetaSolv Solution configuration, showing where files are loaded
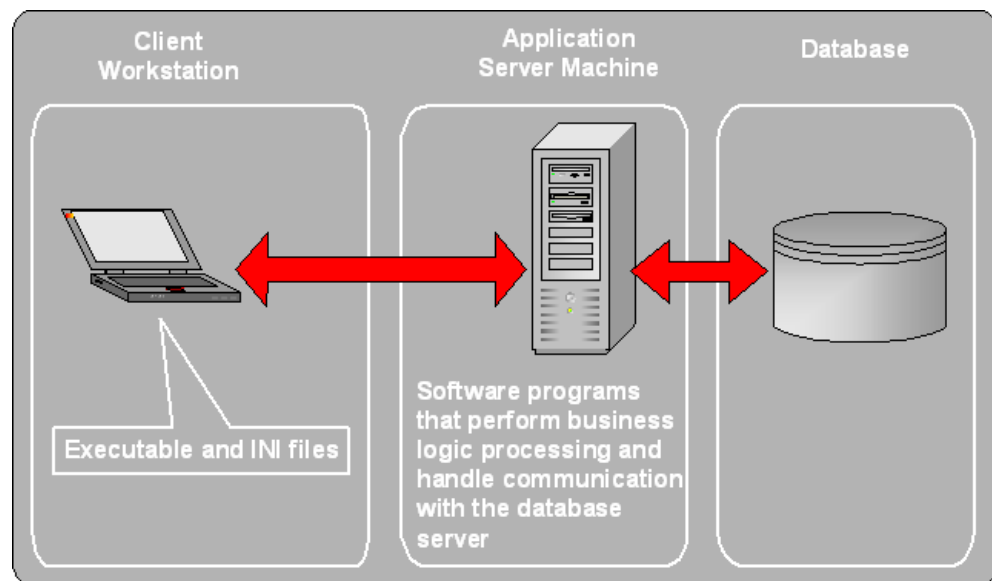
You can use a Citrix server to increase efficiency between the client workstation and the application server. In this configuration, the client workstation files are loaded to the Citrix server and a browser allows the user to access and use the application files on the Citrix server. The Citrix configuration is a good solution in cases where a wide area network (WAN) is used and users must communicate with the application server and database over great distances.

Figure 1–3 shows a MetaSolv Solution configuration with the Citrix server.

Figure 1–3   A MetaSolv Solution configuration, showing the Citrix server
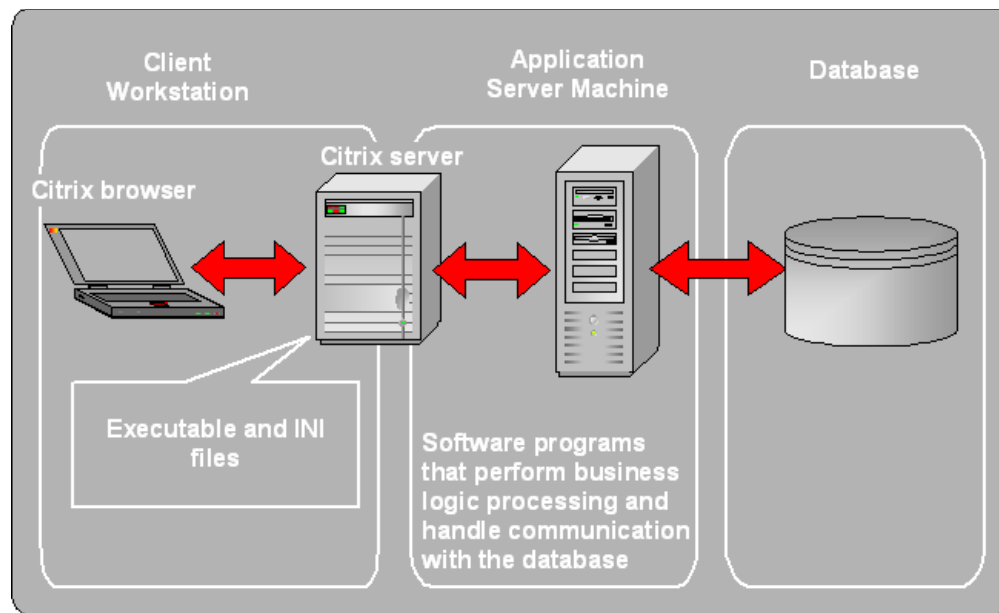
Software Required to Install MetaSolv Solution

Oracle has performed an appropriate testing cycle on the indicated platforms, specific software versions, and configurations indicated, and has confirmed that they have no adverse effect on MetaSolv Solution.

The following tables list certified software versions that can be used with MetaSolv Solution 6.3.*x*.

See "Minimum Technical Requirements" for a complete list and details of technical requirements.

Table 1–1 lists the certified software version for the database server.

Table 1–1   Certified Software Version for the Database Server

Software Version	Required?
Oracle Database Enterprise Edition 12cR1	Yes

Table 1–2 lists the certified software versions for the application server.

Table 1–2   Certified Software Versions for the Application Server

Software Version	Required?
Oracle Enterprise Linux Server 6.6 (or later) and 7.0 (or later) Red Hat Enterprise Linux Server 6.6 (or later) and 7.0 (or later) AIX 7.1 Update 1 HP Itanium 11.31 Update 7 Oracle Solaris 11 Windows Server 2012 R2	Yes
Oracle WebLogic Server 12.2.1.2	Yes
JacORB 3.8	Yes

Table 1–2 (Cont.) Certified Software Versions for the Application Server

Software Version	Required?
Java Development Kit (JDK) 8 (with latest critical patch update)	Yes

Table 1–3 lists the certified software versions for the workstation client.

Table 1–3 Certified Software Versions for the Workstation Client

Software Version	Required?
Internet Explorer 11[1]	Yes
Windows 7 Professional Windows 8.1 Professional Windows Server 2012 R2	Yes
Adobe Acrobat Reader 15 or later	Yes
Citrix[2]	No
Oracle Database Client 12.1.0.2.0 (32-bit)[3]	No

[1] To use Internet Explorer 11, update the registry settings. See *MetaSolv Solution Installation Guide* for more information.

[2] Any version of Citrix that would run on the platforms that support the MSS client.

[3] Required only if using Location and Routing Gateway, NPA Split Utility, Data Selection Tool, Pre-Migration Analysis Tool, or MetaSolv Solution Utilities.

Table 1–4 lists the software version information for the single sign-on functionality. Refer to the *MSS Security Guide* for more information.

Table 1–4 Software Versions for Single Sign-on Functionality

Software Version	Required?
Oracle Enterprise Single Sign-On Software 11.1.2.3.0	No
Oracle Unified Directory (OUD) Software 11.1.2.3.0	No

Setting Up a Test Environment

Before you move MetaSolv Solution into production, you should run it in a test environment to ensure you understand how it works and to resolve any issues before you commit the application to your production computers. This document and other MetaSolv Solution documents explain how to set up for a production environment, but you can set up your test environment with some variations. The fail over requirements are not as strict for a test environment as they are for production.

For example, you can run MetaSolv Solution 6.3.*x* and MetaSolv Solution 6.2.*x* on the same test computer. You must keep each application separate and ensure that ports used for http communication, name services, and logging are unique for each instance. The Oracle client (tnsnames.ora) must be configured to connect to the appropriate database for each instance.

On UNIX, use separate users for each instance and set necessary configuration settings for each user. On Windows, you might need to alter some start scripts to ensure the correct paths are set for environment variables such as PATH, CLASSPATH, TNS.ADMIN, and so on.

To achieve optimum application server performance for individual business needs, load and performance testing in a test environment that represents your true production environment is required. The test environment should mimic how you use your production system, including the transaction mix, number of users, hardware and software infrastructures, database, network usage, and all other relevant factors. Setting up a test environment will allow you to determine the optimal application server settings that you should implement in your production environment for:

- Connection pool sizing
- Execute thread sizing
- Java memory management

2

Environment Planning Considerations

This chapter describes considerations for Oracle Communications MetaSolv Solution components and provides tips on how to set up for the most efficient use of the application.

Availability Requirements

Business requirements for availability, scalability, and capacity planning have important impacts on planning. This is especially true for hardware sizing, hardware and software configuration, and software use.

Availability refers to a software system's ability to service users. A system has 100 percent availability if it can service a request within a defined period of time for every single user request. In practice, 100 percent availability is difficult to achieve.

Scalability Requirements

Scalability refers to the degree to which a system can maintain acceptable response times, availability, and other performance metrics as the load on the system increases. A system is infinitely scalable if the amount of work the system completes per second increases linearly as the amount of computer resources available increases. Infinite scalability allows MetaSolv Solution to serve an ever-increasing population of users simply by increasing the computer resources available to it.

MetaSolv Solution provides high availability using Oracle WebLogic Server platform. Oracle WebLogic offers service continuity in the event of a single server failure within a cluster by allowing you to configure multiple servers as members of a single distributed server set. If one server instance within the cluster fails, other instances of the same distributed server set provide uninterrupted service.

For information on installing and deploying MetaSolv Solution as a multi-server or server cluster configuration, see *MetaSolv Solution Installation Guide*. For supplemental information on configuring and using server clusters, see the Oracle Web page at:

http://www.oracle.com/technetwork/middleware/weblogic/overview/index.html

With MetaSolv Solution, you can manage a single network inventory using multiple application servers. The optimal number of servers that can be supported in a multi-server configuration depends on a number of interrelated conditions, including the size of the database, power of the database server computer, and number of database connections required. Conditions vary for each deployment. In a multi-server environment, all MetaSolv Solution servers share a single Oracle (logical) database, with each server interacting with the database concurrently. Oracle's transaction

facilities maintain consistency of the data within the inventory as the database receives multiple concurrent updates from different MetaSolv Solution servers.

Hardware Sizing Guidelines

You must know how many application servers to set up and the hardware needed to support your deployment of MetaSolv Solution 6.3.*x*. For more information on hardware and software planning, see "Minimum Technical Requirements".

The following sections contain Oracle's recommendations for medium and large hardware configurations, based on 100, 500, and 1000 concurrent users. The N+1 industry practice is used in the configurations.

Hardware and Software Configuration

The following sections contain information on installing MetaSolv Solution components.

Database Considerations

If you have installed a version of MetaSolv Solution that is earlier than 6.0.*x*, you must upgrade to MSS 6.0.*x* before installing MSS 6.3.*x*.

> **Note:** For MSS 6.3.*x*, you must install Oracle Database 12cR1.

Database Server Configuration

MetaSolv Solution 6.3.*x* supports the following database server configurations:

- Active/passive: In this configuration, an active cluster node performs processing while a second passive node is held in reserve to take over processing if the active node fails. This configuration provides faster fail over response than traditional standby methods because the passive node is available immediately to take over processing.

- Oracle RAC: In conjunction with WebLogic JDBC multi data source fail over algorithm, connection requests get routed to the first data source in the list; if the request fails, the request is sent to the next data source in the list, and so forth. MSS 6.3.*x* also supports manual configuration of WebLogic Active GridLink data sources with Fast Connection Failover.

Application Server Considerations

The following section details application server considerations. Considerations include the following: connection pooling, clustering, clients, if your plan includes a background processor, if your plan includes a Citrix server, security, and performance and tuning.

Connection Pooling

Connection pools are a group of ready-to-use connections between an application server and the database dedicated to the application. The connection pool creates the specified number of database connections when the application server starts. By establishing connections at start-up and keeping them ready for an application to use, the connection pool eliminates the overhead of creating a database connection for each

client request. Connections are returned to the connection pool when they are freed from use by the application.

Managing connection pools effectively can increase the efficiency of an application, especially if clustered servers are used. Therefore, as part of your environment planning, you should determine the best configuration for managing the connection pools. One factor is the size of the load (the number of concurrent users). A general rule is to provide a connection for each concurrent user you estimate will use the application, so no user waits for a connection. Another general rule is that the number of application server connection pools should be 30 to 50 percent of the number of potential users.

For assistance in determining how to size and set up connection pooling, see the Oracle WebLogic Server documentation.

Should You Cluster?

Single-server architecture is not recommended for MetaSolv Solution. There is no backup strategy if the server fails, and the result could be a loss of data and operational functionality. In addition, the architecture is not scalable. If your business needs increase, it is difficult to add more client workstations and increase the throughput of the system.

A more efficient way to deploy MetaSolv Solution 6.3.*x* is to cluster application servers. There are four basic ways to cluster application servers:

- Oracle proxy server with clustered servers on a single host

- Oracle proxy server with clustered servers on multiple hosts

- External load balancer with clustered servers on a single host

  For an external load balancer solution, failover support depends on the vendor solution. A deployment architecture that clusters all servers on one host is not recommended because hardware failure can cause an outage and nullify the benefits of clustering.

- External load balancer with clustered servers on multiple hosts (recommended)

  You can use external load balancers and place some application servers on the same host computer and some on different hosts. The configuration of session replication prevents the drawback of the single host approach.

Figure 2–1 shows a 4-node cluster with eight servers and failover load balancers.

Figure 2–1   Server Cluster with Load Balancing in Oracle WebLogic Domain
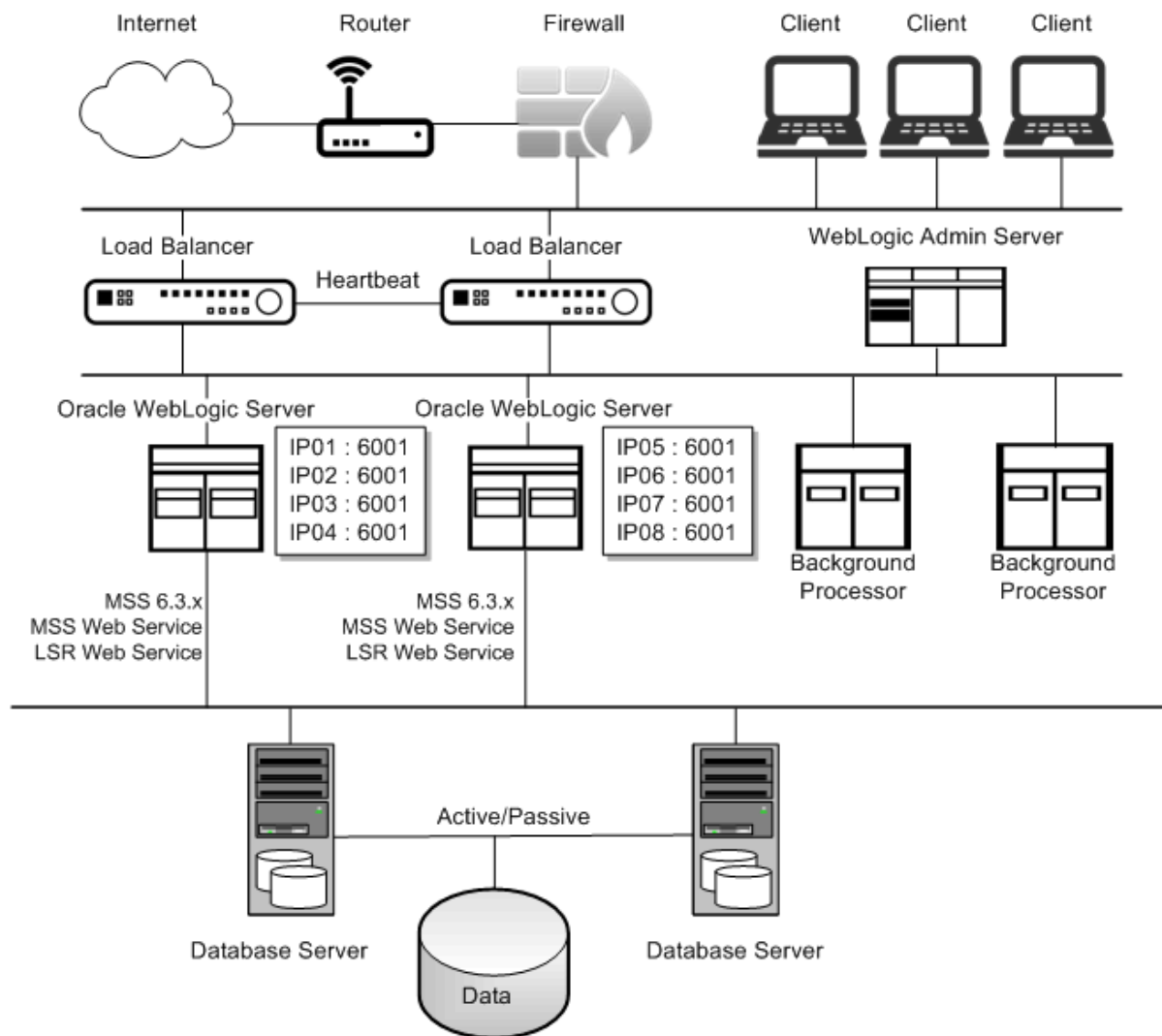
Recommendations for load balancing:

■ If you have more than 250 concurrent users, Oracle recommends using an external load balancer to ensure system performance and response time.

■ If you choose an Oracle proxy solution, Oracle recommends placing the proxy server on a separate computer. The Oracle proxy server in this case becomes a single point of failure.

Client Considerations

Client software includes utilities as well as the core client application. The utilities are not required to run the MetaSolv Solution core application on a workstation. Instead, the utilities allow specific tasks to be completed that are in addition to core responsibilities. You can choose to install these applications on a single workstation where they can be easily accessed, or you can allow any user to install them on the same client computer used for the core application.

If you are not using a Citrix server, which handles processing of many users efficiently, you should consider increasing the processing power of hardware dedicated to the client workstation. The technical requirements listed for the MetaSolv Solution rich

client provide minimums. For maximum efficiency, consider your company's needs and increase the processing levels of the hardware requirements if necessary.

The following client software can be loaded on a separate computer from the core application:

- MetaSolv Solution Location and Routing Gateway
- MetaSolv Solution NPA Split Utility
- MetaSolv Solution Utilities

If you choose to run these software applications on a computer separate from a core client workstation, you must install the Oracle database client on the computer to allow the applications to communicate with the database server.

If Your Plan Includes a Background Processor

The MetaSolv Solution Background Processor consists of the following applications that can be distributed between a remote server and a system administrator's workstation:

- Job Master (JMASTER.EXE)
- Job Worker (JWKR.EXE)
- Job Manager (JMANAGER.EXE)

The Background Processor includes a job queue that consists of user-initiated jobs or scheduled jobs sent to the background to be processed. Job Master checks the queue periodically and schedules them immediately or at a predefined time by spawning a Job Worker client for each job. The Job Manager enables you to review and administer the job queue.

Oracle recommends running the background processor on a separate server, but the application can also be run on the client workstation. The number of background tasks handled by the Background Processor should be considered before you set it up in either configuration. If the Background Processor will handle a high volume of tasks, it is more efficient to put it on a separate server. See "Minimum Technical Requirements" for complete information on the Background Processor's technical requirements.

If Your Plan Includes a Citrix Server

Citrix and Windows 2012 R2 with Remote Desktop Services allow you to install MetaSolv Solution in one place and have all the clients access the software. You install the application as you would on a server, but it behaves as if you installed on the client. A Citrix server setup resolves performance issues that you get when you install MetaSolv Solution on a server and have everyone access through a shortcut. Citrix also resolves logistical issues of installing on individual clients.

Microsoft Windows 2012 R2 Server with Remote Desktop Services is an operating system that allows multiple, simultaneous clients access to sessions in a server environment. Each session is a private, protected memory space in which users can run applications.

Citrix is server-based software that provides:

- A wider range of clients and protocols
- Enterprise-scale management tools
- Integration of local and remote resources with bandwidth independent performance

Configuration

MetaSolv Solution must be in the same domain as the APIs, database, and clients.

Figure 2–2 displays an example of a Citrix and MetaSolv Solution configuration.

Figure 2–2   Citrix / MetaSolv Solution Configuration
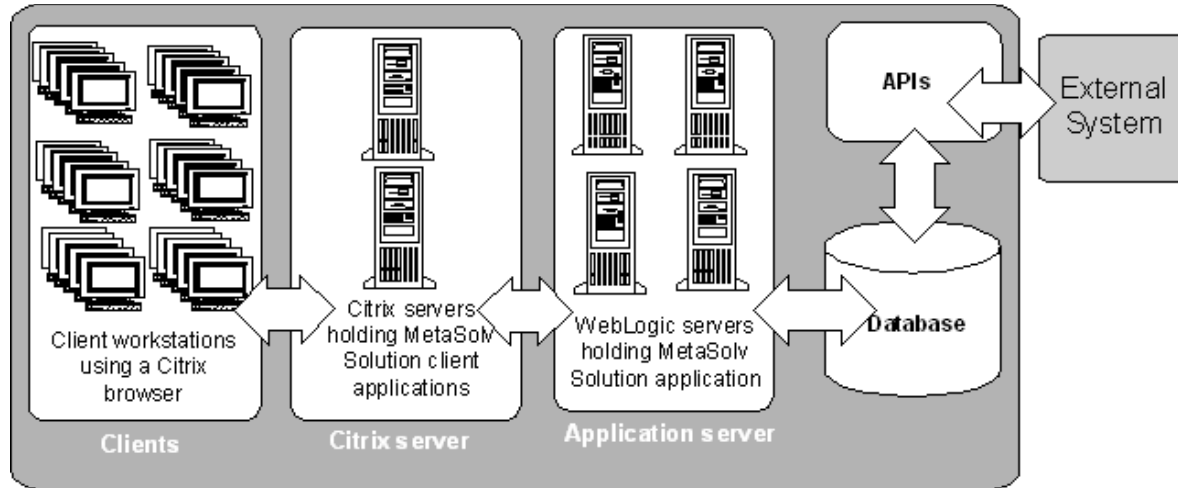
Be sure to use the following Citrix configuration with MetaSolv Solution:

- Set up a default printer.

- (According to Citrix instructions) If using gateways, modify the MetaSolv Solution registry entry under APICLIENT so the %SYSTEMROOT% in the path name gets hard coded to the correct drive letter and path.

- There are references to **C:\temp** made during the installation and placed in the registry. Although this process works most of the time, it could be an issue in some installations. Contact Oracle Support for more information.

Security

Use the Citrix application execution shell (App) to write execution scripts that:

- Copy standardized INI files containing default settings to user directories before starting an application. Perform application-related cleanup after the application closes.

- Keep hackers from modifying execution parameters (for example, working directory or execution directory).

For more information on Citrix security and the App shell, see the Citrix product documentation.

User Authentication

Users are authenticated by the database server at logon by default. For other authentication methods, see *MetaSolv Solution Installation Guide*.

Data Migration

This section is applicable only if you are upgrading from a pre-6.0.*x* version (for example, MSS 5.2) to 6.3.*x*. If you are moving to 6.3.*x* from a pre-6.0.*x* release, it may be

necessary for you to perform a data migration especially if you used the Broadband Network Design module to design and provision ATM/Frame Relay and DSL. The Broadband module is obsolete as of 6.0, and customers who use the Broadband module must migrate using this migration utility or if you need the ability to set up your network elements and associate equipment to them. If you have already completed the migration when upgrading to 6.0.*x*, you do not need to do this migration.

Contact Oracle Communications Consulting or Oracle Communications Product Management for guidance on the data migration.

Planning Tips

- Your production application server and database server should be two different physical servers for the following reasons:
    - Two systems on the same computer can lead to performance issues and prevent both from operating at their optimum capacity.
    - If hardware issues are encountered, you must rebuild both the database and the application server before production activity is restored.
    - It is difficult to diagnose performance and network problems when both are on the same computer.
- All client traffic, with the exception of client utilities, is routed through the application server. Therefore, to ensure continuous availability, Oracle recommends an environment that has a minimum of two production application servers. This configuration enables you to implement failover and load balancing functionality. See "Hardware Sizing Guidelines" for additional details based on users and transactions.
- For nonproduction environments like training, testing, or development, it is possible to place multiple application servers on one physical server. This will reduce the overall cost of maintaining the MetaSolv Solution environment.
- Consider the application server environment in your normal production maintenance plan. It should be customized, tuned, backed up, and monitored on a regular basis to ensure optimal performance. Make plans to archive logs and re-evaluate your configuration on an ongoing basis. If you leave the system running without oversight and maintenance, you will not get optimal performance.
- The MetaSolv Solution client contains some functionality that is subject to network delays when run across a WAN. Where possible, end users should be located near the database and application servers.
- Oracle systems can operate over a LAN or a WAN. The software initiates a significant amount of network traffic between the database server, the application server, and the Oracle client. In a LAN configuration, a Gigabit Ethernet network delivers the best performance. If a WAN implementation is necessary, consider using a Citrix Terminal Server solution to reduce the amount of data being transmitted to and from the client.
- Separate the Oracle database files from the operating system files. Place Oracle program files and Oracle archive log files on different disks.
- Do not allocate so much memory to the Oracle database and other applications that the operating system has to perform memory/disk swapping or paging. A

good rule is to not allocate over half the amount of the computer's available physical memory.

- Limit the database server to database-only use. If the operating system is being taxed by other resources, the Oracle database runs slowly no matter how well tuned your instance is.

- For production, run only one instance of the Oracle database per computer. The more instances running on a computer, the harder it is to tune the instance with system resources.

3

Minimum Technical Requirements

This chapter provides the minimum MetaSolv Solution hardware and software requirements. See "Deployment Configuration Examples" for Oracle's recommendations on deploying to small, medium, and large environments for the application server and the database server.

Because each business differs in factors like size, use of the application, and performance desired, each installation of MetaSolv Solution has different hardware and software requirements. For each piece of hardware listed in the requirements, the estimated number of users the hardware can support is listed.

Before you make hardware decisions, contact Oracle Communications Consulting or Oracle Communications Product Management to ensure you have the right equipment and software to achieve the system performance required for your business needs.

For a complete list of certified software versions used with MetaSolv Solution, see "Software Required to Install MetaSolv Solution".

MetaSolv Solution Installation Components

Table 3–1 identifies the required and optional software components of the MetaSolv Solution environment.

Table 3–1   MetaSolv Solution Components

Component	Required or Optional
Database Server	Required
Application Server	Required
MetaSolv Solution Rich Client	Required
MetaSolv Solution Utilities	Required
Background Processor	Optional
Location and Routing Gateway	Optional
NPA Split Utility	Optional
Data Selection Tool	Optional

Recommended Actions for Best Performance

Every MetaSolv Solution environment is different. The environment is affected by the product functionality being used, mix of transactions, API usage, hardware capacity, network speed and capacity, how the servers are tuned, and so on. For best results

using each software component, Oracle recommends that you take the following actions:

- Stay abreast of notices on products referenced in this section that are no longer supported to ensure your software environment is fully supported.

- To upgrade outside the supported versions, contact Oracle Support to determine available options. Recommendations may include migrating to a newer version of MetaSolv Solution.

Database Server

The following provides information on the MetaSolv Solution database server.

Software requirements:

- **Operating system:** Refer to the Oracle Database documentation for information on supported OS versions.

- **Database:** Oracle Database Enterprise Edition 12cR1.

Storage: A high performance, fault tolerant disk subsystem should be used.

Fault tolerance: Fault tolerance is important when provisioning the database server. If this server fails, the MetaSolv Solution software cannot function. There are several commercial clustering solutions available for Oracle servers. Oracle recommends that you work with its hardware vendor to implement a clustering solution.

Scalability: Scalability is achieved through the use of a server with multiple and/or faster processors.

Sizing for existing customers: See Appendix A, "Deployment Configuration Examples" for sizing information that includes examples for small, medium, and large deployments.

Additional information:

- Because disk sizing is approximate, adjust sizing based on your data requirements.

- MetaSolv Solution is certified to work with Oracle's Dictionary Managed Storage.

- Required tablespaces are DATA and INDEXES, which can be either Dictionary or Locally Managed. These are required as default tablespaces for creating new objects.

- This release of MetaSolv Solution is certified to work with the version of Oracle Enterprise Edition listed. Work with Oracle Global Customer Support to determine the recommended patch level for your intended platform/version combination.

Ensure the following initialization parameters are set for databases running Oracle Database 12c.

```
_b_tree_bitmap_plans = false
O7_DICTIONARY_ACCESSIBILITY=TRUE
_grant_secure_role = true
optimizer_features_enable=12.1.0.2.1
optimizer_adaptive_features= FALSE
```

Oracle recommends you do the following:

- Set the O7_DICITONARY_ACCESSIBILITY parameter to **TRUE** to ensure that the install script completes successfully.

–   Set the _grant_secure_role parameter to **TRUE** to ensure that the install script completes successfully.

–   Set the optimizer_features_enable parameter to **12.1.0.2.1** to ensure that the performance is optimized.

–   Set the optimizer_adaptive_features parameter to **FALSE** to ensure that performance is optimized.

Application Server

The MetaSolv application server supports the MetaSolv Solution application code running in the middle tier. Clients connect to the application server using HTTP or IIOP (both over TCP/IP), and the application server connects to the database server using JDBC connection pools. The MetaSolv Solution APIs also run on the application server. The application server is compliant with OMG CORBA 2.4 and JEE 1.8 specifications.

Fault Tolerance: Fault tolerance is provided by clustering multiple application servers together. Because the application server is a critical component, Oracle recommends multiple application servers be implemented in a clustered configuration in a production environment. Oracle WebLogic software provides clustering mechanisms, although other load balancing/high availability solutions may be used. Oracle recommends the application servers and database servers run on separate computers in a production environment.

Scalability: Scalability is achieved by running multiple application server processes or using more powerful servers. Performance levels in the application server tier is heavily dependent on tuning the environment and configuring to optimize communication between the database, application server, and client. The sizing numbers shown in this section provide a general guideline for determining hardware requirements. Customers should follow installation and configuration guidelines available from the application server vendor.

Software: Table 3–2 shows the component software required by each platform that MetaSolv Solution supports for 6.3.*x*.

Table 3–2   Component software for MetaSolv Solution 6.3.x by platform

Platform/ Component Software	Microsoft	Sun	Linux	AIX	HP
Operating system	Windows Server 2012 R2	Oracle Solaris 11 (on a SPARC computer)	Oracle Enterprise Linux Server 6.6 (or later) and 7.0 (or later) Red Hat Enterprise Linux Server 6.6 (or later) and 7.0 (or later)	AIX 7.1 Update 1	HP-UX 11.31 Update 7 (Itanium only)
Application server	Oracle WebLogic Server 12.2.1.2	Oracle WebLogic Server 12.2.1.2	Oracle WebLogic Server 12.2.1.2	Oracle WebLogic Server 12.2.1.2	Oracle WebLogic Server 12.2.1.2
ORB	JacORB 3.8	JacORB 3.8	JacORB 3.8	JacORB 3.8	JacORB 3.8
Network	HTTP(s) and IIOP over TCP/IP	HTTP(s) and IIOP over TCP/IP	HTTP(s) and IIOP over TCP/IP	HTTP(s) and IIOP over TCP/IP	HTTP(s) and IIOP over TCP/IP

Additional information:

- The application server supports 64-bit Java Virtual Machine (JVM). It is possible that 64-bit JVM may support a large number of users per application instance as a sizable amount of memory can be allocated to the java heap. An individual application server instance using the 64-bit JVM can support 80 or 120 users if 8 GB or 12 GB of memory is allocated to the java heap.

- Sizing of the application server should be based on the expected maximum number of requests, or concurrent transactions, sent to the application server at the same time. This number is considerably less than the number of clients using the application server, typically 15-20 percent of the total number of users logged on to the system. For more specific sizing and configuration guidelines, see *MetaSolv Solution Installation Guide*.

- More servers may be employed in a software- or hardware-based cluster. This approach provides more redundancy and reduced impact if a server in the cluster fails. However, the dispatcher functionality should be run on multiple servers to ensure redundancy.

- Oracle does not support running the application server on Citrix.

- If you plan to use an external load balancing mechanism, it must support sticky sessions, and it cannot modify WebLogic cookies. In addition, the network configuration needs to support requests from the application server to the load balancer.

- The application server must be able to obtain graphics settings from the host to provide graphics functionality in the application. Oracle does not endorse or certify functionality of the third-party packages. To enable graphic installation, one of the following options must be implemented:

  - Enable xhost to allow remote connections to the console (run "xhost" as root user).

  - Install a graphics card in the host computer.

  - Install and configure PJA library. For additional information, see:

    http://www.eteks.com/pja/en

  - Install and configure XVFB, 'X Virtual Frame Buffer.' For additional information, see:

    http://www.xfree86.org

MetaSolv Solution Rich Client

Software:

Operating System:

- Windows 7 Professional

- Windows 8.1 Professional

- Windows Server 2012 R2

Network: HTTP/HTTPS

Database client: N/A

Browser: Internet Explorer 11

Reader: Adobe Acrobat Reader 15 or later

Storage: 0.5 GB. No persistent user data is stored.

Fault Tolerance: No special requirements are needed. Should any client fail, a user may resume work on any client computer.

Scalability: A faster processor in the client computer will improve performance. Increased memory often has a significant improvement on desktop performance, especially if multiple applications are used simultaneously. Additional clients may be added as needed, and the servers may need to be scaled to handle the additional load, as noted in each of the server descriptions. Specific sizing recommendations are shown below.

Sizing (client computer):

CPU:

- 2.6 GHz (minimum)
- 3.4 GHz (recommended for Inventory Management users)

Memory: 8 GB

Colors: True color (24 bit)

Resolution: 1024 x 768

Disk: 0.5 GB

Additional information:

- CPU and memory requirements assume other applications will be running on the client computer. Client hardware configuration will impact general performance of MetaSolv Solution client applications. If the client hardware has only the minimum configuration, processes may take significantly longer to run than they would on a computer with the higher recommended configuration.

  Customers need to determine optimal requirements based on how MetaSolv Solution is used in their business.

- Only the Small Fonts setting for Font Size in the Display Properties is supported.
- The Text Size setting in the browser must be set to Medium.
- Select the following check boxes for the HTTP 1.1 settings on the **Advanced** tab of the Internet Options window:
  - **Use HTTP 1.1**
  - **Use HTTP 1.1 through proxy connections**

Background Processor

The Background Processor processes MetaSolv Solution user work in the background when the option is available and a user selects it. Users place tasks in a queue and the background processor pulls requests from it. Results are available to users through another table. There is no direct communication between the users and the Background Processor. The Background Processor runs the same code as the end user clients, but it does not have an interactive user interface.

Software:

Operating system:

- Windows 7 Professional
- Windows 8.1 Professional

- Windows Server 2012 R2

Database: N/A

Network: HTTP/HTTPS

Storage: Disk requirements are minimal. No persistent user data is stored.

Fault Tolerance: Fault tolerance is achieved with multiple computers. Each computer can process the same work queue, and in the case of a failure, the surviving computer continues processing the work queue.

Scalability: Scalability is achieved with multiple computers (horizontal scaling) or the use of more powerful servers.

Sizing: Table 3–3 describes the background processor sizing requirements:

Table 3–3   Background Processor sizing requirements

Number of concurrent background jobs	CPU	Memory	Disk
0-10	2.6 GHz (minimum)	8 GB	0.5 GB

Additional information:

- Hardware sizing is not directly affected by the number of users. User behavior affects the load placed upon these servers and subsequent hardware requirements.

Citrix

Description: Citrix executes the MetaSolv Solution client software for the end user, transmits screen updates to a thin client, and receives mouse and keyboard data from the thin client. Use of Citrix is recommended for any customer with end users running across a WAN. Citrix minimizes the response time delays caused by network latency. Other benefits include ease of software distribution, reduction of WAN bandwidth requirements, and reduced client specifications.

Software:

OS: Any OS version that supports the MSS client. For example, Windows 7 Professional, Windows 8.1 Professional, and Windows Server 2012 R2.

Database: N/A

Network: CA/RDP over TCP/IP

Colors: The color setting depends on the operating system you use.

Sizing: For information on sizing a Citrix configuration, see the Citrix documentation or contact Citrix Systems, Inc.

Storage: Disk requirements are minimal. No persistent user data is stored.

Fault Tolerance: Fault tolerance is achieved with multiple computers in a farm. Citrix provides the capability to direct client requests to one of many servers in a farm.

Scalability: Scalability is achieved with multiple computers (horizontal scaling), or the use of more powerful servers. Generally, better results are obtained by limiting the server size to two CPUs.

Additional information:

- This software runs on Windows platforms only. Other platforms are not supported.

■ Citrix is optional.

Location and Routing Gateway Client

Description: This is one of three optional peripheral applications that require client computers to execute special activities.

Software:

Operating system:

■ Windows 7 Professional

■ Windows 8.1 Professional

■ Windows Server 2012 R2

Network: Oracle Database Client 12.1.0.2 (32-bit)

Browser: Internet Explorer 11

Sizing (client computer):

CPU:

■ 2.6 GHz (minimum)

■ 3.4 GHz (recommended for Inventory Management users)

Memory: 8 GB

Colors: 256

Resolution: 1024 x 768

Disk: 0.5 GB

NPA Split Utility Client

Description: This is one of three optional peripheral applications that require client computers to execute special activities.

Software:

Operating system:

■ Windows 7 Professional

■ Windows 8.1 Professional

■ Windows Server 2012 R2

Network: Oracle Database Client 12.1.0.2 (32-bit)

Browser: Internet Explorer 11

Sizing (client computer):

CPU:

■ 2.6 GHz (minimum)

■ 3.4 GHz (recommended for Inventory Management users)

Memory: 8 GB

Colors: 256

Resolution: 1024 x 768

Disk: 0.5 GB

MetaSolv Solution Utilities Client

Description: This is one of three optional peripheral applications that require client PCs to execute special activities.The MetaSolv Solution Utilities client enables you to do various maintenance and setup activities for MetaSolv Solution.

Software:

Operating system:

- Windows 7 Professional

- Windows 8.1 Professional

- Windows Server 2012 R2

Network: Oracle Database Client 12.1.0.2 (32-bit)

Browser: Internet Explorer 11

Sizing (client computer):

CPU:

- 2.6 GHz (minimum)

- 3.4 GHz (recommended for Inventory Management users)

Memory: 8 GB

Colors: 256

Resolution: 1024 x 768

Disk: 0.5 GB

A

Deployment Configuration Examples

This appendix contains examples of three deployment configurations:

- Small (100 users)

- Medium (300 to 400 users)

- Large (1000 users)

The hardware proposed for each deployment size is based on the equation for calculating capacity presented in "Hardware Sizing Guidelines".

The examples presented here are based on the number of concurrent users, which is only one criteria used to determine hardware sizing. The examples are general and are intended as a learning tool. Estimates on equipment and configuration settings cannot be exact because needs vary between MetaSolv Solution installations based on criteria such as the number of users, the volume of transactions, whether the application is being used on a WAN, and so on. To ensure that you have planned for the appropriate equipment and software, Oracle recommends that you contact its Professional Services Organization before you proceed with an installation.

When assessing your business situation to estimate hardware needs, you should consider a combination of factors such as API transactions and the type and number of transactions being processed, then adjust accordingly.

Small Deployment Example (100 users)

The following sections describe a small deployment example and include details on deployment size assumptions and hardware configuration.

Deployment Description

Table A–1 shows the size assumptions made for this deployment example.

Table A–1   Size Assumptions for a Small Deployment

Size and Usage Requirement	Nonclustered Nonredundant Environment	Clustered Redundant Environment
Number of concurrent users	100	100
Number of orders per day	8,000	8,000
Circuit assignment	700	700
Number of trouble tickets	4,000	4,000
Reliability/availability	98%	99.5%

Hardware Configuration

Table A–2 shows the hardware configurations for this deployment example.

Table A–2   Example Small Deployment Hardware Configuration

Computer	Nonclustered Nonredundant Environment	Clustered Redundant Environment
Client computer (one per user)	Windows-based computer (2.6+ GHz; 8 GB+ RAM)	Windows-based computer (2.6+ GHz; 8 GB+ RAM)
Administration server computer	N/A	You can use the WebLogic application server computer (below) to handle the administration server as well. No additional hardware is needed.
WebLogic application server computer	1 SPARC T7-1 ■ 1 dual core, 4.13 GHz SPARC M7 processor ■ 16 GB RAM, 2 X 600 GB Disk	2 SPARC T7-1 ■ 1 dual core, 4.13 GHz SPARC M7 processor ■ 16 GB RAM, 2 X 600 GB Disk
External load balancers	N/A	***2 load balancers Customer's choice Example: F5 BIG-IP LTM
Database server (Oracle) computer	1 SPARC T7-1 ■ 1 quad core, 4.13 GHz SPARC M7 processor ■ 16 GB RAM, 2 X 600 GB Disk	2 SPARC T7-1 (Active/Passive) ■ 1 quad core, 4.13 GHz SPARC M7 processor ■ 16 GB RAM, 2 X 600 GB Disk
Background Processor computer	1 Windows-based computer ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM	2 Windows-based computers ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM

*Clustering with non-redundancy does not apply here. Oracle recommends one Oracle application server per 2 CPUs.

**Only one Oracle Application Server will reside on each computer.

***Access Oracle requirements for hardware load balancer. See the following website:

http://docs.oracle.com/middleware/12212/wls/CLUST/load_
balancing.htm#CLUST171

For a configuration example using BIG-IP LTM as hardware load balancer, see the following website:

http://f5.com/solutions/deployment-guides/oracle-weblogic-121-103-big-ip-v
114-ltm-aam

Medium Deployment Example (300 to 400 users)

The following sections describe a medium deployment example, and include details on size assumptions and hardware configuration.

Deployment Description

Table A–3 shows the size assumptions for this deployment example.

Table A–3   Size Assumptions for a Medium Deployment

Size and Usage Requirement	Clustered Nonredundant Environment	Clustered Redundant Environment
Number of concurrent users	300-400	300-400
Number of orders per day	30,000	30,000
Circuit assignment	3,000	3,000
Number of trouble tickets	16,000	16,000
Reliability/availability	99.5%	99.9%

Hardware Configuration

Table A–4 shows the hardware configurations for this deployment example.

Table A–4   Example Medium Deployment Hardware Configuration

Computer	Clustered Nonredundant Environment	Clustered Redundant Environment
Client computer (one per user)	Windows-based computer (3.4+ GHz; 8 GB+ RAM)	Windows-based computer (3.4+ GHz; 8 GB+ RAM)
Administration server computer	N/A	You can use the WebLogic application server computer (below) to handle the administration server as well. No additional hardware is needed.
WebLogic application server computer	1 SPARC T7-1 ■ 1 quad core, 4.13 GHz SPARC M7 processor ■ 32 GB RAM, 2 X 250 GB Disk	2 SPARC T7-1 ■ 1 quad core, 4.13 GHz SPARC M7 processor ■ 32 GB RAM, 2 X 250 GB Disk
External load balancers	*** 1 load balancer Customer's choice Example: F5 BIG-IP LTM	***2 load balancers Customer's choice Example: F5 BIG-IP LTM
Database server (Oracle) computer	■ 1 x SPARC T7-1, 8 cores ■ 32 GB RAM, 2 x 600 GB Disk	■ 2 x SPARC T7-1, each with 8 cores ■ 32 GB RAM, 2 x 600 GB Disk
Background Processor computer	1 Windows-based computer ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM	2 Windows-based computers ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM

*For better performance and reliability, a clustered environment is recommended for medium-sized customers.

**The recommendation is for four Oracle application server processes to run on each computer.

***Access Oracle requirements for hardware load balancer. See the following website:

https://docs.oracle.com/middleware/12212/wls/CLUST/load_
balancing.htm#CLUST171

For a configuration example using BIG-IP LTM as hardware load balancer, see the following website:

https://f5.com/solutions/deployment-guides/oracle-weblogic-121-103-big-ip-
v114-ltm-aam

Large Deployment Example (1,000 users)

The following sections describe a large deployment example, and include details on size assumptions and hardware configuration.

Deployment Description

Table A–5 shows the size assumptions for this deployment example.

Table A–5   Size Assumptions for a Large Deployment

Size and Usage Requirement	Clustered Nonredundant Environment	Clustered Redundant Environment
Number of concurrent users	1,000	1,000
Number of orders per day	100,000	100,000
Circuit assignment	7,200	7,200
Number of trouble tickets	42,000	42,000
Reliability/availability	99.5%	99.9%

Hardware Recommendations

Table A–6 shows the hardware configurations for this deployment example.

Table A–6   Example Large Deployment Hardware Configuration

Computer	Clustered Nonredundant Environment	Clustered Redundant Environment
Client computer (one per user)	Windows-based computer (3.4+ GHz; 512 MB+ RAM)	Windows-based computer (3.4+ GHz; 512 MB+ RAM)
Administration server computer	N/A	You can use the WebLogic application server computer (below) to handle the administration server as well. No additional hardware is needed.
WebLogic application server computer	■ 1 x SPARC T7-2, each with 16 cores ■ 64 GB RAM, 2 x 350 GB Disk	■ 2 x SPARC T7-2, each with 16 cores ■ 64 GB RAM, 2 x 350 GB Disk
External load balancers	***1 load balancer Customer's choice Example: F5 BIG-IP LTM	***2 load balancers Customer's choice Example: F5 BIG-IP LTM

Table A–6   (Cont.) Example Large Deployment Hardware Configuration

Computer	Clustered Nonredundant Environment	Clustered Redundant Environment
Database server (Oracle) computer	■ 1 x SPARC T7-2, each with 16 cores ■ 64 GB RAM, 2 x 600 GB Disk	■ 2 x SPARC T7-2, each with 16 cores ■ 64 GB RAM, 2 x 600 GB Disk
Background Processor computer	1 Windows-based computer ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM	2 Windows-based computers ■ 2 CPUs @ 3.4+ GHz ■ 8 GB RAM

*For better performance and reliability, a clustered environment is recommended for large-sized customers.

**The recommendation is for eight Oracle application server processes to run on each computer.

***Access Oracle requirements for hardware load balancer. See the following website:

https://docs.oracle.com/middleware/12212/wls/CLUST/load_balancing.htm#CLUST171

For a configuration example using BIG-IP LTM as hardware load balancer, see the following website:

https://f5.com/solutions/deployment-guides/oracle-weblogic-121-103-big-ip-v114-ltm-aam

B

Environment Planning Worksheet

This appendix contains worksheets to use in your environment planning.

Environment Profiles

Use Table B–1 and Table B–2 to write down your hardware and software specifications, for example disk size, type, processor speed, and operating system type/version.

Table B–1   Hardware/Software Specifications for the Current Environment

Environment and Purpose	AppServers	DB Servers	Background Processor	Citrix Server	Max Concurrent Users
Test					
Development					
Production					

Table B–2   Hardware/Software Specifications for the Anticipated MSS 6.3 Environment

Environment and Purpose	AppServers	DB Servers	Background Processor	Citrix Server	Max Concurrent Users
Test					
Development					
Production					

Functional Areas

Rank the following areas of the application in Table B–3, with 10 being most heavily used and 0 being not used at all. If there is a specific function not listed that is particularly high use or important to your process, add it to the list.

Table B–3   Functional Areas and Level of Use

Functional Area	Level of Use (0-10)
PSR	
ASR	
ISR	
LSR	

Table B–3   (Cont.) Functional Areas and Level of Use

Functional Area	Level of Use (0-10)
USO	
ASR to PSR Mapping	
LSR to PSR Mapping	
Product Catalog	
Customer Management	
Trouble Management	
Work Management	
PERT Chart	
Rules and Behaviors	
Equipment Specifications	
Equipment Installation	
Auto Design	
Path Analysis	
IP Address Management	
TN Administration	
Group Assign	
Reconciliation	
Engineering Work Order (EWO)	
LERG	
NPA/NXX Split Utility	
Background Processor	
Custom Attributes	
APIs (list which ones)	
Diversity Module	
SONET Module	
SONET AutoBuild	
Broadband Design Module (non-template ATM/FR and DSL)	
DSL Module (non-template)	
VPN Module (non-template)	
Network Design Canvas (general templates and graphical design)	
ATM/FR Technology Module (template based)	
DLC Technology Module (template based)	
DSL Technology Module (template based)	

Table B–3   (Cont.) Functional Areas and Level of Use

Functional Area	Level of Use (0-10)
Ethernet Technology Module (template based)	
Fiber Based Broadband Delivery Module (template based)	
IP Technology Module (template based)	
MPLS Technology Module (template based)	
Optical/TDM Technology Module (template based)	