Oracle® Fusion Middleware

Enterprise Deployment Guide for Oracle SOA Suite

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Documentation for administrators that describes how to install and configure Oracle Fusion Middleware components in an enterprise deployment.

Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite, 12c (12.2.1.2)

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Preface

This guide explains how to install, configure, and manage a highly available Oracle Fusion Middleware enterprise deployment. For more information, see About the Enterprise Deployment Guide.

Audience

In general, this document is intended for administrators of Oracle Fusion Middleware, who are assigned the task of installing and configuring Oracle Fusion Middleware software for production deployments.

Specific tasks can also be assigned to more specialized administrators, such as database administrators (DBAs) and network administrators, where applicable.

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Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

Convention	Meaning
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Note:

This guide focuses on the implementation of the enterprise deployment reference topology on Oracle Linux systems.

The topology can be implemented on any certified, supported operating system, but the examples in this guide typically show the commands and configuration steps as they should be performed using the bash shell on Oracle Linux.

Part I

Understanding an Enterprise Deployment

It is important to understand the concept and general characteristics of a typical enterprise deployment, before configuring the Oracle SOA Suite enterprise deployment topology.

This part of the Enterprise Deployment Guide contains the following topics.

Enterprise Deployment Overview
: The Enterprise Deployment Guide provides detailed, validated instructions that help you plan, prepare, install, and configure a multi-host, secure, highly available, production topology for selected Oracle Fusion Middleware products.

About a Typical Enterprise Deployment
: It is essential to understand the components of a typical enterprise deployment topology.

About the Oracle SOA Suite Enterprise Deployment Topology

1

Enterprise Deployment Overview

The Enterprise Deployment Guide provides detailed, validated instructions that help you plan, prepare, install, and configure a multi-host, secure, highly available, production topology for selected Oracle Fusion Middleware products.

This chapter introduces the concept of an Oracle Fusion Middleware enterprise deployment. It also provides information on when to use the Enterprise Deployment guide.

1.1 About the Enterprise Deployment Guide

An Enterprise Deployment Guide provides a comprehensive, scalable example for installing, configuring, and maintaining a secure, highly available, production-quality deployment of selected Oracle Fusion Middleware products. This resulting environment is known as an **enterprise deployment topology**.

By example, the enterprise deployment topology introduces key concepts and best practices that you can use to implement a similar Oracle Fusion Middleware environment for your organization.

Each Enterprise Deployment Guide provides detailed, validated instructions for implementing the reference topology. Along the way, the guide offers links to supporting documentation that explains concepts, reference material, and additional options for an Oracle Fusion Middleware enterprise deployment.

Note that the enterprise deployment topologies described in the enterprise deployment guides cannot meet the exact requirements of all Oracle customers. In some cases, you can consider alternatives to specific procedures in this guide, depending on whether the variations to the topology are documented and supported by Oracle.

Oracle recommends customers use the Enterprise Deployment Guides as a first option for deployment. If variations are required, then those variations should be verified by reviewing related Oracle documentation or by working with Oracle Support.

1.2 When to Use the Enterprise Deployment Guide

This guide describes one of three primary installation and configuration options for Oracle Fusion Middleware. Use this guide to help you plan, prepare, install, and configure a multi-host, secure, highly available, production topology for selected Oracle Fusion Middleware products.

Alternatively, you can:

- To install a **development environment**, use the instructions in Installing Oracle SOA Suite Quick Start for Developers in *Oracle Fusion Middleware Installing SOA Suite and Business Process Management Suite Quick Start for Developers*.

  A development environment provides the software and tools that you can use to develop Java, Oracle Application Development Framework, and other applications that depend on Oracle technologies. Development environments are typically installed on a single host and do not require many of the features of a production environment.

- Review *Planning an Installation of Oracle Fusion Middleware*, which provides additional information to help you prepare for any Oracle Fusion Middleware installation.

2

About a Typical Enterprise Deployment

It is essential to understand the components of a typical enterprise deployment topology.

This chapter provides information on Enterprise Deployment Topology diagram.

2.1 Diagram of a Typical Enterprise Deployment

This diagram shows all the components of a typical enterprise deployment, including the Web tier, application tier and data tier. All enterprise deployments are based on these basic principles.

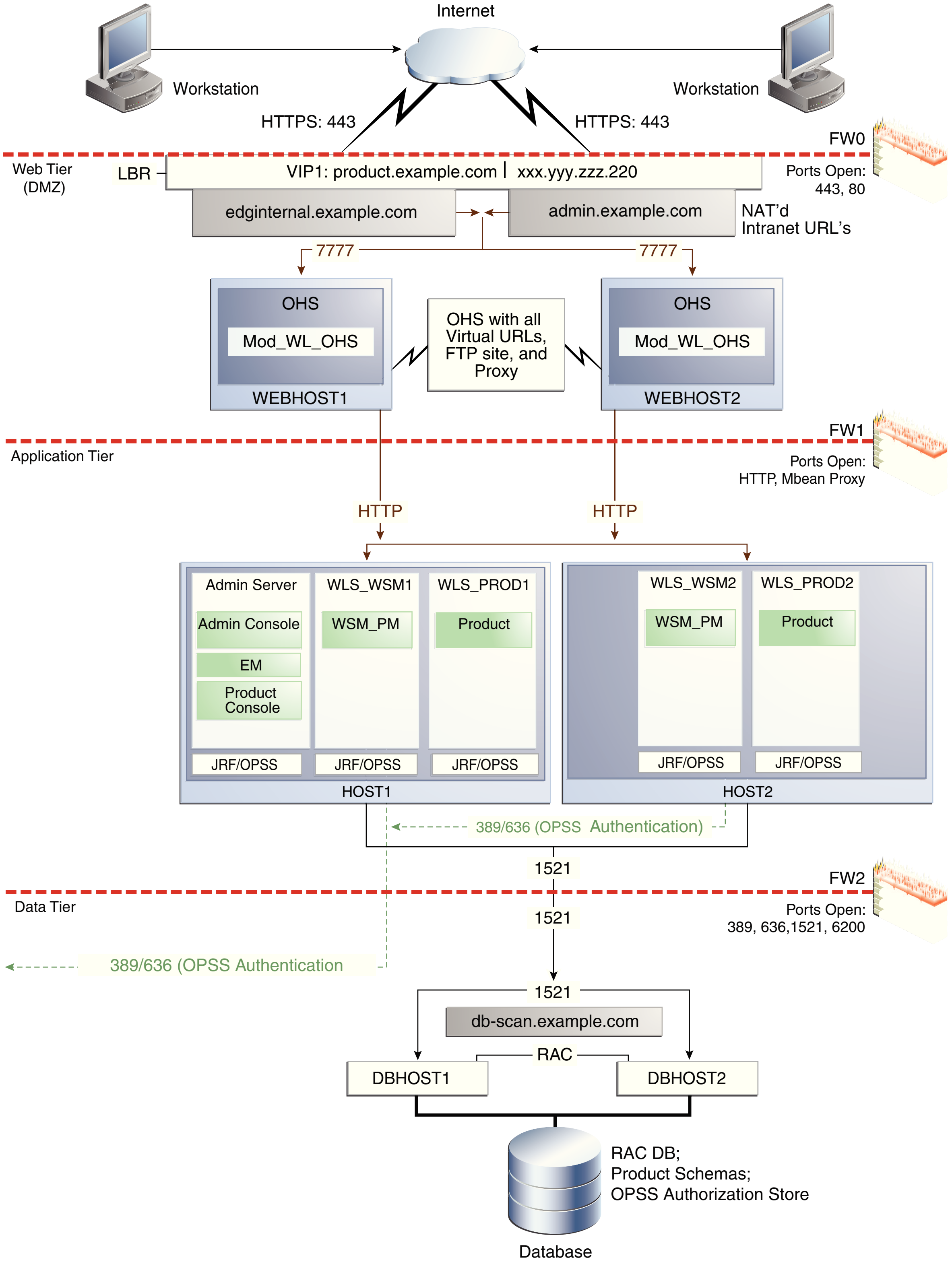
All Oracle Fusion Middleware enterprise deployments are designed to demonstrate the best practices for installing and configuring an Oracle Fusion Middleware production environment.

A best practices approach starts with the basic concept of a multi-tiered deployment and standard communications between the different software tiers.

Figure 2-1 shows a typical enterprise deployment, including the Web tier, application tier and data tier. All enterprise deployments are based on these basic principles.

For a description of each tier and the standard protocols used for communications within a typical Oracle Fusion Middleware enterprise deployment, see About the typical Enterprise Deployment Topology Diagram.

Figure 2-1 Typical Enterprise Deployment Topology Diagram



2.2 About the Typical Enterprise Deployment Topology Diagram

A typical enterprise deployment topology consists of a Hardware Load Balancer (LBR), Web Tier, Application Tier, and Data Tier. You can obtain detailed information on these components in this section.

2.2.1 Understanding the Firewalls and Zones of a Typical Enterprise Deployment

The topology is divided into several security zones, which are separated by firewalls:

- The Web tier (or DMZ), which is used for the hardware load balancer and Web servers (in this case, Oracle HTTP Server instances) that receive the initial requests from users. This zone is accessible only through a single virtual server name defined on the load balancer.
- The application tier, which is where the business and application logic resides.
- The data tier, which is not accessible from the Internet and reserved in this topology for the highly available database instances.

The firewalls are configured to allow data to be transferred only through specific communication ports. Those ports (or in some cases, the protocols that will need open ports in the firewall) are shown on each firewall line in the diagram.

For example:

- On the firewall protecting the Web tier, only the HTTP ports are open: 443 for HTTPS and 80 for HTTP.
- On the firewall protecting the Application tier, HTTP ports, and MBean proxy port are open.

  Applications that require external HTTP access can use the Oracle HTTP Server instances as a proxy. Note that this port for outbound communications only and the proxy capabilities on the Oracle HTTP Server must be enabled.
- On the firewall protecting the data tier, the database listener port (typically, 1521) must be open.

  The LDAP ports (typically, 389 and 636) are also required to be open for communication between the authorization provider and the LDAP-based identity store.

  The ONS port (typically, 6200) is also required so the application tier can receive notifications about workload and events in the Oracle RAC Database. These events are used by the Oracle WebLogic Server connection pools to adjust quickly (creating or destroying connections), depending on the availability and workload on the Oracle RAC database instances.

For a complete list of the ports you must open for a specific Oracle Fusion Middleware enterprise deployment topology, see the chapter that describes the topology you want to implement, or refer to the *Enterprise Deployment Workbook* for the topology you are implement. For more information, see Using the Enterprise Deployment Workbook .

2.2.2 Understanding the Elements of a Typical Enterprise Deployment Topology

The enterprise deployment topology consists of the following high-level elements:

- A hardware load balancer that routes requests from the Internet to the Web servers in the Web tier. It also routes requests from internal clients or other components that are performing internal invocations within the corporate network.
- A Web tier, consisting of a hardware load balancer and two or more physical computers that host the Web server instances (for high availability).

  The Web server instances are configured to authenticate users (via an external identity store and a single sign-on server) and then route the HTTP requests to the Oracle Fusion Middleware products and components running in the Application tier.

  The Web server instances also host static Web content that does not require application logic to be delivered. Placing such content in the Web tier reduces the overhead on the application servers and eliminates unnecessary network activity.
- An Application tier, consisting of two or more physical computers that are hosting a cluster of Oracle WebLogic Server Managed Servers, and the Administration Server for the domain. The Managed Servers are configured to run the various Oracle Fusion Middleware products, such as Oracle SOA Suite, Oracle Service Bus, Oracle WebCenter Content, and Oracle WebCenter Portal, depending on your choice of products in the enterprise deployment.
- A data tier, consisting of two or more physical hosts that are hosting an Oracle RAC Database.

2.2.3 Receiving Requests Through Hardware Load Balancer

The following topics describe the hardware load balancer and its role in an enterprise deployment.

2.2.3.1 Purpose of the Hardware Load Balancer (LBR)

The following topics describe the types of requests handled by the hardware load balancer in an enterprise deployment.

2.2.3.1.1 HTTP Requests from the Internet to the Web server instances in the Web tier

The hardware load balancer balances the load on the Web tier by receiving requests to a single virtual host name and then routing each request to one of the Web server instances, based on a load balancing algorithm. In this way, the load balancer ensures that no one Web server is overloaded with HTTP requests.

For more information about the purpose of specific virtual host names on the hardware load balancer, see Summary of the Typical Load Balancer Virtual Server Names.

Note that in the reference topology, only HTTP requests are routed from the hardware load balancer to the Web tier. Secure Socket Layer (SSL) requests are terminated at the load balancer and only HTTP requests are forwarded to the Oracle HTTP Server instances. This guide does not provide instructions for SSL configuration between the load balancer and the Oracle HTTP Server instances or between the Web tier and the Application tier.

The load balancer provides high availability by ensuring that if one Web server goes down, requests will be routed to the remaining Web servers that are up and running.

Further, in a typical highly available configuration, the hardware load balancers are configured such that a hot standby device is ready to resume service in case a failure occurs in the main load balancing appliance. This is important because for many types of services and systems, the hardware load balancer becomes the unique point of access to make invocations and, as a result, becomes a single point of failure (SPOF) for the whole system if it is not protected.

2.2.3.1.2 MLLP Requests for Oracle SOA Suite for Healthcare Integration

If you plan to configure Oracle SOA Suite for healthcare integration, then the hardware load balancer must also pass requests via the Minimum Lower Layer Protocol (MLLP) protocol. MLLP is required when you are using the Health Level 7 (HL7) standards to exchange healthcare documents.

For more information, see Using the HL7 Document Protocol in the *Healthcare Integration User's Guide for Oracle SOA Suite*.

2.2.3.1.3 SFTP Requests for Oracle MFT Integration

When MFT is deployed, the load balancer needs to configure also a TCP Virtual Server that will load balance the sFTP requests across different OTD instances in the DMZ. sFTP is the secure protocol used to provide file transfers for MFT in the Enterprise Deployment Guides, For more information, see Embedded FTP and sFTP Servers in *Oracle Fusion Middleware Using Oracle Managed File Transfer*.

2.2.3.1.4 Specific internal-only communications between the components of the Application tier

In addition, the hardware load balancer routes specific communications between the Oracle Fusion Middleware components and applications on the application tier. The internal-only requests are also routed through the load balancer, using a unique virtual host name.

2.2.3.2 Summary of the Typical Load Balancer Virtual Server Names

In order to balance the load on servers and to provide high availability, the hardware load balancer is configured to recognize a set of virtual server names. As shown in the diagram, the following virtual server names are recognized by the hardware load balancer in this topology:

- `soa.example.com` - This virtual server name is used for all incoming traffic.

  Users enter this URL to access the Oracle Fusion Middleware product you have deployed and the custom applications available on this server. The load balancer then routes these requests (using a load balancing algorithm) to one of the servers in the Web tier. In this way, the single virtual server name can be used to route traffic to multiple servers for load balancing and high availability of the Web servers instances.

- `soainternal.example.com` - This virtual server name is for internal communications only.

  The load balancer uses its **Network Address Translation (NAT)** capabilities to route any internal communication from the Application tier components that are directed to this URL. This URL is not exposed to external customers or users on the Internet. Each product has specific uses for the internal URL, so in the deployment instructions, we prefix it with the product name.

- `admin.example.com` - This virtual server name is for administrators who need to access the Oracle Enterprise Manager Fusion Middleware Control and Oracle WebLogic Server Administration Console interfaces.

  This URL is known only to internal administrators. It also uses the NAT capabilities of the load balancer to route administrators to the active Administration Server in the domain.

For the complete set of virtual server names you must define for your topology, see the chapter that describes the product-specific topology.

2.2.3.3 HTTPS versus HTTP Requests to the External Virtual Server Name

Note that when you configure the hardware load balancer, a best practice is to assign the main external URL (for example, `http://myapplication.example.com`) to port 80 and port 443.

Any request on port 80 (non-SSL protocol) should be redirected to port 443 (SSL protocol). Exceptions to this rule include requests from public WSDLs. For more information, see Configuring Virtual Hosts on the Hardware Load Balancer.

2.2.4 Understanding the Web Tier

The Web tier of the reference topology consists of the Web servers that receive requests from the load balancer. In the typical enterprise deployment, at least two Oracle HTTP Server instances or two Oracle Traffic Director instances are configured in the Web tier. The following topics provide more detail.

2.2.4.1 Benefits of Using a Web Tier to Route Requests

A Web tier with Oracle HTTP Server or Oracle Traffic Director is not a requirement for many of the Oracle Fusion Middleware products. You can route traffic directly from the hardware load balancer to the WLS servers in the Application Tier. However, a

Web tier does provide several advantages, which is why it is recommended as part of the reference topology:

- The Web tier provides faster fail-over in the event of a WebLogic Server instance failure. The plug-in actively learns about the failed WebLogic Server instance by using the information supplied by its peers. It avoids the failed server until the peers notify the plug-in that it is available. Load balancers are typically more limited and their monitors cause higher overhead.
- The Web tier provides DMZ public zone, which is a common requirement in security audits. If a load balancer routes directly to the WebLogic Server, requests move from the load balancer to the application tier in one single HTTP jump, which can cause security concerns.
- The Web tier allows the WebLogic Server cluster membership to be reconfigured (new servers added, others removed) without having to change the Web server configuration (as long as at least some of the servers in the configured list remain alive).
- Oracle HTTP Server delivers static content more efficiently and faster than WebLogic Server; it also provides FTP services, which are required for some enterprise deployments, as well as the ability to create virtual hosts and proxies via the Oracle HTTP Server configuration files.
- The Web tier provide HTTP redirection over and above what WebLogic Server provides. You can use Oracle HTTP Server as a front end against many different WebLogic Server clusters, and in some cases, control the routing via content based routing.
- Oracle HTTP Server provides the ability to integrate single sign-on capabilities into your enterprise deployment. For example, you can later implement single sign-on for the enterprise deployment, using Oracle Access Manager, which is part of the Oracle Identity and Access Management family of products.
- Oracle HTTP Server provides support for WebSocket connections deployed within WebLogic Server.

For more information about Oracle HTTP Server, see Introduction to Oracle HTTP Server in *Administrator's Guide for Oracle HTTP Server*.

For more information about Oracle Traffic Director, see the Getting Started with Oracle Traffic Director in the *Oracle Traffic Director Administrator's Guide*.

2.2.4.2 Alternatives to Using a Web Tier

Although a Web tier provides a variety of benefits in an enterprise topology, Oracle also supports routing requests directly from the hardware load balancer to the Managed Servers in the middle tier.

This approach provide the following advantages:

- Lower configuration and processing overhead than using a front-end Oracle HTTP Server Web tier front-end.
- Monitoring at the application level since the LBR can be configured to monitor specific URLS for each Managed Server (something that is not possible with Oracle HTTP Server).

  You can potentially use this load balancer feature to monitor SOA composite application URLs. Note that this enables routing to the Managed Servers only when all composites are deployed, and you must use the appropriate monitoring software.

2.2.4.3 Configuration of Oracle HTTP Server in the Web Tier

Starting with Oracle Fusion Middleware 12*c*, the Oracle HTTP Server software can be configured in one of two ways: as part of an existing Oracle WebLogic Server domain or in its own standalone domain. Each configuration offers specific benefits.

When you configure Oracle HTTP Server instances as part of an existing WebLogic Server domain, you can manage the Oracle HTTP Server instances, including the wiring of communications between the Web servers and the Oracle WebLogic Server Managed Servers using Oracle Enterprise Manager Fusion Middleware Control. When you configure Oracle HTTP Server in a standalone configuration, you can configure and manage the Oracle HTTP Server instances independently of the application tier domains.

For this enterprise deployment guide, the Oracle HTTP Server instances are configured as separate standalone domains, one on each Web tier host. You can choose to configure the Oracle HTTP Server instances as part of the application tier domain, but this enterprise deployment guide does not provide specific steps to configure the Oracle HTTP Server instances in that manner.

For more information, see About Oracle HTTP Server in *Oracle Fusion Middleware Installing and Configuring Oracle HTTP Server*.

2.2.4.4 About Mod_WL_OHS

As shown in the diagram, the Oracle HTTP Server instances use the WebLogic Proxy Plug-In (`mod_wl_ohs`) for proxying HTTP requests from Oracle HTTP Server to the Oracle WebLogic Server Managed Servers in the Application tier.

For more information, see What are Oracle WebLogic Server Proxy Plug-Ins? in *Oracle Fusion Middleware Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.1*.

2.2.5 Understanding the Application Tier

The application tier consists of two physical host computers, where Oracle WebLogic Server and the Oracle Fusion Middleware products are installed and configured. The application tier computers reside in the secured zone between firewall 1 and firewall 2.

The following topics provide more information.

Configuration of the Administration Server and Managed Servers Domain Directories

Using Oracle Web Services Manager in the Application Tier

Best Practices and Variations on the Configuration of the Clusters and Hosts on the Application Tier

About the Node Manager Configuration in a Typical Enterprise Deployment

About Using Unicast for Communications within the Application Tier

Understanding OPSS and Requests to the Authentication and Authorization Stores

About Coherence Clusters In a Typical Enterprise Deployment

2.2.5.1 Configuration of the Administration Server and Managed Servers Domain Directories

Unlike the Managed Servers in the domain, the Administration Server uses an active-passive high availability configuration. This is because only one Administration Server can be running within an Oracle WebLogic Server domain.

In the topology diagrams, the Administration Server on HOST1 is in the active state and the Administration Server on HOST2 is in the passive (inactive) state.

To support the manual fail over of the Administration Server in the event of a system failure, the typical enterprise deployment topology includes:

- A Virtual IP Address (VIP) for the routing of Administration Server requests
- The configuration of the Administration Server domain directory on a shared storage device.

In the event of a system failure (for example a failure of HOST1), you can manually reassign the Administration Server VIP address to another host in the domain, mount the Administration Server domain directory on the new host, and then start the Administration Server on the new host.

However, unlike the Administration Server, there is no benefit to storing the Managed Servers on shared storage. In fact, there is a potential performance impact when Managed Server configuration data is not stored on the local disk of the host computer.

As a result, in the typical enterprise deployment, after you configure the Administration Server domain on shared storage, a copy of the domain configuration is placed on the local storage device of each host computer, and the Managed Servers are started from this copy of the domain configuration. You create this copy using the Oracle WebLogic Server pack and unpack utilities.

The resulting configuration consists of separate domain directories on each host: one for the Administration Server (on shared storage) and one for the Managed Servers (on local storage). Depending upon the action required, you must perform configuration tasks from one domain directory or the other.

For more information about structure of the Administration Server domain directory and the Managed Server domain directory, as well as the variables used to reference these directories, see Understanding the Recommended Directory Structure for an Enterprise Deployment.

There is an additional benefit to the multiple domain directory model. It allows you to isolate the Administration Server from the Managed Servers. By default, the primary enterprise deployment topology assumes the Administration Server domain directory is on one of the Application Tier hosts, but if necessary, you could isolate the Administration Server further by running it from its own host, for example in cases where the Administration Server is consuming high CPU or RAM. Some administrators prefer to configure the Administration Server on a separate, dedicated host, and the multiple domain directory model makes that possible.

2.2.5.2 Using Oracle Web Services Manager in the Application Tier

Oracle Web Services Manager (Oracle WSM) provides a policy framework to manage and secure Web services in the Enterprise Deployment topology.

In most enterprise deployment topologies, the Oracle Web Services Manager Policy Manager runs on Managed Servers in a separate cluster, where it can be deployed in an active-active highly available configuration.

You can choose to target Oracle Web Services Manager and Fusion Middleware products or applications to the same cluster, as long as you are aware of the implications.

The main reasons for deploying Oracle Web Services Manager on its own managed servers is to improve performance and availability isolation. Oracle Web Services Manager often provides policies to custom Web services or to other products and components in the domain. In such a case, you do not want the additional Oracle Web Services Manager activity to affect the performance of any applications that are sharing the same managed server or cluster as Oracle Web Services Manager.

The eventual process of scaling out or scaling up is also better addressed when the components are isolated. You can scale out or scale up only the Fusion Middleware application Managed Servers where your products are deployed or only the Managed Servers where Oracle Web Services Manager is deployed, without affecting the other product.

2.2.5.3 Best Practices and Variations on the Configuration of the Clusters and Hosts on the Application Tier

In a typical enterprise deployment, you configure the Managed Servers in a cluster on two or more hosts in the application tier. For specific Oracle Fusion Middleware products, the enterprise deployment reference topologies demonstrate best practices for the number of Managed Servers, the number of clusters, and what services are targeted to each cluster.

These best practices take into account typical performance, maintenance, and scale-out requirements for each product. The result is the grouping of Managed Servers into an appropriate set of clusters within the domain.

Variations of the enterprise deployment topology allow the targeting of specific products or components to additional clusters or hosts for improved performance and isolation.

For example, you can consider hosting the Administration Server on a separate and smaller host computer, which allows the FMW components and products to be isolated from the Administration Server.

For another example, in an Oracle SOA Suite deployment, you might deploy Oracle SOA Suite and Oracle Service Bus on different hosts. Similarly, you might target Oracle Business Activity Monitoring and Enterprise Scheduler to a separate cluster on separate host computers.

These variations in the topology are supported, but the enterprise deployment reference topology uses the minimum hardware resources while keeping high availability, scalability and security in mind. You should perform the appropriate resource planning and sizing, based on the system requirements for each type of server and the load that the system needs to sustain. Based on these decisions, you must adapt the steps to install and configure these variations accordingly from the instructions presented in this guide.

2.2.5.4 About the Node Manager Configuration in a Typical Enterprise Deployment

Starting with Oracle Fusion Middleware 12*c*, you can use either a per domain Node Manager or a per host Node Manager. The following sections of this topic provide more information on the impact of the Node Manager configuration on a typical enterprise deployment.

Note:

For general information about these two types of Node Managers, see Overview in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

About Using a Per Domain Node Manager Configuration

In a per domain Node Manager configuration—as opposed to a per host Node Manager configuration—you actually start two Node Manager instances on the Administration Server host: one from the Administration Server domain directory and one from the Managed Servers domain directory. In addition, a separate Node Manager instance runs on each of the other hosts in the topology.

The Node Manager controlling the Administration Server uses the listen address of the virtual host name created for the Administration Server. The Node Manager controlling the Managed Servers uses the listen address of the physical host. When the Administration Server fails over to another host, an additional instance of Node Manager is started to control the Administration Server on the failover host.

The key advantages of the per domain configuration are an easier and simpler initial setup of the Node Manager and the ability to set Node Manager properties that are unique to the Administration Server. This last feature was important in previous releases because some features, such as Crash Recovery, applied only to the Administration Server and not to the Managed servers. In the current release, the Oracle SOA Suite products can be configured for Automated Service Migration, rather than Whole Server Migration. This means the Managed Servers, as well as the Administration Server, can take advantage of Crash Recovery, so there is no need to apply different properties to the Administration Server and Managed Server domain directories.

Another advantage is that the per domain Node Manager provides a default SSL configuration for Node Manager-to-Server communication, based on the Demo Identity store created for each domain.

About Using a Per Host Node Manager Configuration

In a per-host Node Manager configuration, you start a single Node Manager instance to control the Administration Server and all Managed Servers on a host, even those that reside in different domains. This reduces the footprint and resource utilization on the Administration Server host, especially in those cases where multiple domains coexist on the same machine.

A per-host Node Manager configuration allows all Node Managers to use a listen address of ANY, so they listen on all addresses available on the host. This means that when the Administration Server fails over to a new host, no additional configuration is necessary. The per host configuration allows for simpler maintenance, because you can update and maintain a single Node Manager properties file on each host, rather than multiple node manager property files.

The per-host Node Manager configuration requires additional configuration steps. If you want SSL for Node Manager-to-Server communication, then you must configure an additional Identity and Trust store, and it also requires using Subject Alternate

Names (SAN), because the Node Manager listens on multiple addresses. Note that SSL communications are typically not required for the application tier, because it is protected by two firewalls.

2.2.5.5 About Using Unicast for Communications within the Application Tier

Oracle recommends the unicast communication protocol for communication between the Managed Servers and hosts within the Oracle WebLogic Server clusters in an enterprise deployment. Unlike multicast communication, unicast does not require cross-network configuration and it reduces potential network errors that can occur from multicast address conflicts as well.

When you consider using the multicast or unicast protocol for your own deployment, consider the type of network, the number of members in the cluster, and the reliability requirements for cluster membership. Also consider the following features of each protocol.

Features of unicast in an enterprise deployment:

- Uses a group leader that every server sends messages directly to. This leader is responsible for retransmitting the message to every other group member and other group leaders, if applicable.
- Works out of the box in most network topologies
- Requires no additional configuration, regardless of the network topology.
- Uses a single missed heartbeat to remove a server from the cluster membership list.

Features of multicast in an enterprise deployment:

- Multicast uses a more scalable peer-to-peer model where a server sends each message directly to the network once and the network makes sure that each cluster member receives the message directly from the network.
- Works out of the box in most modern environments where the cluster members are in a single subnet.
- Requires additional configuration in the router(s) and WebLogic Server (that is., Multicast TTL) if the cluster members span more than one subnet.
- Uses three consecutive missed heartbeats to remove a server from the cluster membership list.

Depending on the number of servers in your cluster and on whether the cluster membership is critical for the underlying application (for example in session-replication intensive applications or clusters with intensive RMI invocations across the cluster), each model may behave better.

Consider whether your topology is going to be part of an Active-Active disaster recovery system or if the cluster is going to traverse multiple subnets. In general, unicast will behave better in those cases.

For more information see the following resources:

- Configuring Multicast Messaging for WebLogic Server Clusters in *Oracle Fusion Middleware High Availability Guide*

- One-to-Many Communication Using Unicast in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*

2.2.5.6 Understanding OPSS and Requests to the Authentication and Authorization Stores

Many of the Oracle Fusion Middleware products and components require an Oracle Platform Security Services (OPSS) security store for authentication providers (an identity store), policies, credentials, keystores, and for audit data. As a result, communications must be enabled so the Application tier can send requests to and from the security providers.

For authentication, this communication is to an LDAP directory, such as Oracle Internet Directory (OID) or Oracle Unified Directory (OUD), which typically communicates over port 389 or 636. When you configure an Oracle Fusion Middleware domain, the domain is configured by default to use the WebLogic Server Authentication provider. However, for an enterprise deployment, you must use a dedicated, centralized LDAP-compliant authentication provider.

For authorization (and the policy store), the location of the security store varies, depending upon the tier:

- For the application tier, the authorization store is database-based, so frequent connections from the Oracle WebLogic Server Managed Servers to the database are required for the purpose of retrieving the required OPSS data.
- For the Web tier, the authorization store is file-based, so connections to the database are not required.

For more information about OPSS security stores, see the following sections of *Oracle Fusion Middleware Securing Applications with Oracle Platform Security Services*:

- Authentication Basics
- The Security Model

2.2.5.7 About Coherence Clusters In a Typical Enterprise Deployment

The standard Oracle Fusion Middleware enterprise deployment includes a Coherence cluster that contains storage-enabled Managed Coherence Servers.

This configuration is a good starting point for using Coherence, but depending upon your specific requirements, you can consider tuning and reconfiguring Coherence to improve performance in a production environment or to resolve possible port conflicts.

When reviewing port assignments, note that the Oracle Fusion Middleware products and components default to a Well Known Address (WKA) list that uses the port specified on the Coherence Clusters screen of the Configuration Wizard. The WKA list also uses the listen address of all servers that participate in the coherence cluster as the listen address for the WKA list. These settings can be customized using the WLS Administration Console.

For more information, refer to the following resources:

- For information about Coherence clusters, see Configuring and Managing Coherence Clusters in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

- For information about tuning Coherence, see Performance Tuning in *Oracle Fusion Middleware Administering Oracle Coherence*.
- For information about storing HTTP session data in Coherence, see Using Coherence*Web with WebLogic Server in *Oracle Fusion Middleware Administering HTTP Session Management with Oracle Coherence*Web*.
- For more information about creating and deploying Coherence applications, see Creating Coherence Applications for WebLogic Server and Deploying Coherence Applications for WebLogic Server in *Oracle Fusion Middleware Developing Oracle Coherence Applications for Oracle WebLogic Server*.

2.2.6 About the Data Tier

In the Data tier, an Oracle RAC database runs on the two hosts (DBHOST1 and DBHOST2). The database contains the schemas required by the Oracle SOA Suite components and the Oracle Platform Security Services (OPSS) policy store.

You can define multiple services for the different products and components in an enterprise deployment to isolate and prioritize throughput and performance accordingly. In this guide, one database service is used as an example. Furthermore, you can use other high availability database solutions to protect the database:

- Oracle Data Guard; for more information, see the Introduction to Oracle Data Guard in *Oracle Data Guard Concepts and Administration*.
- Oracle RAC One Node; for more information, see Overview of Oracle RAC One Node in *Oracle Real Application Clusters Administration and Deployment Guide*.

These solutions above provide protection for the database beyond the information provided in this guide, which focuses on using an Oracle RAC Database, given the scalability and availability requirements that typically apply to an enterprise deployment.

For more information about using Oracle Databases in a high availability environment, see Database Considerations in *Oracle Fusion Middleware High Availability Guide*.

3

About the Oracle SOA Suite Enterprise Deployment Topology

The Oracle SOA Suite enterprise deployment topologies represent specific reference implementations of the concepts that are described in About a Typical Enterprise Deployment.

- About the Primary and Build-Your-Own Enterprise Deployment Topologies
  This guide focuses on one or more primary reference topologies for a selected product. In addition, this guide provides high-level information about how to design and build your own enterprise deployment topology.
- Diagrams of the Primary Oracle SOA Suite Enterprise Topologies
  The two primary Oracle SOA Suite enterprise deployment topologies are: Oracle SOA Suite and Oracle Service Bus Topology and Oracle SOA Suite and Oracle Business Activity Monitoring Topology
- About the Primary Oracle SOA Suite Topology Diagrams
  Most of the elements of Oracle SOA Suite topologies represent standard features of any enterprise topology that follows the Oracle-recommended best practices. These elements are unique to the primary topology.
- Flow Charts and Road Maps for Implementing the Primary Oracle SOA Suite Enterprise Topologies
  Instructions in the form of flow charts and road maps help you to install and configure the enterprise deployment topology with ease.
- Building Your Own Oracle SOA Suite Enterprise Topology
  You can implement alternative topologies depending on the requirements of your organization, by using some variations of the instructions provided in this guide.
- About Installing and Configuring a Custom Enterprise Topology
  If you choose to implement a topology that is not described in this guide, be sure to review the certification information, system requirements, and interoperability requirements for the products you want to include in the topology.
- About Using Automatic Service Migration for the Oracle SOA Suite Enterprise Topology
  To ensure high availability of the Oracle SOA Suite products and components, this guide recommends that you enable Oracle WebLogic Server Automatic Service Migration for the clusters that you create as part of the reference topology.

3.1 About the Primary and Build-Your-Own Enterprise Deployment Topologies

This guide focuses on one or more primary reference topologies for a selected product. In addition, this guide provides high-level information about how to design and build your own enterprise deployment topology.

The exact topology you install and configure for your organization might vary, but for the primary topologies, this guide provides step-by-step instructions for installing and configuring those topologies.

For the build-your-own topologies, the guide also provides information about how to add specific components or products required for your specific environment.

3.2 Diagrams of the Primary Oracle SOA Suite Enterprise Topologies

The two primary Oracle SOA Suite enterprise deployment topologies are: Oracle SOA Suite and Oracle Service Bus Topology and Oracle SOA Suite and Oracle Business Activity Monitoring Topology

Diagram of the Oracle SOA Suite and Oracle Service Bus Topology

Diagram of the Oracle SOA Suite and Oracle Business Activity Monitoring Topology

3.2.1 Diagram of the Oracle SOA Suite and Oracle Service Bus Topology

Figure 3-1 shows a diagram of the Oracle SOA and Oracle Service Bus enterprise deployment topology.

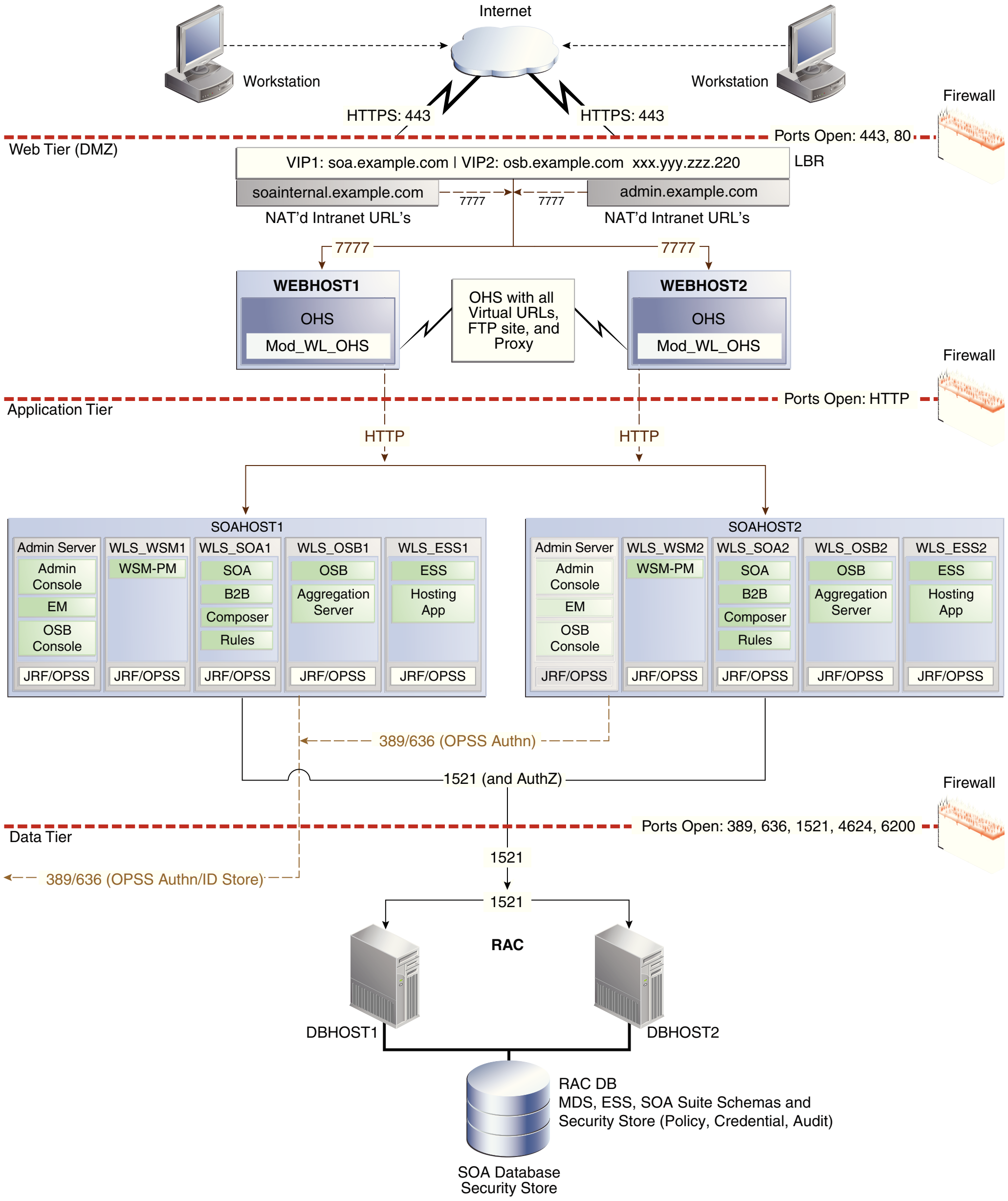
Note:

You can configure Oracle Service Bus in the same domain as Oracle SOA Suite or in its own domain. For more information, see About the Topology Options for Oracle Service Bus.

For a description of the standard elements shown in the diagram, see Understanding the Typical Enterprise Deployment Topology Diagram.

For a description of the elements shown in the diagram, see Understanding the Primary Oracle SOA Suite Topology Diagrams.

Figure 3-1 Oracle SOA Suite and Oracle Service Bus Enterprise Deployment Reference Topology Diagram



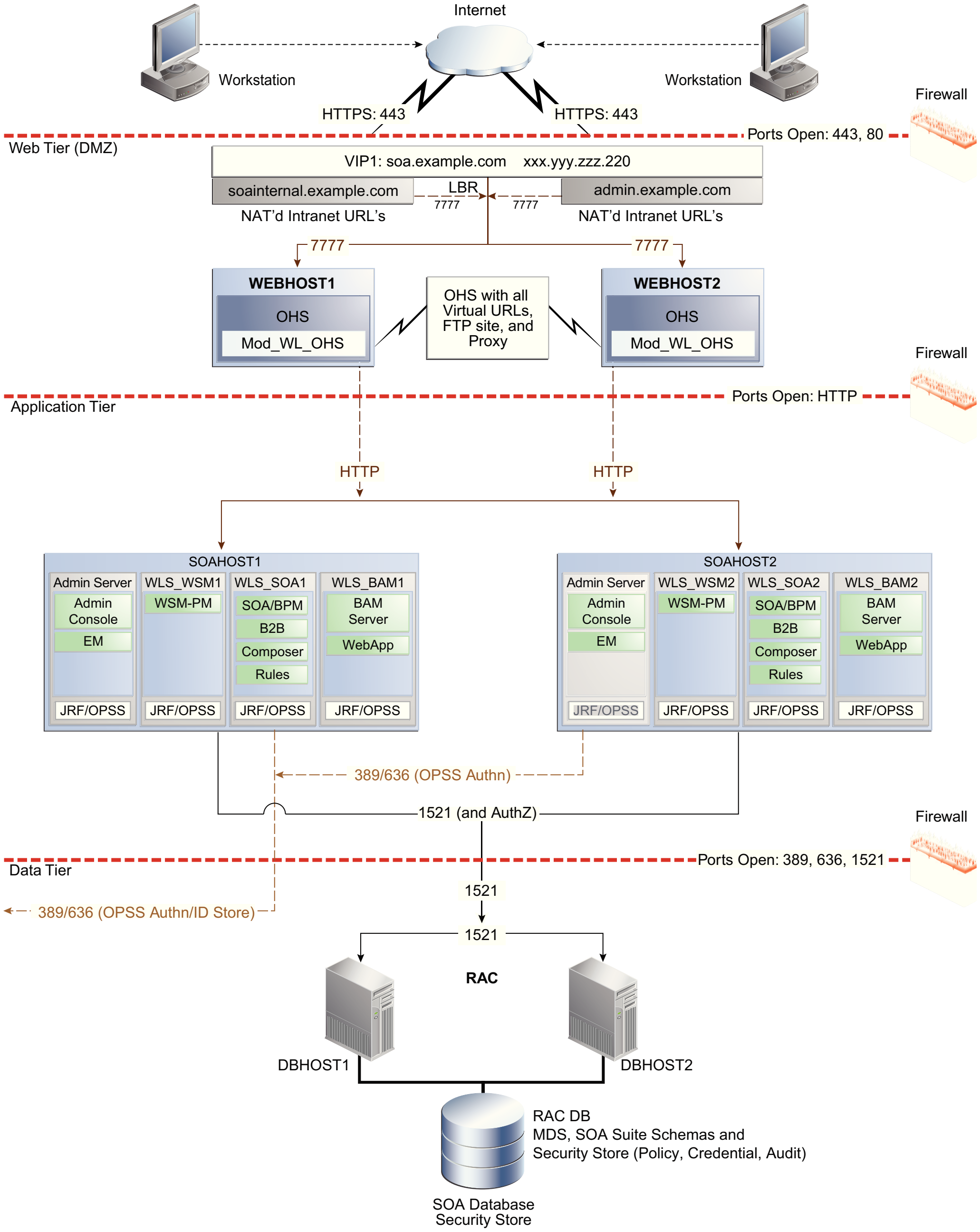
3.2.2 Diagram of the Oracle SOA Suite and Oracle Business Activity Monitoring Topology

Figure 3-2 shows a diagram of the Oracle SOA Suite and Oracle Business Activity Monitoring enterprise topology.

For a description of the standard elements shown in the diagram, see Understanding the Typical Enterprise Deployment Topology Diagram.

For a description of the elements that are specific to the Oracle SOA Suite topologies, see Understanding the Primary Oracle SOA Suite Topology Diagrams.

Figure 3-2 Oracle SOA Suite and Oracle Business Activity Monitoring Enterprise Topology Diagram



3.3 About the Primary Oracle SOA Suite Topology Diagrams

Most of the elements of Oracle SOA Suite topologies represent standard features of any enterprise topology that follows the Oracle-recommended best practices. These elements are unique to the primary topology.

These elements are described in detail in Understanding a Typical Enterprise Deployment.

Before you review the information here, it is assumed you have reviewed the information in Understanding a Typical Enterprise Deployment and that you are familiar with the general concepts of an enterprise deployment topology.

See the following sections for information about the elements that are unique to the topology described in this chapter:

About the Topology Options for Oracle Service Bus

Summary of Oracle SOA Suite Load Balancer Virtual Server Names

About the Routing of SOA Composite Requests

Summary of the Managed Servers and Clusters on SOA Application Tier

3.3.1 About the Topology Options for Oracle Service Bus

The Oracle SOA Suite and Oracle Service Bus topology diagram in this guide assumes a single domain that contains both SOA Suite and Oracle Service Bus. However, it is often advantageous to configure Oracle Service Bus in its own domain.

For example, consider separate domains when you are using Oracle Service Bus on an enterprise scale. In this scenario, you can then use Oracle Service Bus to route to multiple SOA domains and other services.

On the other hand, if you are using Oracle Service Bus primarily for mediating and providing routing for SOA Suite composite applications, configure Oracle Service Bus in the same domain, but in separate clusters for optimum performance and scalability.

When considering these options, take into account patching and other life cycle maintenance operations. For example, Oracle SOA Suite and Oracle Service Bus sometimes have differing patching requirements. If the two products are in separate domains, it can be easier to patch one without affecting the other.

3.3.2 Summary of Oracle SOA Suite Load Balancer Virtual Server Names

In order to balance the load on servers and to provide high availability, the hardware load balancer is configured to recognize a set of virtual server names.

For information about the purpose of each of these server names, see Summary of the Typical Load Balancer Virtual Server Names.

The following virtual server names are recognized by the hardware load balancer in Oracle SOA Suite topologies:

- `soa.example.com` - This virtual server name is used for all incoming traffic. It acts as the access point for all HTTP traffic to the runtime SOA components. The load balancer routes all requests to this virtual server name over SSL. As a result, clients access this service using the following secure address:

  ```
  soa.example.com:443
  ```

- `osb.example.com` - This virtual server name that acts as the access point for all HTTP traffic to the runtime Oracle Service Bus resources and proxy services. The load balancer routes all requests to this virtual server name over SSL. As a result, clients access this service using the following secure address:

  ```
  osb.example.com:443
  ```

- `soainternal.example.com` - This virtual server name is for internal communications between the application tier components only and is not exposed to the Internet.

  Specifically, for the Oracle SOA Suite enterprise topology, this URL is used for both Oracle SOA Suite and Oracle Service Bus internal communications.

The traffic from clients to this URL is not SSL-enabled. Clients access this service using the following address and the requests are forwarded to port 7777 on WEBHOST1 and WEBHOST2:

```
soainternal.example.com:80
```

Note that this URL can also be set as the URL to be used for internal service invocations while modeling composites or at runtime with the appropriate Enterprise Manager MBeans. For more information, see More About the sointernal Virtual Server Name.

- `admin.example.com` - This virtual server name is for administrators who need to access the Oracle Enterprise Manager Fusion Middleware Control and Oracle WebLogic Server Administration Console interfaces.

> **Note:** There are some components that use specific TCP Virtual Servers in the front end LBR for non- HTTP access to the system. This is the case of MLLP for Oracle SOA HC Integration and Oracle MFT. These virtual servers may use the same host name and different port or may use a different host name. Using a different host name may be a likely option when network tools are used for controlling traffic (for example, prioritizing the type of traffic based on the destination addresses). However, you will require an additional host name address in the required DNS systems.

Instructions later in this guide explain how to:

- Configure the hardware load balancer to recognize and route requests to the virtual host names.
- Configure the Oracle HTTP Server instances on the Web Tier to recognize and properly route requests to the virtual host names and the correct host computers.

3.3.3 About the Routing of SOA Composite Requests

The following topics provide additional information on configuring the enterprise deployment for Oracle SOA Suite composite applications.

More About the soainternal Virtual Server Name

About Web Services Optimizations for SOA Composite Applications

About Accessing SOA Composite Applications via Oracle HTTP Server

About Accessing Oracle SOA Suite Composite Applications via the Load Balancer

3.3.3.1 More About the soainternal Virtual Server Name

The `sointernal.example.com` virtual server name functions exactly the same as the `soa.example.com`, except that it invoked by intranet clients and callbacks only. This topic provides additional details.

The `soainternal.example.com` virtual server name is not used explicitly during the installation and configuration of the enterprise deployment, but custom systems often expose services that should be consumed by internal-only clients. In those cases, for efficiency and security reasons, you should avoid using an external URL such as soa.example.com. Instead, you should use an address that cannot be invoked by

Internet clients. SOA Composite applications, in particular, can use this internal URL in their end points, either directly or through deployment plans.

When you use the `soainternal.example.com` address, there are implications for the front end address specified for the system. Web Services optimizations (for example, direct RMI invocation instead of invocations that involve a full loopback to the load balancer endpoint) are triggered when the Front End address for the cluster matches the invocation endpoint. For this reason, depending on the number and relevance of the expected internal invocations, consider setting the front end URL for the cluster and the `ServerURL` and `HTTPServerURL` properties to either the external or internal.

You can set the front end URL for a cluster when you are creating the cluster in the Configuration Wizard. You can also modify it later, using the WebLogic Server Administration Console. For more information, see Configure HTTP Protocol in the *Administration Console Online Help*.

For more information about setting the `ServerURL` and `HTTPServerURL` properties, see Configuring SOA Infrastructure Properties.

3.3.3.2 About Web Services Optimizations for SOA Composite Applications

When configuring internal callbacks so that SOA composite applications can communicate efficiently within the enterprise deployment, you should be aware of how the system checks for the proper end-point address for each request.

For webservice local optimization, the basic requirement is to make sure that the two SOA composites are colocated on the same Managed Server or process. To determine if the composites are colocated on the same server, Oracle SOA Suite compares the server on which the target service composite is deployed (host and port configuration) with those specified in the reference service endpoint URI.

- For target service host value, here is the sequence of checks in order precedence:
  - Checks the Server URL configuration property value on SOA Infrastructure Common Properties page.
  - If not specified, checks the FrontendHost and FrontendHTTPPort (or FrontendHTTPSPort if SSL is enabled) configuration property values from the cluster MBeans.
  - If not specified, checks the FrontendHost and FrontendHTTPPort (or FrontendHTTPSPort if SSL is enabled) configuration property values from the Oracle WebLogic Server MBeans.
  - If not specified, uses the DNS-resolved Inet address of localhost.
- For target service port value, here is the sequence of checks in order precedence:
  - Checks the port configured in HttpServerURL on SOA Infrastructure Common Properties page.
  - If not specified, checks the port configured in Server URL on SOA Infrastructure Common Properties page.
  - If not specified, checks the FrontendHost and FrontendHTTPPort (or FrontendHTTPSPort if SSL is enabled) configuration property values from the cluster MBeans.

- If not specified, checks the FrontendHost and FrontendHTTPPort (or FrontendHTTPSPort if SSL is enabled) configuration property values from the Oracle WebLogic Server MBean.
- If not specified, SOA Suite assumes 80 for HTTP and 443 for HTTPS URLs.

3.3.3.3 About Accessing SOA Composite Applications via Oracle HTTP Server

When routing requests from the Oracle HTTP Server instances on the Web tier to specific Oracle SOA Suite composite application URLs on the application, consider the following:

- In previous releases of Oracle Fusion Middleware, Oracle HTTP Server generated an HTTP 503 (Service Unavailable) message if a request to Oracle SOA Suite composite application was received by the Managed Server and the composite application was not yet loaded.
- In Oracle Fusion Middleware 12c, this behavior has changed. If requests for a composite arrives before the composite is active, then the HTTP requests are put on hold until the required artifacts are available and the composite reaches the active state.

> **Note:**
>
> Composites that include JCA bindings, EJB, and ADF binding cannot be lazy loaded and will behave like not-loaded-yet composites.

This change in behavior allows you to route requests to composite applications that are not yet loaded during the startup of an Oracle SOA Suite Managed Server. However, the communication channel between the Oracle HTTP Server and Oracle WebLogic Server needs to account for the possibility of long delays in getting replies.

To address this issue, while configuring firewalls between Oracle HTTP Server and Oracle WebLogic Server, set the appropriate timeout to avoid shutting down of connections that are waiting for a composite to be loaded.

For more information, see Configuring the Firewalls and Ports for an Enterprise Deployment.

Note that the Oracle HTTP Server instances route requests based on the availability of the Oracle WebLogic Server servers and not on the availability of any specific application. The instances continue to route the requests as long as the Oracle WebLogic Server is up and running.

3.3.3.4 About Accessing Oracle SOA Suite Composite Applications via the Load Balancer

In the default configuration, the hardware load balancer routes all requests to the Web tier, which then routes the requests to the appropriate resource in the application tier.

However, you can configure the hardware load balancer to route directly to Managed Servers on the application tier. This configuration has some benefits, especially in an Oracle SOA Suite enterprise deployment:

- Configuration and processing overhead is lower than when using Oracle HTTP Server.

- It enables monitoring at the application level, because the load balancer can be configured to monitor specific URLs in each WLS server (something that is not possible with Oracle HTTP Server).

If Oracle HTTP server directs an HTTP request for a composite to a Oracle SOA Suite Managed Server and the `soa-infra` application is not yet active, then the request will fail. Therefore, you should always verify that the `soa-infra` application is active after you start, restart, or migrate a server.

There is at least one disadvantage to this approach. If requests are routed directly from the load balancer to the Managed Servers, then each request will cross two firewalls without any proxy or interception. This might a security issue, depending on the network security policies in your organization.

3.3.4 Summary of the Managed Servers and Clusters on SOA Application Tier

The Application tier hosts the Administration Server and Managed Servers in the Oracle WebLogic Server domain.

Depending upon the topology you select, the Oracle WebLogic Server domain for the Oracle SOA Suite domain consists of the clusters shown in Table 3-1. These clusters function as active-active high availability configurations.

Table 3-1 Summary of the Clusters in the Oracle SOA Suite Enterprise Deployment Topology

Cluster	Managed Servers
Oracle SOA Suite, Oracle Business Process Management, and Oracle B2B Cluster	WLS_SOA1, WLS_SOA2
Oracle Web Services Manager Cluster	WLS_WSM1, WLS_WSM2
Oracle Service Bus Cluster	WLS_OSB1, WLS_OSB2
Oracle Enterprise Scheduler	WLS_ESS1, WLS_ESS2
Oracle Business Activity Monitoring Cluster	WLS_BAM1, WLS_BAM2

There are some clusters that run in their own domains, such as MFT and HealthCare Integration. The clusters for these components are shown in Table 3-2

Table 3-2 Summary of the Clusters in the Oracle SOA Suite Enterprise Deployment Topology with Their Own Domains

Cluster	Managed Servers
Oracle Managed File Transfer	WLS_MFT1, WLS_MFT2
Oracle SOA Suite for Healthcare Integration	WLS_SOA1, WLS_SOA2

3.4 Flow Charts and Road Maps for Implementing the Primary Oracle SOA Suite Enterprise Topologies

Instructions in the form of flow charts and road maps help you to install and configure the enterprise deployment topology with ease.

The following sections summarize the high-level steps you must perform to install and configure the enterprise topology that is described in this chapter.

3.4.1 Flow Chart of the Steps to Install and Configure the Primary Oracle SOA Suite Enterprise Topologies

Figure 3-3 shows a flow chart of the steps required to install and configure the primary enterprise deployment topologies described in this chapter. The sections following the flow chart explain each step in the flow chart.

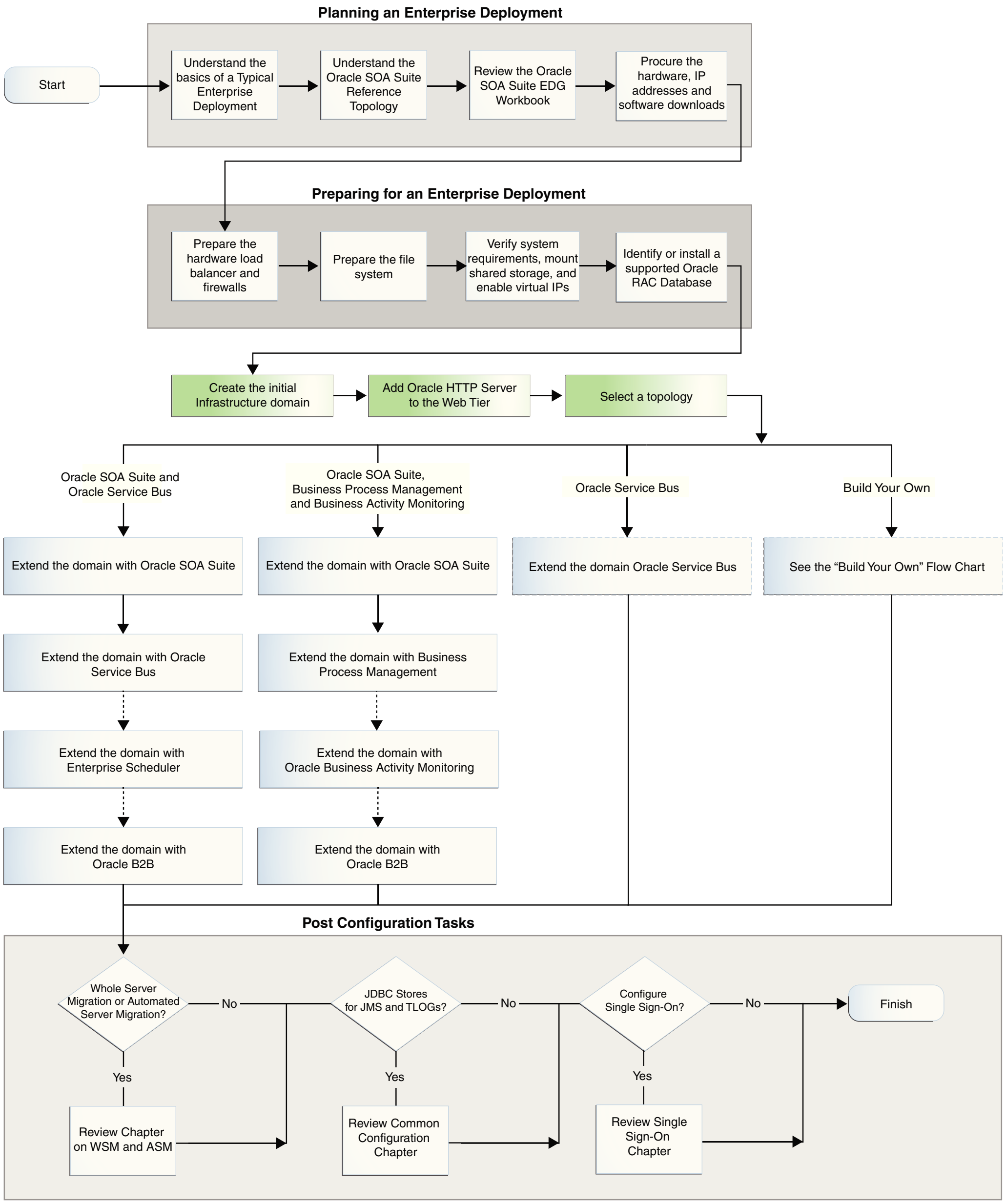
This guide is designed so you can start with a working Oracle SOA Suite domain and then later extend the domain to add additional capabilities.

This modular approach to building the topology allows you to make strategic decisions, based on your hardware and software resources, as well as the Oracle SOA Suite features that are most important to your organization.

It also allows you to validate and troubleshoot each individual product or component as they are configured.

This does not imply that configuring multiple products in one Configuration Wizard session is not supported; it is possible to group various extensions like the ones presented in this guide in one Configuration Wizard execution. However, the instructions in this guide focus primarily on the modular approach to building an enterprise deployment.

Figure 3-3 Flow Chart of the Enterprise Topology Configuration Steps


Planning an Enterprise Deployment
Start
Understand the basics of a Typical Enterprise Deployment
Understand the Oracle SOA Suite Reference Topology
Review the Oracle SOA Suite EDG Workbook
Procure the hardware, IP addresses and software downloads
Preparing for an Enterprise Deployment
Prepare the hardware load balancer and firewalls
Prepare the file system
Verify system requirements, mount shared storage, and enable virtual IPs
Identify or install a supported Oracle RAC Database
Create the initial Infrastructure domain
Add Oracle HTTP Server to the Web Tier
Select a topology
Oracle SOA Suite and Oracle Service Bus
Oracle SOA Suite, Business Process Management and Business Activity Monitoring
Oracle Service Bus
Build Your Own
Extend the domain with Oracle SOA Suite
Extend the domain with Oracle SOA Suite
Extend the domain Oracle Service Bus
See the "Build Your Own" Flow Chart
Extend the domain with Oracle Service Bus
Extend the domain with Business Process Management
Extend the domain with Enterprise Scheduler
Extend the domain with Oracle Business Activity Monitoring
Extend the domain with Oracle B2B
Extend the domain with Oracle B2B
Post Configuration Tasks
Whole Server Migration or Automated Server Migration?
No
Yes
Review Chapter on WSM and ASM
JDBC Stores for JMS and TLOGs?
No
Yes
Review Common Configuration Chapter
Configure Single Sign-On?
No
Yes
Review Single Sign-On Chapter
Finish

3.4.2 Roadmap Table for Planning and Preparing for an Enterprise Deployment

The following table describes each of the planning and preparing steps shown in the enterprise topology flow chart.

Flow Chart Step	More Information
Understand the basics of a Typical Enterprise Deployment	Understanding a Typical Enterprise Deployment

Flow Chart Step	More Information
Understand the specific reference topology for the products you plan to deploy.	Review the product-specific topologies and the description of the topologies, including the virtual servers required and the summary of clusters and Managed Servers recommended for the product-specific deployment.
Review the Oracle SOA Suite EDG Workbook	Using the Enterprise Deployment Workbook
Procure the hardware, IP addresses and software downloads	Procuring Resources for an Enterprise Deployment
Prepare the hardware load balancer and firewalls	Preparing the Load Balancer and Firewalls for an Enterprise Deployment
Prepare the file system	Preparing the File System for an Enterprise Deployment
Verify system requirements, mount shared storage, and enable virtual IPs	Preparing the Host Computers for an Enterprise Deployment
Identify or install a supported Oracle RAC Database	Preparing the Database for an Enterprise Deployment

3.4.3 Roadmap Table for Configuring the Oracle SOA Suite and Oracle Service Bus Enterprise Topology

Table 3-3 describes each of the configuration steps required when configuring the Oracle SOA Suite and Oracle Service Bus topology shown in Figure 3-1.

These steps correspond to the Oracle SOA Suite and Oracle Service Bus Topology steps shown in the flow chart in Figure 3-3.

Note:

You can configure Oracle Service Bus in the same domain as Oracle SOA Suite or in its own domain. For more information, see About the Topology Options for Oracle Service Bus.

Table 3-3 Roadmap Table for Configuring the Oracle SOA Suite and Oracle Service Bus Enterprise Topology

Flow Chart Step	More Information
Create the initial Infrastructure domain	Creating the Initial Infrastructure Domain for an Enterprise Deployment
Extend the domain to Include the Web Tier	Configuring the Web Tier for an Enterprise Deployment
Extend the domain with Oracle SOA Suite	Extending the Domain with Oracle SOA Suite
Extend the Domain with Oracle Service Bus	Extending the Domain with Oracle Service Bus
Extend the domain with Enterprise Scheduler	Extending the Domain with Oracle Enterprise Scheduler Note that extending the domain with Enterprise Scheduler is optional; perform the procedure in this chapter only if you want to configure Enterprise Scheduler.
Extend the domain with Oracle B2B	Extending the Domain with Oracle B2B Note that extending the domain with Oracle B2B is optional; perform the procedures in this chapter only if you want to configure Oracle B2B.
Create a domain for Oracle Managed File Transfer	Configuring Oracle Managed File Transfer in an Enterprise Deployment

3.4.4 Roadmap Table for Configuring the Oracle SOA Suite and Oracle Business Activity Monitoring Enterprise Topology

Table 3-4 describes each of the configuration steps required to configure the Oracle SOA Suite and Oracle Business Activity Monitoring topology shown in Figure 3-2.

These steps correspond to the configuration steps shown for the Oracle SOA Suite Oracle Business Activity Monitoring topology in the flow chart in Figure 3-3.

Table 3-4 Roadmap Table for Configuring the Oracle SOA Suite and Oracle Business Activity Monitoring Enterprise Topology

Flow Chart Step	More Information
Create the initial Infrastructure domain	Creating the Initial Infrastructure Domain for an Enterprise Deployment
Extend the domain to Include the Web Tier	Configuring the Web Tier for an Enterprise Deployment
Extend the domain with Oracle SOA Suite	Extending the Domain with Oracle SOA Suite
Extend the domain with Business Process Management	Extending the Domain with Business Process Management
Extend the domain with Oracle Business Activity Monitoring	Extending the Domain with Business Activity Monitoring

Table 3-4 (Cont.) Roadmap Table for Configuring the Oracle SOA Suite and Oracle Business Activity Monitoring Enterprise Topology

Flow Chart Step	More Information
Extend the domain with Oracle B2B	Extending the Domain with Oracle B2B
Extend the domain with Oracle Healthcare	Extending the Domain with Oracle SOA Suite for Healthcare Integration

3.5 Building Your Own Oracle SOA Suite Enterprise Topology

You can implement alternative topologies depending on the requirements of your organization, by using some variations of the instructions provided in this guide.

This document provides step-by-step instructions for configuring the two primary enterprise topologies for Oracle SOA Suite, which are described in Diagrams of the Primary Oracle SOA Suite Enterprise Topologies.

However, Oracle recognizes that the requirements of your organization may vary, depending on the specific set of Oracle Fusion Middleware products that you purchase and the specific types of applications you deploy.

In many cases, you can install and configure an alternative topology — one that includes additional components, or one that does not include all the Oracle SOA Suite products shown in the primary topology diagrams.

Note:

All managed servers of a component type in the domain must belong to that cluster. For example, Oracle Service Bus domains support only a single Service Bus cluster inside each domain.

Flow Chart of the "Build Your Own" Enterprise Topologies

Description of the Supported "Build Your Own" Topologies

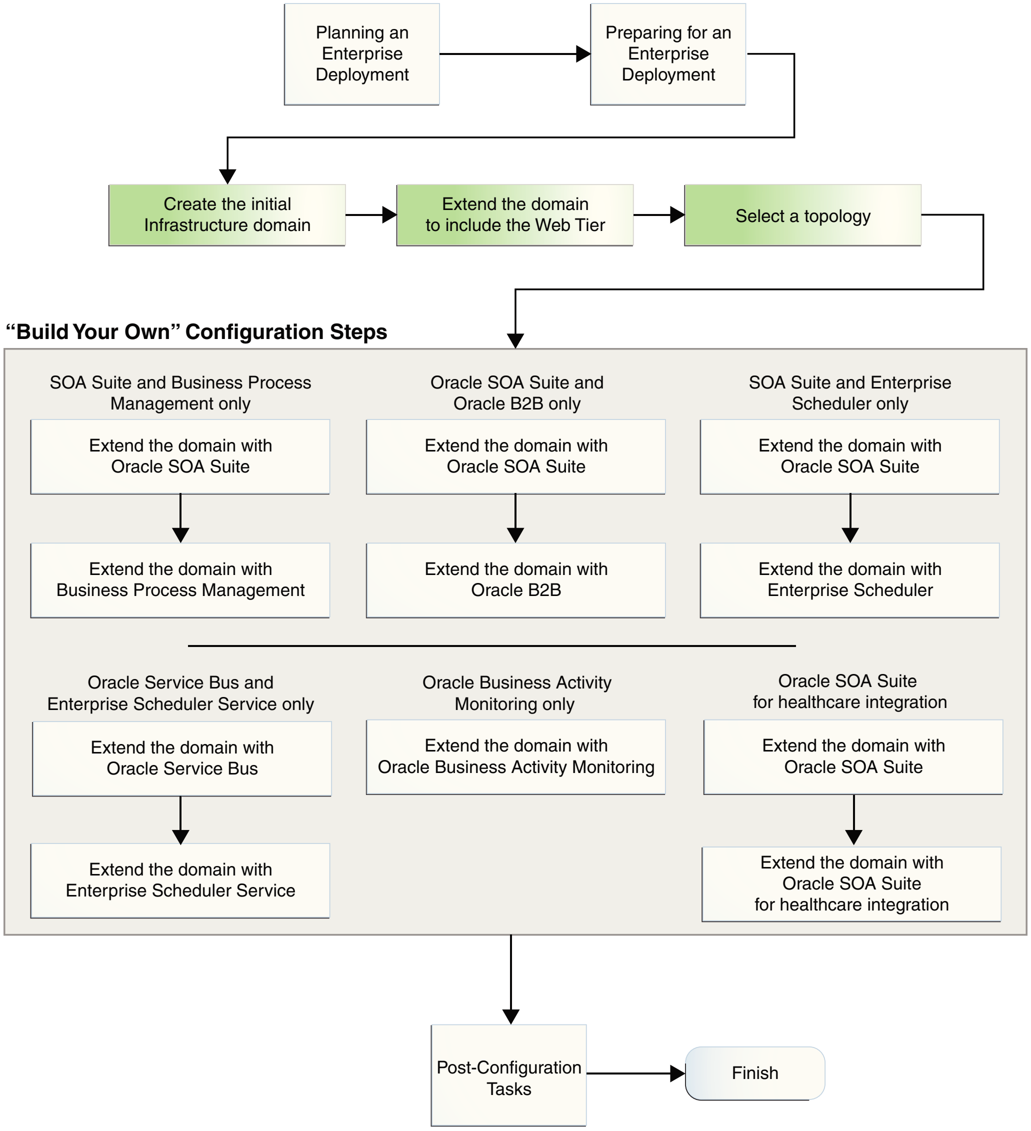
3.5.1 Flow Chart of the "Build Your Own" Enterprise Topologies

Building your own enterprise topology involves picking and choosing which Oracle Fusion Middleware products and which configuration steps you want to use to build your topology.

Figure 3-4 shows the high-level configuration steps required to build some typical alternative Oracle SOA Suite enterprise topologies. Each of the configuration steps corresponds to a chapter in this guide.

Note that modifications of the steps in this guide are necessary in order to implement the "Build Your Own" topologies. Refer to Description of the Supported "Build Your Own" Topologies for more information.

Figure 3-4 Flow Chart of the Oracle SOA Suite Build-Your-Own Topologies


Planning an Enterprise Deployment
Preparing for an Enterprise Deployment
Create the initial Infrastructure domain
Extend the domain to include the Web Tier
Select a topology
"Build Your Own" Configuration Steps
SOA Suite and Business Process Management only
Extend the domain with Oracle SOA Suite
Extend the domain with Business Process Management
Oracle SOA Suite and Oracle B2B only
Extend the domain with Oracle SOA Suite
Extend the domain with Oracle B2B
SOA Suite and Enterprise Scheduler only
Extend the domain with Oracle SOA Suite
Extend the domain with Enterprise Scheduler
Oracle Service Bus and Enterprise Scheduler Service only
Extend the domain with Oracle Service Bus
Extend the domain with Enterprise Scheduler Service
Oracle Business Activity Monitoring only
Extend the domain with Oracle Business Activity Monitoring
Oracle SOA Suite for healthcare integration
Extend the domain with Oracle SOA Suite
Extend the domain with Oracle SOA Suite for healthcare integration
Post-Configuration Tasks
Finish

3.5.2 Description of the Supported "Build Your Own" Topologies

Table 3-5 describes the configuration steps to follow if you want to use the instructions in this guide to build the enterprise topologies listed in Figure 3-4.

It also identifies some differences you will need to consider when you use the existing instructions in this guide to build each topology.

Table 3-5 Roadmap Table for Building Your Own Enterprise Topology

Topology	After configuring the Web Tier, refer to the following chapters...	Considerations and Dependencies
SOA Suite and Business Process Management only	1. Extending the Domain with Oracle SOA Suite 2. Extending the Domain with Business Process Management	These instructions assume you will run the Oracle SOA Suite and Business Process Management installer twice--once to install Oracle SOA Suite and once to install Oracle Business Process Management. Alternatively, you can install both Oracle SOA Suite and Oracle Business Process Management at the same time by selecting the **BPM** install type during the installation. Similarly, you can configure this topology by running the Configuration Wizard only once by selecting both the SOA and Oracle Business Process Management templates during the Configuration Wizard session.
Oracle SOA Suite and Oracle B2B only	1. Extending the Domain with Oracle SOA Suite 2. Extending the Domain with Oracle B2B	No special instructions required.
SOA Suite and Enterprise Scheduler only	1. Extending the Domain with Oracle SOA Suite 2. Extending the Domain with Oracle Enterprise Scheduler	No special instructions required.
Oracle Service Bus and Enterprise Scheduler only	See 1. Extending the Domain with Oracle Service Bus 2. Extending the Domain with Oracle Enterprise Scheduler	This topology does not require Oracle SOA Suite. However, the instructions in Extending the Domain with Oracle Service Bus assume you have already created a cluster of two SOA Managed Servers. As a result, when you create this topology, ignore any references to the SOA Managed Servers or the SOA Cluster. In addition, you must run the Repository Creation Utility (RCU) to create the SOAINFRA schema, which is also required by Oracle Service Bus.

Table 3-5 (Cont.) Roadmap Table for Building Your Own Enterprise Topology

Topology	After configuring the Web Tier, refer to the following chapters...	Considerations and Dependencies
Oracle Business Activity Monitoring only	Extending the Domain with Business Activity Monitoring	The instructions in Extending the Domain with Business Activity Monitoring assume you are extending an existing Oracle SOA Suite domain and that the Oracle SOA Suite software (which includes Oracle BAM) has already been installed in an Oracle home on shared storage. For this Oracle BAM-only topology, you will need to install Oracle SOA Suite into the Oracle Fusion Middleware Infrastructure Oracle home before you can configure the domain to include an Oracle BAM cluster. In addition, you must run the Repository Creation Utility (RCU) to create the required SOA schemas.
Oracle SOA Suite for healthcare integration	1. Extending the Domain with Oracle SOA Suite 2. Extending the Domain with Oracle SOA Suite for Healthcare Integration	No special instructions required.
Oracle SOA Suite for MFT Integration	1. Extending the Domain with Oracle SOA Suite 2. Configuring Oracle Managed File Transfer in an Enterprise Deployment	Oracle Managed File Transfer requires Oracle Traffic Director as the Web server in the Web tier.

3.6 About Installing and Configuring a Custom Enterprise Topology

If you choose to implement a topology that is not described in this guide, be sure to review the certification information, system requirements, and interoperability requirements for the products you want to include in the topology.

After you verify that the topology is supported, then you can either use the instructions in this guide as a guide to installing and configuring the components you need, or you can install and configure a standard installation topology using the Oracle Fusion Middleware 12*c* installation guides and use the "Start Small and Scale Out" approach to configuring your environment.

For more information, see Planning for a Production Environment in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

3.7 About Using Automatic Service Migration for the Oracle SOA Suite Enterprise Topology

To ensure high availability of the Oracle SOA Suite products and components, this guide recommends that you enable Oracle WebLogic Server Automatic Service Migration for the clusters that you create as part of the reference topology.

For more information, see Using Whole Server Migration and Service Migration in an Enterprise Deployment.

Part II

Preparing for an Enterprise Deployment

It is important to understand the tasks that need to be performed to prepare for an enterprise deployment.

This part of the enterprise deployment guide contains the following topics.

4

Using the Enterprise Deployment Workbook

The Enterprise Deployment Workbook enables you to plan an enterprise deployment for your organization.

This chapter provides an introduction to the Enterprise Deployment workbook, use cases and information on who should use the Enterprise Deployment workbook.

4.1 Introduction to the Enterprise Deployment Workbook

The Enterprise Deployment Workbook is a spreadsheet that is used by architects, system engineers, database administrators, and others to plan and record all the details for an environment installation (such as server names, URLs, port numbers, installation paths, and other resources).

The Enterprise Deployment Workbook serves as a single document you can use to track input variables for the entire process, allowing for:

- Separation of tasks between architects, system engineers, database administrators, and other key organizational roles
- Comprehensive planning before the implementation
- Validation of planned decisions before actual implementation
- Consistency during implementation
- A record of the environment for future use

4.2 Typical Use Case for Using the Workbook

It is important to understand the roles and tasks involved in a typical use case of the enterprise deployment workbook.

A typical use case for the Enterprise Deployment Workbook involves the following roles and tasks, in preparation for an Oracle Fusion Middleware enterprise deployment:

- Architects read through the first five chapters of this guide, and fill in the corresponding sections of the Workbook.
- The Workbook is validated by other architects and system engineers.
- The architect uses the validated workbook to initiate network and system change requests with system engineering departments.
- The Administrators and System Integrators who are installing and configuring the software refer to the workbook and the subsequent chapters of this guide to perform the installation and configuration tasks.

4.3 Using the Oracle SOA Suite Enterprise Deployment Workbook

Locating and understanding the Oracle SOA Suite Enterprise Deployment Workbook enables you to use it efficiently.

The following sections provide an introduction to the location and contents of the Oracle SOA Suite Enterprise Deployment Workbook:

Locating the Oracle SOA Suite Enterprise Deployment Workbook

Understanding the Contents of the Oracle SOA Suite Enterprise Deployment Workbook

4.3.1 Locating the Oracle SOA Suite Enterprise Deployment Workbook

The Oracle SOA Suite Enterprise Deployment Workbook is available as a Microsoft Excel Spreadsheet in the Oracle Fusion Middleware documentation library. It is available as a link on the Install, Patch, and Upgrade page of the library.

4.3.2 Understanding the Contents of the Oracle SOA Suite Enterprise Deployment Workbook

The following sections describe the contents of the Oracle SOA Suite Enterprise Deployment Workbook. The workbook is divided into tabs, each containing a set of related variables and values you will need to install and configure the Enterprise Deployment topologies.

Using the Start Tab

Using the Hardware - Host Computers Tab

Using the Network - Virtual Hosts & Ports Tab

Using the Storage - Directory Variables Tab

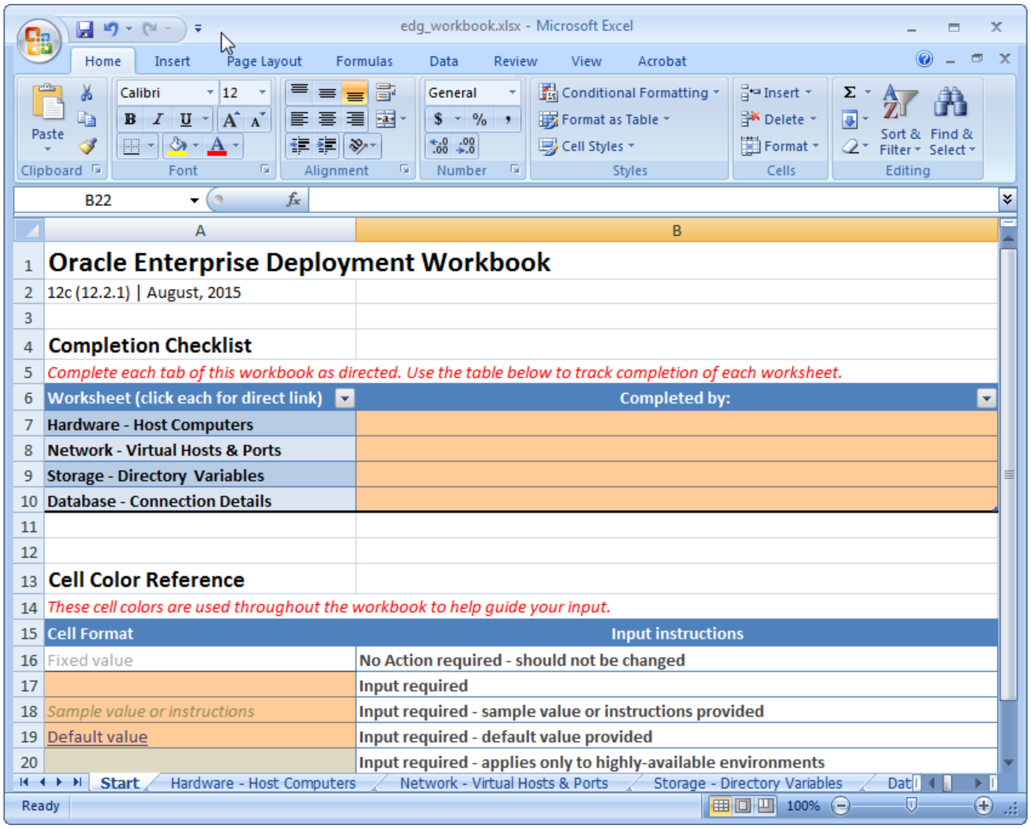
Using the Database - Connection Details Tab

4.3.2.1 Using the Start Tab

The Start tab of the Enterprise Deployment Workbook serves as a table of contents for the rest of the workbook. You can also use it to identify the people who will be completing the spreadsheet.

The Start tab also provides a key to identify the colors used to identify workbook fields that need values, as well as those that are provided for informational purposes.

The following image shows the Start tab of the spreadsheet.



	A	B
1	Oracle Enterprise Deployment Workbook	
2	12c (12.2.1) | August, 2015	
3		
4	Completion Checklist	
5	*Complete each tab of this workbook as directed. Use the table below to track completion of each worksheet.*	
6	Worksheet (click each for direct link)	Completed by:
7	Hardware - Host Computers	
8	Network - Virtual Hosts & Ports	
9	Storage - Directory Variables	
10	Database - Connection Details	
11		
12		
13	Cell Color Reference	
14	*These cell colors are used throughout the workbook to help guide your input.*	
15	Cell Format	Input instructions
16	Fixed value	No Action required - should not be changed
17		Input required
18	*Sample value or instructions*	Input required - sample value or instructions provided
19	Default value	Input required - default value provided
20		Input required - applies only to highly-available environments

4.3.2.2 Using the Hardware - Host Computers Tab

The Hardware - Host Computers tab lists the host computers required to install and configure the Oracle SOA Suite Enterprise Deployment Topology.

The reference topologies typically require a minimum of six host computers: two for the Web tier, two for the application tier, and two for the Oracle RAC database on the data tier. If you decide to expand the environment to include more systems, add a row for each additional host computer.

The **Abstract Host Name** is the name used throughout this guide to reference the host. For each row, procure a host computer, and enter the **Actual Host Name**. You can then use the actual host name when any of the abstract names is referenced in this guide.

For example, if a procedure in this guide references SOAHOST1, you can then replace the SOAHOST1variable with the actual name provided on the Hardware - Host Computers tab of the workbook.

Note:

If two domains share the same node, for example, if you set up the Oracle SOA suite, and then create MFT with its own domain, you will have two domains on the same node. In this case, you will use SOAHOST1 and MFTHOST1 at the same time, one for each domain.

For easy reference, Oracle also recommends that you include the IP address, Operating System (including the version), number of CPUs, and the amount of RAM for each host. This information can be useful during the installation, configuration, and maintenance of the enterprise deployment.

For more information, see Preparing the Host Computers for an Enterprise Deployment.

4.3.2.3 Using the Network - Virtual Hosts & Ports Tab

The Network - Virtual Hosts & Ports tab lists the virtual hosts that must be defined by your network administrator before you can install and configure the enterprise deployment topology.

The port numbers are important for several reasons. You must have quick reference to the port numbers so you can access the management consoles; the firewalls must also be configured to allow network traffic via specific ports.

Each virtual host, virtual IP address, and each network port serves a distinct purpose in the deployment. For more information, see Preparing the Load Balancer and Firewalls for an Enterprise Deployment.

In the Network - Virtual Hosts table, review the items in the **Abstract Virtual Host or Virtual IP Name** column. These are the virtual host and virtual IP names used in the procedures in this guide. For each abstract name, enter the actual virtual host name defined by your network administrator. Whenever this guide references one of the abstract virtual host or virtual IP names, replace that value with the actual corresponding value in this table.

Similarly, in many cases, this guide assumes you are using default port numbers for the components or products you install and configure. However, in reality, you will likely have to use different port numbers. Use the Network - Port Numbers table to map the default port values to the actual values used in your specific installation.

4.3.2.4 Using the Storage - Directory Variables Tab

As part of preparing for an enterprise deployment, it is assumed you will be using a standard directory structure, which is recommended for Oracle enterprise deployments.

In addition, procedures in this book reference specific directory locations. Within the procedures, each directory is assigned a consistent variable, which you should replace with the actual location of the directory in your installation.

For each of the directory locations listed on this tab, provide the actual directory path in your installation.

In addition, for the application tier, it is recommended that many of these standard directories be created on a shared storage device. For those directories, the table also provides fields so you can enter the name of the shared storage location and the mount point used when you mounted the shared location.

For more information, see Preparing the File System for an Enterprise Deployment.

4.3.2.5 Using the Database - Connection Details Tab

When you are installing and configuring the enterprise deployment topology, you will often have to make connections to a highly available Oracle Real Application Clusters (RAC) database. In this guide, the procedures reference a set of variables that identify the information you will need to provide to connect to the database from tools, such as the Configuration Wizard and the Repository Creation Utility.

To be sure you have these values handy, use this tab to enter the actual values for these variables in your database installation.

For more information, see Preparing the Database for an Enterprise Deployment.

4.4 Who Should Use the Enterprise Deployment Workbook?

The details of the Enterprise Deployment Workbook are filled in by the individual or team responsible for planning, procuring, or setting up each category of resources.

The information in the Enterprise Deployment Workbook is divided into categories. Depending on the structure of your organization and roles defined for your team, you can assign specific individuals in your organization to fill in the details of the workbook. Similarly, the information in each category can be assigned to the individual or team responsible for planning, procuring, or setting up each category of resources.

For example, the workbook can be filled in, reviewed, and used by people in your organization that fill the following roles:

- Information Technology (IT) Director
- Architect
- System Administrator
- Network Engineer
- Database Administrator

5

Procuring Resources for an Enterprise Deployment

It is essential to procure the required hardware, software, and network settings before configuring the Oracle SOA Suite reference topology.

This chapter provides information on reserving the required IP addresses and identifying and obtaining software downloads for an enterprise deployment.

5.1 Hardware and Software Requirements for the Enterprise Deployment Topology

It is important to understand the hardware load balancer requirements, host computer hardware requirements, and operating system requirements for the enterprise deployment topology.

This section includes the following sections.

5.1.1 Hardware Load Balancer Requirements

This section lists the desired features of the external load balancer.

This enterprise topology uses an external load balancer. This external load balancer should have the following features:

- Ability to load-balance traffic to a pool of real servers through a virtual host name: Clients access services using the virtual host name (instead of using actual host names). The load balancer can then load balance requests to the servers in the pool.
- Port translation configuration should be possible so that incoming requests on the virtual host name and port are directed to a different port on the backend servers.
- Monitoring of ports on the servers in the pool to determine availability of a service.
- Virtual servers and port configuration: Ability to configure virtual server names and ports on your external load balancer, and the virtual server names and ports must meet the following requirements:
  - The load balancer should allow configuration of multiple virtual servers. For each virtual server, the load balancer should allow configuration of traffic management on more than one port. For example, for Oracle HTTP Server in the web tier, the load balancer needs to be configured with a virtual server and ports for HTTP and HTTPS traffic.
  - The virtual server names must be associated with IP addresses and be part of your DNS. Clients must be able to access the external load balancer through the virtual server names.
- Ability to detect node failures and immediately stop routing traffic to the failed node.
- Fault-tolerant mode: It is highly recommended that you configure the load balancer to be in fault-tolerant mode.
- It is highly recommended that you configure the load balancer virtual server to return immediately to the calling client when the backend services to which it forwards traffic are unavailable. This is preferred over the client disconnecting on its own after a timeout based on the TCP/IP settings on the client machine.
- Sticky routing capability: Ability to maintain sticky connections to components. Examples of this include cookie-based persistence, IP-based persistence, and so on.
- The load balancer should be able to terminate SSL requests at the load balancer and forward traffic to the backend real servers using the equivalent non-SSL protocol (for example, HTTPS to HTTP).
- SSL acceleration (this feature is recommended, but not required for the enterprise topology).
- The ability to route TCP/IP requests; this is a requirement for Oracle SOA Suite for healthcare integration, which uses the Minimum Lower Layer Protocol (MLLP) over TCP.

5.1.2 Host Computer Hardware Requirements

This section provides information to help you procure host computers that are configured to support the enterprise deployment topologies.

It includes the following topics.

General Considerations for Enterprise Deployment Host Computers
: This section specifies the general considerations required for the enterprise deployment host computers.

Reviewing the Oracle Fusion Middleware System Requirements
: This section provides reference to the system requirements information to help you ensure that the environment meets the necessary minimum requirements.

Typical Memory, File Descriptors, and Processes Required for an Enterprise Deployment
: This section specifies the typical memory, number of file descriptors, and operating system processes and tasks details required for an enterprise deployment.

Typical Disk Space Requirements for an Enterprise Deployment
: This section specifies the disk space typically required for this enterprise deployment.

5.1.2.1 General Considerations for Enterprise Deployment Host Computers

This section specifies the general considerations required for the enterprise deployment host computers.

Before you start the process of configuring an Oracle Fusion Middleware enterprise deployment, you must perform the appropriate capacity planning to determine the number of nodes, CPUs, and memory requirements for each node depending on the specific system's load as well as the throughput and response requirements. These requirements will vary for each application or custom Oracle SOA Suite system being used.

The information in this chapter provides general guidelines and information that will help you determine the host computer requirements. It does not replace the need to perform capacity planning for your specific production environment.

Note:

As you obtain and reserve the host computers in this section, note the host names and system characteristics in the Enterprise Deployment Workbook. You will use these addresses later when you enable the IP addresses on each host computer.

For more information, see Using the Enterprise Deployment Workbook

5.1.2.2 Reviewing the Oracle Fusion Middleware System Requirements

This section provides reference to the system requirements information to help you ensure that the environment meets the necessary minimum requirements.

Review the *Oracle Fusion Middleware System Requirements and Specifications* to ensure that your environment meets the minimum installation requirements for the products you are installing.

The Requirements and Specifications document contains information about general Oracle Fusion Middleware hardware and software requirements, minimum disk space and memory requirements, database schema requirements, and required operating system libraries and packages.

It also provides some general guidelines for estimating the memory requirements for your Oracle Fusion Middleware deployment.

5.1.2.3 Typical Memory, File Descriptors, and Processes Required for an Enterprise Deployment

This section specifies the typical memory, number of file descriptors, and operating system processes and tasks details required for an enterprise deployment.

The following table summarizes the memory, file descriptors, and processes required for the Administration Server and each of the Managed Servers computers in a typical Oracle SOA Suite enterprise deployment. These values are provided as an example only, but they can be used to estimate the minimum amount of memory required for an initial enterprise deployment.

The example in this topic reflects the minimum requirements for configuring the Managed Servers and other services required on SOAHOST1, as depicted in the reference topologies.

When you are procuring machines, use the information in the **Approximate Top Memory** column as a guide when determining the minimum physical memory each host computer should have available.

After you procure the host computer hardware and verify the operating system requirements, review the software configuration to be sure the operating system settings are configured to accommodate the number of open files listed in the **File Descriptors** column and the number processes listed in the **Operating System Processes and Tasks** column.

For more information, see Setting the Open File Limit and Number of Processes Settings on UNIX Systems.

Managed Server, Utility, or Service	Approximate Top Memory	Number of File Descriptors	Operating System Processes and Tasks
Administration Server	3.5 GB	3500	165
WLS_WSM	3.0 GB	2000	130
WLS_SOA	4.0 GB	3100	240
WLS_OSB	4.0 GB	2200	180
WLS_ESS	3.5 GB	1300	35
WLS_BAM	3.5 GB	2300	210
WLST (connection to the Node Manager)	1.5 GB	910	20
Configuration Wizard	1.5 GB	700	20
Node Manager	1.0 GB	720	15
TOTAL	27.0 GB*	17000	1200

* Approximate total, with consideration for Operating System and other additional memory requirements.

5.1.2.4 Typical Disk Space Requirements for an Enterprise Deployment

This section specifies the disk space typically required for this enterprise deployment.

For the latest disk space requirements for the Oracle Fusion Middleware 12*c* (12.2.1.2) products, including the Oracle SOA Suite products, review the *Oracle Fusion Middleware System Requirements and Specifications*.

In addition, the following table summarizes the disk space typically required for an Oracle SOA Suite enterprise deployment.

Use the this information and the information in Preparing the File System for an Enterprise Deployment to determine the disk space requirements required for your deployment.

Server	Disk
Database	nXm n = number of disks, at least 4 (striped as one disk) m = size of the disk (minimum of 30 GB)
WEBHOST*n*	10 GB
SOAHOST*n* (SOA only)	10 GB*
SOAHOST*n* (SOA and OSB)	11 GB*

* For a shared storage Oracle home configuration, two installations suffice by making a total of 20 GB.

5.1.3 Operating System Requirements for the Enterprise Deployment Topology

This section provides details about the operating system requirements.

The Oracle Fusion Middleware software products and components described in this guide are certified on various operating systems and platforms, which are listed in *Oracle Fusion Middleware System Requirements and Specifications*.

Note:

This guide focuses on the implementation of the enterprise deployment reference topology on Oracle Linux systems.

The topology can be implemented on any certified, supported operating system, but the examples in this guide typically show the commands and configuration steps as they should be performed using the bash shell on Oracle Linux.

5.1.4 Shared Storage Requirements

Oracle provides a few recommendations for using shared storage in an enterprise deployment topology (binary directories, domain configuration files, deployments plans, and so on). The use of shared storage is needed if you want to provide failover to Administration Server, configure some adapters in HA, or use JMS and TLOGs in file-persistent stores.

- Oracle recommends that you use a shared storage device that is network-attached storage (NAS) or storage area network (SAN). The following example command is based on a NAS device. However, your options may differ from those in this example. See UNIX/Linux documentation for more on the mount command and its options.

  ```
  mount nasfiler:/vol/vol1/u01/oracle /u01/oracle -t nfs -o
  rw,bg,hard,nointr,tcp,vers=3,timeo=300,rsize=32768,wsize=327
  68
  ```

- For maximum availability, Oracle recommends a *highly available* NAS or SAN device for shared storage. Shared storage devices that are not highly available can be a single point of failure. Check with your storage provider for options to achieve maximum availability.

5.2 Reserving the Required IP Addresses for an Enterprise Deployment

You have to obtain and reserve a set of IP addresses before installing and configuring the enterprise topology. The set of IP addresses that need to be reserved are listed in this section.

Before you begin installing and configuring the enterprise topology, you must obtain and reserve a set of IP addresses:

- Physical IP (IP) addresses for each of the host computers you have procured for the topology
- A virtual IP (VIP) address for the Administration Server
- Additional VIP addresses for each Managed Server that is configured for Whole Server Migration

  For Fusion Middleware 12*c* products, such as Oracle SOA Suite, that support Automatic Service Migration, VIPs for the Managed Servers are typically not necessary.

- A unique virtual host name to be mapped to each VIP.

You can then work with your network administrator to be sure these required VIPs are defined in your DNS server. (Alternatively, for non-production environments, you can use the /etc/hosts file to define these virtual hosts).

For more information, see the following topics.

What Is a Virtual IP (VIP) Address?
This section defines the virtual IP address and specifies its purpose.

Why Use Virtual Host Names and Virtual IP Addresses?
For an enterprise deployment, in particular, it is important that a set of VIPs--and the virtual host names to which they are mapped--are reserved and enabled on the corporate network.

Physical and Virtual IP Addresses Required by the Enterprise Topology
This section describes the physical IP (IP) and virtual IP (VIP) addresses required for the Administration Server and each of the Managed Servers in a typical Oracle SOA Suite enterprise deployment topology.

5.2.1 What Is a Virtual IP (VIP) Address?

This section defines the virtual IP address and specifies its purpose.

A virtual IP address is an unused IP Address that belongs to the same subnet as the host's primary IP address. It is assigned to a host manually. If a host computer fails, the virtual address can be assigned to a new host in the topology. For the purposes of this guide, we reference *virtual* IP addresses, which can be re-assigned from one host to another, and *physical* IP addresses, which are assigned permanently to hardware host computer.

5.2.2 Why Use Virtual Host Names and Virtual IP Addresses?

For an enterprise deployment, in particular, it is important that a set of VIPs--and the virtual host names to which they are mapped--are reserved and enabled on the corporate network.

Alternatively, host names can be resolved through appropriate `/etc/hosts` file propagated through the different nodes.

In the event of the failure of the host computer where the IP address is assigned, the IP address can be assigned to another host in the same subnet, so that the new host can take responsibility for running the Managed Servers assigned to it.

The reassignment of virtual IP address for the Administration Server must be performed manually, but the reassignment of virtual IP addresses for Managed Servers can be performed automatically using the Whole Server Migration feature of Oracle WebLogic Server.

Whether you should use Whole Server Migration or not depends upon the products you are deploying and whether they support Automatic Service Migration.

For example, starting with Oracle SOA Suite 12*c*, the SOA Suite products support automatic service migration. As a result, it is no longer necessary to reserve VIPs for each of the Managed Servers in the domain. Instead, a VIP is required for the Administration Server only.

5.2.3 Physical and Virtual IP Addresses Required by the Enterprise Topology

This section describes the physical IP (IP) and virtual IP (VIP) addresses required for the Administration Server and each of the Managed Servers in a typical Oracle SOA Suite enterprise deployment topology.

Before you begin to install and configure the enterprise deployment, reserve a set of host names and IP addresses that correspond to the VIPs in Table 5-1.

You can assign any unique host name to the VIPs, but in this guide, we reference each VIP using the suggested host names in the table.

Note:

As you obtain and reserve the IP addresses and their corresponding virtual host names in this section, note the values of the IP addresses and host names in the Enterprise Deployment Workbook. You will use these addresses later when you enable the IP addresses on each host computer.

For more information, see Using the Enterprise Deployment Workbook .

Table 5-1 Summary of the Virtual IP Addresses Required for the Enterprise Deployment

Virtual IP	VIP Maps to...	Description
VIP1	ADMINVHN	ADMINVHN is the virtual host name used as the listen address for the Administration Server and fails over with manual failover of the Administration Server. It is enabled on the node where the Administration Server process is running.

5.3 Identifying and Obtaining Software Distributions for an Enterprise Deployment

Before you begin installing and configuring the enterprise topology, you must obtain the software distributions that you need to implement the topology.

The following table lists the distributions you need to obtain.

For general information about how to obtain Oracle Fusion Middleware software, see Obtaining Product Distributions in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

For more specific information about locating and downloading specific Oracle Fusion Middleware products, see the *Oracle Fusion Middleware Download, Installation, and Configuration Readme Files* on OTN.

Distribution	Description
Oracle Fusion Middleware 12*c* (12.2.1.2.0) Infrastructure	Download this distribution to install the Oracle Fusion Middleware Infrastructure, which includes Oracle WebLogic Server and Java Required Files software required for Oracle Fusion Middleware products. This distribution also installs the Repository Creation Utility (RCU), which in previous Oracle Fusion Middleware releases was packaged in its own distribution.
Oracle HTTP Server 12*c* (12.2.1.2.0)	Download this distribution to install Oracle HTTP Server on the Web tier hosts.
Oracle Fusion Middleware 12*c* (12.2.1.2.0) SOA Suite and Business Process Management	Download this distribution to install the SOA Foundation and BPM software, which includes Oracle Business Activity Monitoring (BAM) and Oracle Enterprise Scheduler (ESS).
Oracle Fusion Middleware 12*c* (12.2.1.2.0) Service Bus	Download this distribution if you plan to install and configure Oracle Service Bus as part of the Oracle SOA Suite enterprise topology.
Oracle Fusion Middleware 12*c* (12.2.1.2.0) B2B and Healthcare	Download this distribution if you plan to install and configure Oracle B2B or Oracle B2B Healthcare as part of the Oracle SOA Suite enterprise topology.

6 Preparing the Load Balancer and Firewalls for an Enterprise Deployment

It is important to understand how to configure the hardware load balancer and ports that must be opened on the firewalls for an enterprise deployment.

6.1 Configuring Virtual Hosts on the Hardware Load Balancer

The hardware load balancer configuration facilitates to recognize and route requests to several virtual servers and associated ports for different types of network traffic and monitoring.

The following topics explain how to configure the hardware load balancer, provide the summary of the virtual servers required, and provide additional instructions for these virtual servers:

6.1.1 Overview of the Hardware Load Balancer Configuration

As shown in the topology diagrams, you must configure the hardware load balancer to recognize and route requests to several virtual servers and associated ports for different types of network traffic and monitoring.

In the context of a load-balancing device, a virtual server is a construct that allows multiple physical servers to appear as one for load-balancing purposes. It is typically represented by an IP address and a service, and it is used to distribute incoming client requests to the servers in the server pool.

The virtual servers should be configured to direct traffic to the appropriate host computers and ports for the various services available in the enterprise deployment.

In addition, you should configure the load balancer to monitor the host computers and ports for availability so that the traffic to a particular server is stopped as soon as possible when a service is down. This ensures that incoming traffic on a given virtual host is not directed to an unavailable service in the other tiers.

Note that after you configure the load balancer, you can later configure the Web server instances in the Web tier to recognize a set of virtual hosts that use the same names as the virtual servers you defined for the load balancer. For each request coming from the hardware load balancer, the Web server can then route the request appropriately, based on the server name included in the header in the request. For more information, see Configuring Oracle HTTP Server for Administration and Oracle Web Services Manager.

6.1.2 Typical Procedure for Configuring the Hardware Load Balancer

The following procedure outlines the typical steps for configuring a hardware load balancer for an enterprise deployment.

Note that the actual procedures for configuring a specific load balancer will differ, depending on the specific type of load balancer. There may also be some differences depending on the type of protocol that is being load balanced. For example, TCP virtual servers and HTTP virtual servers use different types of monitors for their pools. Refer to the vendor-supplied documentation for actual steps.

1. Create a pool of servers. This pool contains a list of servers and the ports that are included in the load-balancing definition.

   For example, for load balancing between the Web hosts, create a pool of servers that would direct requests to hosts WEBHOST1 and WEBHOST2 on port 7777.

2. Create rules to determine whether or not a given host and service is available and assign it to the pool of servers described in Step 1.

3. Create the required virtual servers on the load balancer for the addresses and ports that receive requests for the applications.

   For a complete list of the virtual servers required for the enterprise deployment, see Summary of the Virtual Servers Required for an Enterprise Deployment.

   When you define each virtual server on the load balancer, consider the following:

   a. If your load balancer supports it, specify whether or not the virtual server is available internally, externally or both. Ensure that internal addresses are only resolvable from inside the network.

   b. Configure SSL Termination, if applicable, for the virtual server.

c. Assign the pool of servers created in Step 1 to the virtual server.

6.1.3 Summary of the Virtual Servers Required for an Enterprise Deployment

This topic provides the details of the virtual servers required for an enterprise deployment.

The following table provides a list of the virtual servers you must define on the hardware load balancer for the Oracle SOA Suite enterprise topology:

Virtual Host	Server Pool	Protocol	SSL Termination?	External?
`admin.example.com:80`	`WEBHOST1.example.com:7777` `WEBHOST2.example.com:7777`	HTTP	No	No
`soa.example.com:443`	`WEBHOST1.example.com:7777` `WEBHOST2.example.com:7777`	HTTPS	Yes	Yes
`soainternal.example.com:80`	`WEBHOST1.example.com:7777` `WEBHOST2.example.com:7777`	HTTP	No	No
`osb.example.com:443`	`WEBHOST1.example.com:7777` `WEBHOST2.example.com:7777`	HTTPS	No	Yes
`soahealthcare.example.com:95`*`nn`*	`WEBHOST1.example.com:7777WEBHOST2.example.com:7777`	TCP	No	Yes
`mft.example.com:7022`	`WEBHOST1.example.com:7022WEBHOST1.example.com:7022`	SFTP	No	Yes
`mft.example.com:443`	`WEBHOST1.example.com:7500WEBHOST1.example.com:7500`	HTTP	Yes	Yes
`mft.example.com:80`	`WEBHOST1.example.com:7500WEBHOST1.example.com:7500`	HTTP	No	Yes

Note:

If SOA Suite and Oracle Managed File Transfer are deployed on the same host, then Managed File Transfer can share the HTTP and HTTPS virtual servers that are used by SOA to access the Managed File Transfer console. However, a separate Managed File Transfer virtual server is required for TCP protocol 7 (used to load balance SFT requests).

6.1.4 Additional Instructions for admin.example.com

This section provides the additional instructions required for the virtual server—admin.example.com.

When you configure this virtual server on the hardware load balancer:

- Enable address and port translation.

- Enable reset of connections when services or hosts are down.

6.1.5 Additional Instructions for soa.example.com

When you configure this virtual server on the hardware load balancer:

- Use port 80 and port 443. Any request that goes to port 80 (non-SSL protocol) should be redirected to port 443 (SSL protocol).
- Specify ANY as the protocol (non-HTTP protocols are required for B2B).
- Enable address and port translation.
- Enable reset of connections when services and/or nodes are down.
- Create rules to filter out access to `/console` and `/em` on this virtual server.

  These context strings direct requests to the Oracle WebLogic Server Administration Console and to the Oracle Enterprise Manager Fusion Middleware Control and must be used only when accessing the system from `admin.example.com`.

Note:

Oracle recommends configuring LBR for cookie-based persistence because session persistence is required for some web applications of SOA, such as BPM Worklist (`/integration/worklistapp`), SOA Composer (`/soa/composer`), BPM Composer (`/bpm/composer`) and BPM Workspace (`/bpm/workspace`) and so on.

6.1.6 Additional Instructions for soainternal.example.com

When you configure this virtual server on the hardware load balancer:

- Enable address and port translation.
- Enable reset of connections when services or nodes are down.
- As with the soa.example.com, create rules to filter out access to `/console` and `/em` on this virtual server.

6.1.7 Additional Instructions for osb.example.com

When you configure this virtual server on the hardware load balancer:

- Use port 80 and port 443. Any request that goes to port 80 (non-ssl protocol) should be redirected to port 443 (ssl protocol).
- Specify ANY as the protocol (non-HTTP protocols are required for B2B).
- Enable address and port translation.
- Enable reset of connections when services and/or nodes are down.
- Create rules to filter out access to `/console` and `/em` on this virtual server.

  These context strings direct requests to the Oracle WebLogic Server Administration Console and to the Oracle Enterprise Manager Fusion

Middleware Control and should be used only when accessing the system from `admin.example.com`.

6.1.8 Additional Instructions for soahealthcare.example.com

Each Healthcare Minimum Lower Layer Protocol (MLLP) endpoint requires a separate virtual server in the load balancer. The load balancer routes to the MLLP service that will run in one of the Healthcare Managed Servers on a specific port. The pool for this virtual server points to the hostname and port that was used in the Healthcare Console for creating the endpoint.

For example, if an endpoint is created on SOAHOST1:9501 (with failover to SOAHOST2:9501), then you should create a virtual server, using 9501 as service port and with a pool containing SOAHOST1:9501 and SOAHOST2:9501. The Healthcare load balancer virtual servers should use TCP as protocol and use Address and Port translation preserving the sort port of the connection.

6.1.9 Additional Instructions for mft.example.com

Managed File Transfer requires a single Oracle Traffic Director virtual server for the Secure File Transfer Protocol (SFTP). For more information, see Configuring Oracle Managed File Transfer in an Enterprise Deployment.

In the Managed File Transfer scenario, the load balancer routes SFTP requests across two Oracle Traffic Director instances. The Oracle Traffic Direct instances routes the requests to the SFTP embedded servers, which are running on the Managed File Transfer Managed Servers. For consistency, the port used in the hardware load balancer, in Oracle File Transfer and in the SFTP servers, is 7022.

6.2 Configuring the Firewalls and Ports for an Enterprise Deployment

As an administrator, it is important that you become familiar with the port numbers used by various Oracle Fusion Middleware products and services. This ensures that the same port number is not used by two services on the same host, and that the proper ports are open on the firewalls in the enterprise topology.

The following tables lists the ports that you must open on the firewalls in the topology:

Note:

The TCP/IP port for B2B is a user-configured port and is not predefined. Similarly, the firewall ports depend on the definition of TCP/IP ports.

Firewall notation:

- FW0 refers to the outermost firewall.
- FW1 refers to the firewall between the web tier and the application tier.
- FW2 refers to the firewall between the application tier and the data tier.

Table 6-1 Firewall Ports Common to All Fusion Middleware Enterprise Deployments

Type	Firewall	Port and Port Range	Protocol / Application	Inbound / Outbound	Other Considerations and Timeout Guidelines
Browser request	FW0	80	HTTP / Load Balancer	Inbound	Timeout depends on the size and type of HTML content.
Browser request	FW0	443	HTTPS / Load Balancer	Inbound	Timeout depends on the size and type of HTML content.
Browser request	FW1	80	HTTP / Load Balancer	Outbound (for intranet clients)	Timeout depends on the size and type of HTML content.
Browser request	FW1	443	HTTPS / Load Balancer	Outbound (for intranet clients)	Timeout depends on the size and type of HTML content.
Callbacks and Outbound invocations	FW1	80	HTTP / Load Balancer	Outbound	Timeout depends on the size and type of HTML content.
Callbacks and Outbound invocations	FW1	443	HTTPS / Load Balancer	Outbound	Timeout depends on the size and type of HTML content.
Load balancer to Oracle HTTP Server	n/a	7777	HTTP	n/a	n/a
OHS registration with Administration Server	FW1	7001	HTTP/t3	Inbound	Set the timeout to a short period (5-10 seconds).
OHS management by Administration Server	FW1	OHS Admin Port (7779)	TCP and HTTP, respectively	Outbound	Set the timeout to a short period (5-10 seconds).

Table 6-1 (Cont.) Firewall Ports Common to All Fusion Middleware Enterprise Deployments

Type	Firewall	Port and Port Range	Protocol / Application	Inbound / Outbound	Other Considerations and Timeout Guidelines
Session replication within a WebLogic Server cluster	n/a	n/a	n/a	n/a	By default, this communication uses the same port as the server's listen address.
Administration Console access	FW1	7001	HTTP / Administration Server and Enterprise Manager t3	Both	You should tune this timeout based on the type of access to the admin console (whether it is planned to use the Oracle WebLogic Server Administration Console from application tier clients or clients external to the application tier).
Database access	FW2	1521	SQL*Net	Both	Timeout depends on database content and on the type of process model used for SOA.
Coherence for deployment	n/a	8088 Range: 8000 - 8090		n/a	n/a
Oracle Unified Directory access	FW2	389 636 (SSL)	LDAP or LDAP/ssl	Inbound	You should tune the directory server's parameters based on load balancer, and not the other way around.

Table 6-1 (Cont.) Firewall Ports Common to All Fusion Middleware Enterprise Deployments

Type	Firewall	Port and Port Range	Protocol / Application	Inbound / Outbound	Other Considerations and Timeout Guidelines
Oracle Notification Server (ONS)	FW2	6200	ONS	Both	Required for Gridlink. An ONS server runs on each database server.
Load balancer to OTD	n/a	7022, 7500	SFTP HTTP	n/a	n/a
MFT SFTP Requests	FW0, FW1	7022	SFTP/ OTD and WLS_MFTn	Inbound	Timeout depends on the size of the transferred files.
MFT HTTP Requests	FW1	7500	HTTP/ WLS_MFTn	Inbound	Timeout depends on the size and type of the HTML content.

*External clients can access SOA servers directly on RMI or JMS (for example, for JDeveloper deployments and for JMX monitoring), in which case FW0 might need to be open or not depending on the security model that you implement.

Type	Firewall	Port and Port Range	Protocol / Application	Inbound / Outbound	Other Considerations and Timeout Guidelines
WSM-PM access	FW1	7010 Range: 7010 - 7999	HTTP / WLS_WSM-PM*n*	Inbound	Set the timeout to 60 seconds.
SOA Server access	FW1*	8001 Range: 8000 - 8010	HTTP / WLS_SOA*n*	Inbound	Timeout varies based on the type of process model used for SOA.
Oracle Service Bus Access	FW1	8011 Range: 8011-8021	HTTP / WLS_OSBn	Inbound/ Outbound	Set the timeout to a short period (5-10 seconds).

Type	Firewall	Port and Port Range	Protocol / Application	Inbound / Outbound	Other Considerations and Timeout Guidelines
BAM access	FW1	9001 Range: 9000 - 9080	HTTP / WLS_BAM*n*	Inbound	Connections to BAM WebApps are kept open until the report/ browser is closed, so set the timeout as high as the longest expected user session.
MLLP Requests	FW0, FW1	9500 — 95*nn*	Application: MLLP/HC	Inbound	Timeout depends on the expected MLLP transfer sizes.

7 Preparing the File System for an Enterprise Deployment

Preparing the file system for an enterprise deployment involves understanding the requirements for local and shared storage, as well as the terminology used to reference important directories and file locations during the installation and configuration of the enterprise topology.

This chapter describes how to prepare the file system for an Oracle Fusion Middleware enterprise deployment.

7.1 Overview of Preparing the File System for an Enterprise Deployment

It is important to set up your storage in a way that makes the enterprise deployment easy to understand, configure, and manage.

This chapter provides an overview of the process of preparing the file system for an enterprise deployment. Oracle recommends setting up your storage according to information in this chapter. The terminology defined in this chapter is used in diagrams and procedures throughout the guide.

Use this chapter as a reference to help understand the directory variables used in the installation and configuration procedures.

Other directory layouts are possible and supported, but the model adopted in this guide was designed for maximum availability, providing both the best isolation of components and symmetry in the configuration and facilitating backup and disaster recovery. The rest of the document uses this directory structure and directory terminology.

7.2 Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment

It is recommended to implement the following guidelines regarding shared storage when installing and configuring an enterprise deployment.

Before you implement the detailed recommendations in this chapter, be sure to review the recommendations and general information about using shared storage in the *High Availability Guide*.

The recommendations in this chapter are based on the concepts and guidelines described in the *High Availability Guide*.

Table 7-1 lists the key sections you should review and how those concepts apply to an enterprise deployment.

Table 7-1 Shared Storage Resources in the High Availability Guide

Section in *High Availability Guide*	**Importance to an Enterprise Deployment**
Shared Storage Prerequisites	Describes guidelines for disk format and the requirements for hardware devices that are optimized for shared storage.
Using Shared Storage for Binary (Oracle Home) Directories	Describes your options for storing the Oracle home on a shared storage device that is available to multiple hosts. For the purposes of the enterprise deployment, Oracle recommends using redundant Oracle homes on separate storage volumes. If a separate volume is not available, a separate partition on the shared disk should be used to provide redundant Oracle homes to application tier hosts.
Using Shared Storage for Domain Configuration Files	Describes the concept of creating separate domain homes for the Administration Server and the Managed Servers in the domain. For an enterprise deployment, the Administration Server domain home location is referenced by the *ASERVER_HOME* variable.
Shared Storage Requirements for JMS Stores and JTA Logs	Provides instructions for setting the location of the transaction logs and JMS stores for an enterprise deployment.

7.3 About the Recommended Directory Structure for an Enterprise Deployment

The diagrams in this section show the recommended directory structure for a typical Oracle Fusion Middleware enterprise deployment.

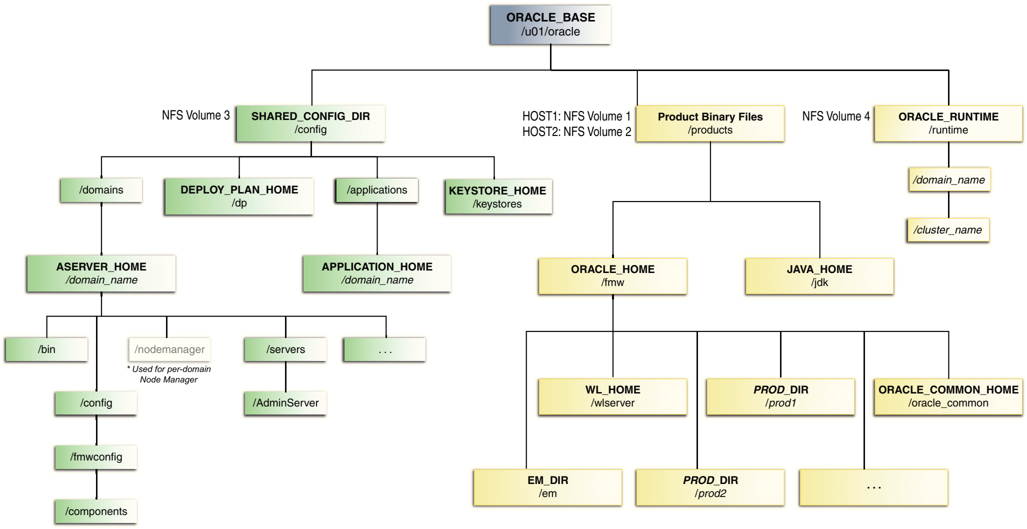
The directories shown in the diagrams contain binary files that are installed on disk by the Oracle Fusion Middleware installers, domain-specific files generated via the domain configuration process, as well as domain configuration files that are propagated to the various host computers via the Oracle WebLogic Server `pack` and `unpack` commands:

- Figure 7-1 shows the resulting directory structure on the shared storage device after you have installed and configured a typical Oracle Fusion Middleware enterprise deployment. The shared storage directories are accessible by the application tier host computers.
- Figure 7-2 shows the resulting directory structure on the local storage device for a typical application tier host after you have installed and configured an Oracle Fusion Middleware enterprise deployment. The Managed Servers in particular are stored on the local storage device for the application tier host computers.
- Figure 7-3 shows the resulting directory structure on the local storage device for a typical Web tier host after you have installed and configured an Oracle Fusion Middleware enterprise deployment. Note that the software binaries (in the Oracle home) are installed on the local storage device for each Web tier host.

> **Note:** Figure 7-3 assumes you are using Oracle HTTP Server in the Web tier. However, you can also use Oracle Traffic Director to route HTTP and other requests to the application tier. For more information, see About Oracle Traffic Director in an Enterprise Deployment.

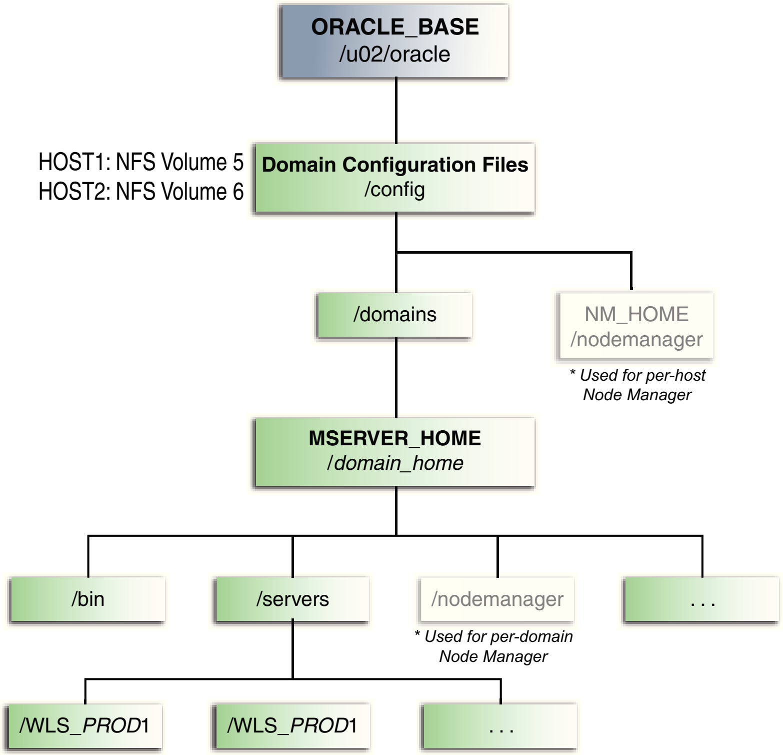
Where applicable, the diagrams also include the standard variables used to reference the directory locations in the installation and configuration procedures in this guide.

Figure 7-1 Recommended Shared Storage Directory Structure for an Enterprise Deployment



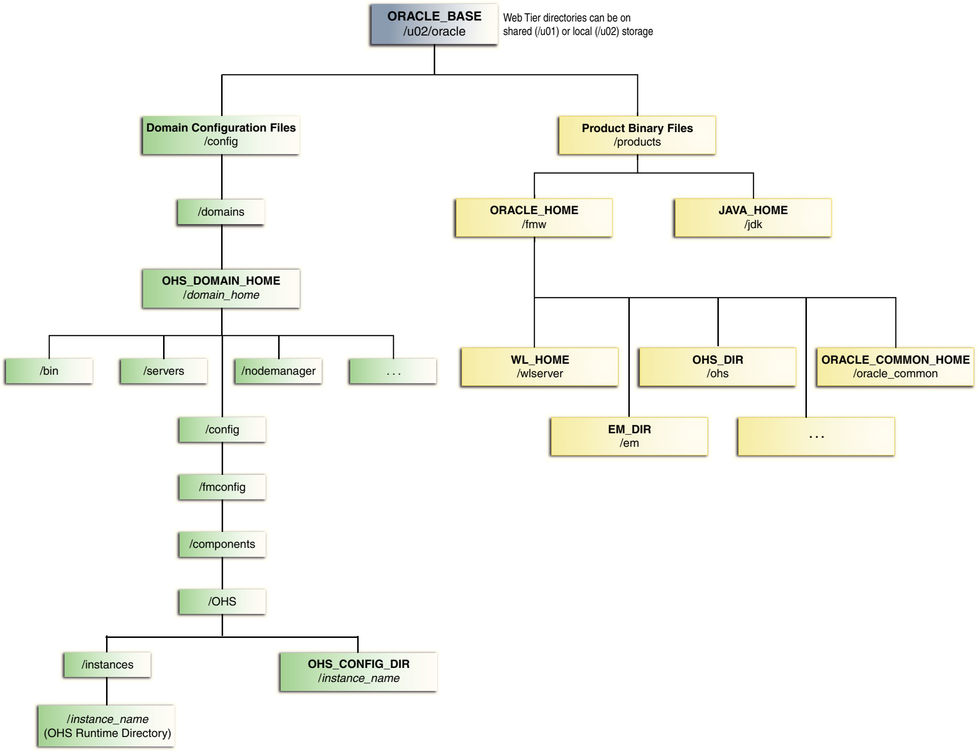
* For more information, see About the Node Manager Configuration in a Typical Enterprise Deployment.

Figure 7-2 Recommended Local Storage Directory Structure for an Application Tier Host Computer in an Enterprise Deployment



* For more information, see About the Node Manager Configuration in a Typical Enterprise Deployment.

Figure 7-3 Recommended Local Storage Directory Structure for a Web Tier Host Computer in an Enterprise Deployment



7.4 File System and Directory Variables Used in This Guide

The file system and directory variables used throughout this guide reference the directories on the Application tier and the Web tier.

Table 7-2 lists the file system directories and the directory variables used to reference the directories on the Application tier. Table 7-3 lists the file system directories and variables used to reference the directories on the Web tier.

For additional information about mounting these directories when you are using shared storage, see About Creating and Mounting the Directories for an Enterprise Deployment.

Throughout this guide, the instructions for installing and configuring the topology refer to the directory locations using the variables shown here.

You can also define operating system variables for each of the directories listed in this section. If you define system variables for the particular UNIX shell you are using, you can then use the variables as they are used in this document, without having to map the variables to the actual values for your environment.

Note:

As you configure your storage devices to accommodate the recommended directory structure, note the actual directory paths in the Enterprise Deployment Workbook. You will use these addresses later when you enable the IP addresses on each host computer.

For more information, see Using the Enterprise Deployment Workbook..

Table 7-2 Sample Values for Key Directory Variables on the Application Tier

Directory Variable	Description	Sample Value on the Application Tier
ORACLE_BASE	The base directory, under which Oracle products are installed.	`/u01/oracle`
ORACLE_HOME	The read-only location for the product binaries. For the application tier host computers, it is stored on shared disk. The Oracle home is created when you install the Oracle Fusion Middleware Infrastructure software. You can then install additional Oracle Fusion Middleware products into the same Oracle home.	`/u01/oracle/products/fmw`
ORACLE_COMMON_HOME	The directory within the Oracle Fusion Middleware Oracle home where common utilities, libraries, and other common Oracle Fusion Middleware products are stored.	`/u01/oracle/products/fmw/oracle_common`
WL_HOME	The directory within the Oracle home where the Oracle WebLogic Server software binaries are stored.	`/u01/oracle/products/fmw/wlserver`
PROD_DIR	Individual product directories for each Oracle Fusion Middleware product you install.	`/u01/oracle/products/fmw/`*`prod_dir`* The product can be `soa`, `wcc`, `bi`, or another value, depending on your enterprise deployment.
EM_DIR	The product directory used to store the Oracle Enterprise Manager Fusion Middleware Control software binaries.	`/u01/oracle/products/fmw/em`
JAVA_HOME	The location where you install the supported Java Development Kit (JDK).	`/u01/oracle/products/jdk`
SHARED_CONFIG_DIR	The shared parent directory for shared environment configuration files, including domain configuration, keystores, runtime artifacts, and application deployments	`/u01/oracle/config`
ASERVER_HOME	The Administration Server domain home, which is installed on shared disk.	`/u01/oracle/config/domains/`*`domain_name`* In this example, replace domain_name with the name of the WebLogic Server domain.
MSERVER_HOME	The Managed Server domain home, which is created via the unpack command on the local disk of each application tier host.	`/u02/oracle/config/domains/`*`domain_name`*

Table 7-2 (Cont.) Sample Values for Key Directory Variables on the Application Tier

Directory Variable	Description	Sample Value on the Application Tier
APPLICATION_HOME	The Application home directory, which is installed on shared disk, so the directory is accessible by all the application tier host computers.	`/u01/oracle/config/applications/`*`domain_name`*
ORACLE_RUNTIME	This directory contains the Oracle runtime artifacts, such as the JMS logs and TLOGS. Typically, you mount this directory as a separate shared file system, which is accessible by all hosts in the domain. When you run the Configuration Wizard or perform post-configuration tasks, and you identify the location of JMS stores or tlogs persistent stores, then you can use this directory, qualified with the name of the domain, the name of the cluster, and the purpose of the directory, as given below: *`ORACLE_RUNTIME/cluster_name/`*`jms` *`ORACLE_RUNTIME/cluster_name/`*`tlogs`	`/u01/oracle/runtime/`
NM_HOME	The directory used by the Per Machine Node Manager start script and configuration files. **Note:** This directory is necessary only if you are using a Per Machine Node Manager configuration. For more information, see About the Node Manager Configuration in a Typical Enterprise Deployment.	`/u02/oracle/config/nodemanager`
DEPLOY_PLAN_HOME	The deployment plan directory, which is used as the default location for application deployment plans. **Note:** This directory is required only when you are deploying custom applications to the application tier.	`/u01/oracle/config/dp`
KEYSTORE_HOME	The shared location for custom certificates and keystores.	`/u01/oracle/config/keystores`

Table 7-3 Sample Values for Key Directory Variables on the Web Tier

Directory Variable	Description	Sample Value on the Web Tier
WEB_ORACLE_HOME	The read-only location for the Web server product binaries. For the Web tier host computers, this directory is stored on local disk. The Oracle home is created when you install the Oracle HTTP Server or Oracle Traffic Director software on a Web tier host. Note that this directory is sometimes referred to as the OHS_ORACLE_HOME if you are using Oracle HTTP Server as your Web server.	`/u02/oracle/products/fmw`
ORACLE_COMMON_HOME	The directory within the Oracle HTTP Server Oracle home where common utilities, libraries, and other common Oracle Fusion Middleware products are stored.	`/u02/oracle/products/fmw /oracle_common`
WL_HOME	The directory within the Oracle home where the Oracle WebLogic Server software binaries are stored.	`/u02/oracle/products/fmw/wlserver`
PROD_DIR	Individual product directories for each Oracle Fusion Middleware product you install.	`/u02/oracle/products/fmw/ohs`
JAVA_HOME	The location where you install the supported Java Development Kit (JDK).	`/u02/oracle/products/jdk`
WEB_DOMAIN_HOME	The domain home for the standalone Web server domain, which is created when you install Oracle HTTP Server or Oracle Traffic Director on the local disk of each Web tier host. Note that this directory is sometimes referred to as the OHS_DOMAIN_HOME if you are using Oracle HTTP Server as your Web server.	`/u02/oracle/config/domains/`*`domain_name`*
OHS_CONFIG_DIR	If you are using Oracle HTTP Server as your Web server, then this is the location where you edit the Oracle HTTP Server configuration files (for example, `httpd.conf` and `moduleconf/*.conf`) on each Web host. Note this directory is also referred to as the OHS Staging Directory. Changes made here are later propagated to the OHS Runtime Directory. For more information, see Staging and Run-time Configuration Directories in *Oracle Fusion Middleware Administering Oracle HTTP Server*.	`/u02/oracle/config/domains /`*`domain_name`*`/config/fmwconfig /components/OHS /`*`instance_name`*
WT_APPLICATION_HOME	If you are using Oracle Traffic Director as your Web server, then this is the location of the domain applications.	`/u2/oracle/config/applications/domain_name`

7.5 About Creating and Mounting the Directories for an Enterprise Deployment

It is recommended to implement the following best practices when creating or mounting the top-level directories in an enterprise deployment.

When creating or mounting the top-level directories, note the following best practices:

- For the application tier, install the Oracle home (which contains the software binaries) on a second shared storage volume or second partition that is mounted to SOAHOST2. Be sure the directory path to the binaries on SOAHOST2 is identical to the directory path on SOAHOST1.

  For example:

  ```
  /u01/oracle/products/fmw/
  ```

  For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

- This enterprise deployment guide assumes that the Oracle Web tier software will be installed on a local disk.

  The Web tier installation is typically performed on local storage to the WEBHOST nodes. When using shared storage, you can install the Oracle Web tier binaries (and create the Oracle HTTP Server instances) on shared disk. However, if you do so, then the shared disk *must* be separate from the shared disk used for the application tier, and you must consider the appropriate security restrictions for access to the storage device across tiers.

  As with the application tier servers (SOAHOST1 and SOAHOST2), use the same directory path on both computers.

  For example:

  ```
  /u02/oracle/products/fmw/
  ```

- If you are configuring Oracle Service Bus (OSB) in its own domain, but on the same host as Oracle SOA Suite, then you must create an additional Oracle home (ORACLE_HOME) for the OSB binaries, and you should mount that Oracle home separately from the SOA Oracle home.

  For example, the OSB_ORACLE_HOME might be mounted as follows:

  ```
  /u03/oracle/products/fmw/osb
  ```

- Similarly, if you are configuring OSB in its own domain, but on the same host as Oracle SOA Suite, then you should mount the domain directories separately from the Oracle SOA Suite domain directories.

  For example, the OSB Administration Server domain directory might be mounted as follows:

  ```
  /u03/oracle/config/domains/osb_domain_name
  ```

  And the OSB Managed Servers domain directory might be mounded as follows:

  ```
  u04/oracle/config/domains/osb_domain_name
  ```

- If you are configuring Oracle Managed File Transfer(MFT) in its own domain, but on the same host as Oracle SOA Suite, then you must create an additional Oracle home (ORACLE_HOME) for the MFT binaries, and you should mount that Oracle home separately from the SOA Oracle home. You cannot install MFT in the same domain as Oracle SOA Suite.

For example, the MFT_ORACLE_HOME might be mounted as follows:

```
/u03/oracle/products/fmw/mft
```

- Similarly, if you are configuring MFT on the same host as Oracle SOA Suite, then you should mount the domain directories separately from the Oracle SOA Suite domain directories.

  For example, the MFT Administration Server domain directory might be mounted as follows:

  ```
  /u03/oracle/config/domains/mft_domain_name
  ```

  And the MFT Managed Servers domain directory might be mounded as follows:

  ```
  u04/oracle/config/domains/mft_domain_name
  ```

7.6 Summary of the Shared Storage Volumes in an Enterprise Deployment

It is important to understand the shared volumes and their purpose in a typical Oracle Fusion Middleware enterprise deployment.

The following table summarizes the shared volumes and their purpose in a typical Oracle Fusion Middleware enterprise deployment.

For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

Table 7-4 Shared Storage Volumes in an Enterprise Deployment

Volume in Shared Storage	Mounted to Host	Mount Directories	Description and Purpose
NFS Volume 1	SOAHOST1	`/u01/oracle/products/`	Local storage for the product binaries to be used by SOAHOST1; this is where the Oracle home directory and product directories are installed.
NFS Volume 2	SOAHOST2	`/u01/oracle/products/`	Local storage for the product binaries to be used by SOAHOST2; this is where the Oracle home directory and product directories are installed.
NFS Volume 3	SOAHOST1 SOAHOST2	`/u01/oracle/config/`	Administration Server domain configuration, mounted to all hosts; used initially by SOAHOST1, but can be failed over to any host.

Table 7-4 (Cont.) Shared Storage Volumes in an Enterprise Deployment

Volume in Shared Storage	Mounted to Host	Mount Directories	Description and Purpose
NFS Volume 4	SOAHOST1 SOAHOST2	`/u01/oracle/runtime/`	The runtime artifacts directory, mounted to all hosts, contains runtime artifacts such as JMS logs, blogs, and any cluster-dependent shared files needed.
NFS Volume 5	SOAHOST1	`/u02/oracle/config/`	Local storage for the Managed Server domain directory to be used by SOAHOST1, if the private Managed Server domain directory resides on shared storage.
NFS Volume 6	SOAHOST2	`/u02/oracle/config/`	Local storage for the Managed Server domain directory to be used by SOAHOST2, if the private Managed Server domain directory resides on shared storage.
NFS Volume 7	WEBHOST1	`/u02/oracle/`	Local storage for the Oracle HTTP Server software binaries (Oracle home) and domain configuration files used by WEBHOST1, if the private Managed Server domain directory resides on shared storage.
NFS Volume 8	WEBHOST2	`/u02/oracle/`	Local storage for the Oracle HTTP Server software binaries (Oracle home) and domain configuration files used by WEBHOST2, if the private Managed Server domain directory resides on shared storage.

8

Preparing the Host Computers for an Enterprise Deployment

It is important to perform a set of tasks on each computer or server before configuring the enterprise deployment topology. This involves verifying the minimum hardware and operating system requirements for each host, configuring operating system users and groups, enabling Unicode support, mounting the required shared storage systems to the host and enabling the required virtual IP addresses on each host.

This chapter describes the tasks you must perform from each computer or server that will be hosting the enterprise deployment.

8.1 Verifying the Minimum Hardware Requirements for Each Host

After procuring the required hardware for the enterprise deployment, it is important to ensure that each host computer meets the minimum system requirements.

After you have procured the required hardware for the enterprise deployment, log in to each host computer and verify the system requirements listed in Hardware and Software Requirements for the Enterprise Deployment Topology.

If you are deploying to a virtual server environment, such as Oracle Exalogic, ensure that each of the virtual servers meets the minimum requirements.

Ensure that you have sufficient local disk storage and shared storage configured as described in Preparing the File System for an Enterprise Deployment.

Allow sufficient swap and temporary space; specifically:

- **Swap Space**–The system must have at least 500 MB.
- **Temporary Space**–There must be a minimum of 500 MB of free space in `/tmp`.

8.2 Verifying Linux Operating System Requirements

You can review the typical Linux operating system settings for an enterprise deployment in this section.

To ensure the host computers meet the minimum operating system requirements, be sure you have installed a certified operating system and that you have applied all the necessary patches for the operating system.

In addition, review the following sections for typical Linux operating system settings for an enterprise deployment.

Setting Linux Kernel Parameters

Setting the Open File Limit and Number of Processes Settings on UNIX Systems

Verifying IP Addresses and Host Names in DNS or hosts File

8.2.1 Setting Linux Kernel Parameters

The kernel-parameter and shell-limit values shown below are recommended values only. Oracle recommends that you tune these values to optimize the performance of the system. See your operating system documentation for more information about tuning kernel parameters.

Kernel parameters must be set to a minimum of those in Table 8-1 on all nodes in the topology.

The values in the following table are the current Linux recommendations. For the latest recommendations for Linux and other operating systems, see *Oracle Fusion Middleware System Requirements and Specifications*.

If you are deploying a database onto the host, you might need to modify additional kernel parameters. Refer to 12*c* (12.2.1.2) Configuring Kernel Parameters in *Oracle Grid Infrastructure Installation Guide for Linux*.

Table 8-1 UNIX Kernel Parameters

Parameter	Value
kernel.sem	256 32000 100 142
kernel.shmmax	4294967295

To set these parameters:

1. Sign in as `root` and add or amend the entries in the file `/etc/sysctl.conf`.
2. Save the file.

3. Activate the changes by entering the following command:

   ```
   /sbin/sysctl -p
   ```

8.2.2 Setting the Open File Limit and Number of Processes Settings on UNIX Systems

On UNIX operating systems, the `Open File Limit` is an important system setting, which can affect the overall performance of the software running on the host computer.

For guidance on setting the `Open File Limit` for an Oracle Fusion Middleware enterprise deployment, see Host Computer Hardware Requirements.

> **Note:**
>
> The following examples are for Linux operating systems. Consult your operating system documentation to determine the commands to be used on your system.

For more information, see the following sections.

Viewing the Number of Currently Open Files

Setting the Operating System Open File and Processes Limits

8.2.2.1 Viewing the Number of Currently Open Files

You can see how many files are open with the following command:

```
/usr/sbin/lsof | wc -l
```

To check your open file limits, use the following commands.

C shell:

```
limit descriptors
```

Bash:

```
ulimit -n
```

8.2.2.2 Setting the Operating System Open File and Processes Limits

To change the Open File Limit values:

1. Sign in as `root` user and edit the following file:

   ```
   /etc/security/limits.conf
   ```

2. Add the following lines to the `limits.conf` file. (The values shown here are for example only):

   ```
   * soft  nofile  4096
   * hard  nofile  65536
   * soft  nproc   2047
   * hard  nproc   16384
   ```

   The `nofiles` values represent the open file limit; the `nproc` values represent the number of processes limit.

3. Save the changes, and close the `limits.conf` file.

> **Note:**
>
> If you are running Oracle Enterprise Linux 6 or Red Hat Linux 6, locate the following operating system configuration file:`/etc/security/limits.d/90-nproc.conf`
>
> Ensure that the same values are added to the `90-nproc.conf` file. Otherwise, the values in the `90-nproc.conf` file overrides the values in the `limits.conf` file.

4. Re-login into the host computer.

8.2.3 Verifying IP Addresses and Host Names in DNS or hosts File

Before you begin the installation of the Oracle software, ensure that the IP address, fully qualified host name, and the short name of the host are all registered with your DNS server. Alternatively, you can use the local `hosts` file and add an entry similar to the following:

```
IP_Address Fully_Qualified_Name Short_Name
```

For example:

```
10.229.188.205  host1.example.com  host1
```

8.3 Configuring Operating System Users and Groups

The users and groups to be defined on each of the computers that host the enterprise deployment are listed in this section.

Groups

You must create the following groups on each node.

- `oinstall`
- `dba`

Users

You must create the following user on each node.

- `nobody`–An unprivileged user.
- `oracle`–The owner of the Oracle software. You may use a different name. The primary group for this account must be `oinstall`. The account must also be in the `dba` group.

Note:

- The group `oinstall` must have write privileges to all the file systems on shared and local storage that are used by the Oracle software.
- Each group must have the same Group ID on every node.
- Each user must have the same User ID on every node.

8.4 Enabling Unicode Support

It is recommended to enable Unicode support in your operating system so as to allow processing of characters in Unicode.

Your operating system configuration can influence the behavior of characters supported by Oracle Fusion Middleware products.

On UNIX operating systems, Oracle highly recommends that you enable Unicode support by setting the `LANG` and `LC_ALL` environment variables to a locale with the UTF-8 character set. This enables the operating system to process any character in Unicode. Oracle SOA Suite technologies, for example, are based on Unicode.

If the operating system is configured to use a non-UTF-8 encoding, Oracle SOA Suite components may function in an unexpected way. For example, a non-ASCII file name might make the file inaccessible and cause an error. Oracle does not support problems caused by operating system constraints.

8.5 Mounting the Required Shared File Systems on Each Host

It is important to understand how to mount the shared storage to all the servers that require access.

The shared storage configured, as described in Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment, must be available on the hosts that use it.

In an enterprise deployment, it is assumed that you have a hardware storage filer, which is available and connected to each of the host computers you have procured for the deployment.

You must mount the shared storage to all servers that require access.

Each host must have appropriate privileges set within the Network Attached Storage (NAS) or Storage Area Network (SAN) so that it can write to the shared storage.

Follow the best practices of your organization for mounting shared storage. This section provides an example of how to do this on Linux using NFS storage.

You must create and mount shared storage locations so that SOAHOST1 and SOAHOST2 can see the same location if it is a binary installation in two separate volumes.

For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

You use the following command to mount shared storage from a NAS storage device to a Linux host. If you are using a different type of storage device or operating system, refer to your manufacturer documentation for information about how to do this.

Note:

The user account used to create a shared storage file system owns and has read, write, and execute privileges for those files. Other users in the operating system group can read and execute the files, but they do not have write privileges.

For more information about installation and configuration privileges, see Selecting an Installation User in the *Oracle Fusion Middleware Installation Planning Guide*.

In the following example, `nasfiler` represents the shared storage filer. Also note that these are examples only. Typically, the mounting of these shared storage locations should be done using the `/etc/fstabs` file on UNIX systems, so that the mounting of these devices survives a reboot. Refer to your operating system documentation for more information.

1. Create the mount directories on SOAHOST1, as described in Summary of the Shared Storage Volumes in an Enterprise Deployment, and then mount the shared storage. For example:

   ```
   mount -t nfs nasfiler:VOL1/oracle/products/ /u01/oracle/products/
   ```

2. Repeat the procedure on SOAHOST2 using VOL2.

Validating the Shared Storage Configuration

Ensure that you can read and write files to the newly mounted directories by creating a test file in the shared storage location you just configured.

For example:

```
$ cd newly mounted directory
$ touch testfile
```

Verify that the owner and permissions are correct:

```
$ ls -l testfile
```

Then remove the file:

```
$ rm testfile
```

Note:

The shared storage can be a NAS or SAN device. The following example illustrates creating storage for a NAS device from SOAHOST1. The options may differ depending on the specific storage device.

```
mount -t nfs -o
rw,bg,hard,nointr,tcp,vers=3,timeo=300,rsize=32768,wsize=32768 nasfiler:VOL1/
Oracle/u01/oracle
```

Contact your storage vendor and machine administrator to learn about the appropriate options for your environment.

8.6 Enabling the Required Virtual IP Addresses on Each Host

You must enable the required virtual IP addresses on each host in order to prepare the host for the enterprise deployment. The procedure varies, depending on whether you are using Oracle Enterprise Linux 5 or Oracle Enterprise Linux 6.

Oracle Enterprise Linux 5

To prepare each host for the enterprise deployment, you must enable the virtual IP (VIP) addresses described in Reserving the Required IP Addresses for an Enterprise Deployment.

It is assumed that you have already reserved the VIP addresses and host names and that they have been enabled by your network administrator. You can then enable the VIPs on the appropriate host.

Note that the virtual IP addresses used for the enterprise topology are not persisted because they are managed by Whole Server Migration (for selected Managed Servers and clusters) or by manual failover (for the Administration Server).

To enable the VIP addresses on each host, run the following commands as `root`:

```
/sbin/ifconfig interface:index IPAddress netmask netmask
/sbin/arping -q -U -c 3 -I interface IPAddress
```

where *`interface`* is `eth0`, or `eth1`, and *`index`* is `0`, `1`, or `2`.

For example:

```
/sbin/ifconfig eth0:1 100.200.140.206 netmask 255.255.255.0
```

Enable your network to register the new location of the virtual IP address:

```
/sbin/arping -q -U -c 3 -I eth0 100.200.140.206
```

Validate that the address is available by using the `ping` command from another node, for example:

```
/bin/ping 100.200.140.206
```

Oracle Enterprise Linux 6 or Later

Starting with Oracle Enterprise Linux 6, the "`ifconfig`" command is deprecated and is replaced with the "`ip`" command.

To enable the VIP addresses on each host, run the following commands as `root`:

1. Determine the CIDR notation of the netmask. Each Netmask has a CIDR notation. For example, 255.255.240.0 has a CIDR of 20.

   If the netmask you are adding is the same as the interface, the fastest way to determine this is to examine the existing IP address assigned to the network card. You can do this using the following command:

   ```
   ip addr show dev bond0
   ```

   Sample output:

   ```
   2: bond0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast qlen 1000
   link/ether 00:21:f6:03:85:9f brd ff:ff:ff:ff:ff:ff
   int 192.168.20.1/20 brd 10.248.11.255 scope global bond0
   ```

In this example, the CIDR value is the value after the forward slash (/), which is, 20. If you are unsure of the CIDR value, contact your network administrator.

2. Add the IP address 192.168.20.3, net mask 255.255.240 (CIDR20) on network card bond0 using the following command:

```
ip addr add 192.168.20.3/20 dev bond0:1
```

3. For each of the virtual IP addresses you define, update the ARP caches using the following command:

```
arping -b -A -c 3 -I bond0 192.168.20.3
```

Note: Due to a known issue in the `ifconfig` utility, during server migration, all VIPs are dropped from the network interface on the machine the WebLogic Managed Server is migrated from. This happens when the VIP is enabled on `:0` of the network interface. To workaround the issue, enable the VIPs on the network interface starting with `:1`.

---

9 Preparing the Database for an Enterprise Deployment

Preparing the database for an enterprise deployment involves ensuring that the database meets specific requirements, creating database services, using SecureFiles for large objects in the database, and creating database backup strategies.

This chapter provides information about the database requirements, creating database services and about the database backup strategies.

9.1 Overview of Preparing the Database for an Enterprise Deployment

It is important to understand how to configure a supported database as part of an Oracle Fusion Middleware enterprise deployment.

Most Oracle Fusion Middleware products require a specific set of schemas that must be installed in a supported database. The schemas are installed using the Oracle Fusion Middleware Repository Creation Utility (RCU).

In an enterprise deployment, Oracle recommends a highly available Real Application Clusters (Oracle RAC) database for the Oracle Fusion Middleware product schemas.

9.2 About Database Requirements

Before configuring the enterprise deployment topology, you have to verify that the database meets the requirements described in the following sections.

Supported Database Versions

Additional Database Software Requirements

Setting the PROCESSES Database Initialization Parameter for an Enterprise Deployment

9.2.1 Supported Database Versions

Use the following information to verify what databases are supported by each Oracle Fusion Middleware release and which version of the Oracle database you are currently running:

- For a list of all certified databases, refer to *Oracle Fusion Middleware Supported System Configurations*.
- To check the release of your database, query the PRODUCT_COMPONENT_VERSION view:

```
SQL> SELECT VERSION FROM SYS.PRODUCT_COMPONENT_VERSION WHERE
        PRODUCT LIKE 'Oracle%';
```

Oracle Fusion Middleware requires that the database supports the AL32UTF8 character set. Check the database documentation for information on choosing a character set for the database.

For enterprise deployments, Oracle recommends using GridLink data sources to connect to Oracle RAC databases.

Note:

For more information about using GridLink data sources and SCAN, see Using Active GridLink Data Sources in *Oracle Fusion Middleware Administering JDBC Data Sources for Oracle WebLogic Server*.

9.2.2 Additional Database Software Requirements

In the enterprise topology, there are two database host computers in the data tier that host the two instances of the RAC database. We refer to these hosts as DBHOST1 and DBHOST2.

Before you install or configure the enterprise topology, you must be ensure that the following software is installed and available on DBHOST1 and DBHOST2:

- **Oracle Clusterware**

For more information, see the Installing Oracle Grid Infrastructure for a Cluster in *Oracle Grid Infrastructure Installation Guide for Linux*.

- **Oracle Real Application Clusters**

  For more information, see the Installing Oracle RAC and Oracle RAC One Node in *Oracle Real Application Clusters Installation Guide for Linux and UNIX*.

- **Time synchronization between Oracle RAC database instances**

  The clocks of the database instances must be in sync if they are used by servers in a Fusion Middleware cluster configured with server migration.

- **Automatic Storage Management** (optional)

  For more information, see the Introducing Oracle Automatic Storage Management in *Oracle Automatic Storage Management Administrator's Guide*.

9.2.3 Setting the PROCESSES Database Initialization Parameter for an Enterprise Deployment

Table 9-1 lists some of the typical Oracle SOA Suite enterprise topologies and the value you should use when setting the PROCESSES initialization parameter for each topology.

Use this information as a guide when configuring the Oracle RAC database for an enterprise deployment.

Table 9-1 Required Initialization Parameters

Configuration	Parameter	Required Value	Parameter Class
SOA	`PROCESSES`	300 or greater	Static
BAM	`PROCESSES`	100 or greater	Static
SOA and BAM	`PROCESSES`	400 or greater	Static
SOA and OSB	`PROCESSES`	800 or greater	Static

To check the value of the initialization parameter using SQL*Plus, you can use the SHOW PARAMETER command.

1. As the SYS user, issue the SHOW PARAMETER command as follows:

   ```
   SQL> SHOW PARAMETER processes;
   ```

2. Set the initialization parameter using the following command:

   ```
   SQL> ALTER SYSTEM SET processes=300 SCOPE=SPFILE;
   ```

3. Restart the database.

The method that you use to change a parameter's value depends on whether your database uses a parameter file or a server parameter file.

Note:

For more information on changing parameter values, see Changing Initialization Parameter Values in *Oracle Database Administrator's Guide*.

9.3 Creating Database Services

When multiple Oracle Fusion Middleware products are sharing the same database, each product should be configured to connect to a separate, dedicated database service.

Note:

The instructions in this section are for the Oracle Database 12*c* (12.1) release. If you are using another supported database, refer to the appropriate documentation library for more up-to-date and release-specific information.

For more information about connecting to Oracle databases using services, see Overview of Using Dynamic Database Services to Connect to Oracle Databases in *Real Application Clusters Administration and Deployment Guide*.

In addition, the database service should be different from the default database service. For complete instructions on creating and managing database services for an Oracle Database 12*c* database, see Overview of Automatic Workload Management with Dynamic Database Services in *Real Application Clusters Administration and Deployment Guide*.

Run-time connection load balancing requires configuring Oracle RAC Load Balancing Advisory with service-level goals for each service for which load balancing is enabled.

You can configure the Oracle RAC Load Balancing Advisory for `SERVICE_TIME` or `THROUGHPUT`. Set the connection load-balancing goal to **SHORT**.

You create and modify Oracle Database services using the `srvctl` utility.

To create and modify a database service:

1. Log in to SQL*Plus and create the service:

```
sqlplus "sys/password as sysdba"

SQL> EXECUTE DBMS_SERVICE.CREATE_SERVICE
(SERVICE_NAME => 'soaedg.example.com',
NETWORK_NAME => 'soaedg.example.com'
);
```

Note:

- For the Service Name of the Oracle RAC database, use lowercase letters, followed by the domain name. For example:`soaedg.example.com`
- Enter the `EXECUTE DBMS_SERVICE` command shown on a single line.

  For more information about the `DBMS_SERVICE` package, see DBMS_SERVICE in *Oracle Database PL/SQL Packages and Types Reference*.

2. Add the service to the database and assign it to the instances using `srvctl`:

   ```
   srvctl add service -d soadb -s soaedg.example.com -r soadb1,soadb2
   ```

3. Start the service:

   ```
   srvctl start service -d soadb -s soaedg.example.com
   ```

   > **Note:**
   >
   > For complete instructions on creating and managing database services with SRVCTL, see Creating Services with SRVCTL in the *Real Application Clusters Administration and Deployment Guide*.

4. Modify the service so it uses the Load Balancing Advisory and the appropriate service-level goals for run-time connection load balancing.

   For example:

   Check the default configuration of the service by using this command:

   ```
   srvctl config service -db soaedg -service soa.us.oracle.com
   ```

   Several parameters are shown. Check the following parameters:

   - Connection Load Balancing Goal: Long
   - Runtime Load Balancing Goal: NONE

   You can modify these parameters by using the following command:

   ```
   srvctl modify service -db soaedg -service soa.us.oracle.com -rlbgoal SERVICE_TIME
   -clbgoal SHORT
   ```

   Restart the service:

   ```
   srvctl stop service -db soaedg -service soa.us.oracle.com
   srvctl start service -db soaedg -service soa.us.oracle.com
   ```

   Verify the change in the configuration:

   ```
   srvctl config service -db soaedg -service soa.us.oracle.com
   Runtime Load Balancing Goal: SERVICE_TIME
     Service name: soa.us.oracle.com
     Service is enabled
     Server pool: soaedg_soa.us.oracle.com
     ...
     Connection Load Balancing Goal: SHORT
     Runtime Load Balancing Goal: SERVICE_TIME
     ...
   ```

   More specifically, use the following resources in the Oracle Database 12*c Real Application Clusters Administration and Deployment Guide* to set the SERVICE_TIME and THROUGHPUT service-level goals:

   - Overview of the Load Balancing Advisory
   - Configuring Your Environment to Use the Load Balancing Advisory

9.4 Using SecureFiles for Large Objects (LOBs) in an Oracle Database

SecureFiles is a new LOB storage architecture introduced in Oracle Database 11g Release 1. It is recommended to use SecureFiles for the Oracle Fusion Middleware schemas, in particular for the Oracle SOA Suite schemas.

Beginning with Oracle Database 11g Release 1, Oracle introduced SecureFiles, a new LOB storage architecture. Oracle recommends using SecureFiles for the Oracle Fusion Middleware schemas, in particular for the Oracle SOA Suite schemas. For more information, see Using Oracle SecureFiles LOBs in the *Oracle Database SecureFiles and Large Objects Developer's Guide*.

In Oracle 12*c* Databases, the default setting for using SecureFiles is `PREFERRED` . This means that the database attempts to create a SecureFiles LOB unless a BasicFiles LOB is explicitly specified for the LOB or the parent LOB (if the LOB is in a partition or sub-partition). The Oracle Fusion Middleware schemas do not explicitly specify BasicFiles, which means that Oracle Fusion Middleware LOBs will default to SecureFiles when installed in an Oracle 12*c* database.

For Oracle 11*g* databases, the `db_securefile` system parameter controls the SecureFiles usage policy. This parameter can be modified dynamically. The following options can be used for using SecureFiles:

- `PERMITTED`: allows SecureFiles to be created (This is the default setting for db_securefile. The default storage method uses BasicFiles)
- `FORCE`: create all (new) LOBs as SecureFiles
- `ALWAYS`: try to create LOBs as SecureFiles, but fall back to BasicFiles if not possible (if ASSM is disabled)

Other values for the `db_securefile` parameter are:

- `IGNORE`: ignore attempts to create SecureFiles
- `NEVER`: disallow new SecureFiles creations

For Oracle 11*g* Databases, Oracle recommends that you set the `db_securefile` parameter to `FORCE` before creating the Oracle Fusion Middleware schemas with the Repository Creation Utility (RCU).

Note that the SecureFiles segments require tablespaces managed with automatic segment space management (ASSM). This means that LOB creation on SecureFiles will fail if ASSM is not enabled. However, the Oracle Fusion Middleware tablespaces are created by default with ASSM enabled. As a result, with the default configuration, nothing needs to be changed to enable SecureFiles for the Oracle Fusion Middleware schemas.

9.5 About Database Backup Strategies

Performing a database backup at key points in the installation and configuration of an enterprise deployment enables you to recover quickly from any issue that might occur in the later configuration steps.

At key points in the installation and configuration of an enterprise deployment, this guide recommends that you back up your current environment. For example, after you install the product software and create the schemas for a particular Oracle Fusion Middleware product, you should perform a database backup. Performing a backup allows you to perform a quick recovery from any issue that might occur in the later configuration steps.

You can choose to use your own backup strategy for the database, or you can simply make a backup using operating system tools or RMAN for this purpose.

Oracle recommends using Oracle Recovery Manager for the database, particularly if the database was created using Oracle Automatic Storage Management. If possible, you can also perform a cold backup using operating system tools such as tar.

9.6 Implementing a Database Growth Management Strategy for Oracle SOA Suite

An Oracle SOA Suite enterprise deployment presents several challenges for database administrators, including managing the growth of the Oracle SOA Suite database. Underestimating the importance of managing the database can lead to issues when the database is moved to a production environment.

For information about determining an appropriate strategy and planning for capacity, testing, and monitoring, see Introduction to Planning for Database Growth in *Administering Oracle SOA Suite and Oracle Business Process Management Suite*.

Part III

Configuring the Enterprise Deployment

This part of the Enterprise Deployment Guide contains the following topics:

Creating the Initial Infrastructure Domain for an Enterprise Deployment

Configuring Oracle HTTP Server for an Enterprise Deployment
When configuring the Web tier, you have the option of using Oracle HTTP Server or Oracle Traffic Director. If you choose to use Oracle HTTP Server, then you must install Oracle HTTP Server on each of the Web tier hosts and configure Oracle HTTP standalone domains on each host.

Configuring Oracle Traffic Director for an Enterprise Deployment
When configuring the Web tier, you have the option of using Oracle Traffic Director to route requests to the application tier, rather than Oracle HTTP Server. The procedure for configuring Oracle Traffic Director is different than the procedure for configuring Oracle HTTP Server. If you decide to use Oracle Traffic Director, then you must install Oracle Traffic Director on both the Web tier hosts and the Application Tier hosts. Then, you extend the enterprise deployment domain to include Oracle Traffic Director.

Extending the Domain with Oracle SOA Suite

Extending the Domain with Oracle Service Bus
The procedures described in this chapter guide you through the process of extending the enterprise deployment topology with Oracle Service Bus (OSB).

Extending the Domain with Business Process Management

Extending the Domain with Oracle Enterprise Scheduler

Extending the Domain with Business Activity Monitoring

Extending the Domain with Oracle B2B

Extending the Domain with Oracle SOA Suite for Healthcare Integration
The procedures explained in this chapter guide you through the process of extending the domain to include Oracle SOA Suite for healthcare integration (Oracle Healthcare).

Configuring Oracle Managed File Transfer in an Enterprise Deployment
The procedures explained in this chapter guide you through the process of adding Oracle Managed File Transfer to your enterprise deployment.

Extending the Domain with Oracle Real-Time Integration Business Insight
You can extend your domain to include Oracle Real-Time Integration Business Insight, an application designed for business users. The

application enables users to model, collect, and monitor business-level metrics using web-based dashboards, and reports.

10

Creating the Initial Infrastructure Domain for an Enterprise Deployment

The following topics describe how to install and configure an initial domain, which can be used as the starting point for an enterprise deployment. Later chapters in this guide describe how to extend this initial domain with the various products and components that comprise the enterprise topology you are deploying.

Modifying the Upload and Stage Directories to an Absolute Path
After configuring the domain and unpacking it to the Managed Server domain directories on all the hosts, verify and update the upload and stage directories for Managed Servers in the new clusters.

Creating a New LDAP Authenticator and Provisioning Enterprise Deployment Users and Group
When you configure an Oracle Fusion Middleware domain, the domain is configured by default to use the WebLogic Server authentication provider (`DefaultAuthenticator`). However, for an enterprise deployment, Oracle recommends that you use a dedicated, centralized LDAP-compliant authentication provider.

Adding the wsm-pm Role to the Administrators Group
After you configure a new LDAP-based Authorization Provider and restart the Administration Server, add the enterprise deployment administration LDAP group (`SOA Administrators`) as a member to the `policy.Updater` role in the `wsm-pm` application stripe.

10.1 About the Initial Infrastructure Domain

Before you create the initial Infrastructure domain, be sure to review the following key concepts.

About the Infrastructure Distribution

Characteristics of the Domain

10.1.1 About the Infrastructure Distribution

You create the initial Infrastructure domain for an enterprise deployment using the Oracle Fusion Middleware Infrastructure distribution. This distribution contains both the Oracle WebLogic Server software and the Oracle JRF software.

The Oracle JRF software consists of Oracle Web Services Manager, Oracle Application Development Framework (Oracle ADF), Oracle Enterprise Manager Fusion Middleware Control, the Repository Creation Utility (RCU), and other libraries and technologies required to support the Oracle Fusion Middleware products.

Later in this guide, you can then extend the domain to support the Oracle Fusion Middleware products required for your enterprise deployment.

For more information, see "Understanding Oracle Fusion Middleware Infrastructure" in *Understanding Oracle Fusion Middleware*.

10.1.2 Characteristics of the Domain

The following table lists some of the key characteristics of the domain you are about to create. Reviewing these characteristics helps you to understand the purpose and context of the procedures used to configure the domain.

Many of these characteristics are described in more detail in Understanding a Typical Enterprise Deployment.

Characteristic of the Domain	More Information
Uses a separate virtual IP (VIP) address for the Administration Server.	Configuration of the Administration Server and Managed Servers Domain Directories

Characteristic of the Domain	More Information
Uses separate domain directories for the Administration Server and the Managed Servers in the domain.	Configuration of the Administration Server and Managed Servers Domain Directories
Includes a dedicated cluster for Oracle Web Services Manager	Using Oracle Web Services Manager in the Application Tier
Uses a per host Node Manager configuration.	About the Node Manager Configuration in a Typical Enterprise Deployment
Requires a separately installed LDAP-based authentication provider.	Understanding OPSS and Requests to the Authentication and Authorization Stores

10.2 Variables Used When Creating the Infrastructure Domain

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

These directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- APPLICATION_HOME
- JAVA_HOME
- NM_HOME

In addition, you'll be referencing the following virtual IP (VIP) addresses and host names defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINHOST
- SOAHOST1
- SOAHOST2
- DBHOST1
- DBHOST2
- SCAN Address for the Oracle RAC Database (DB-SCAN.examle.com)

10.3 Installing the Oracle Fusion Middleware Infrastructure on SOAHOST1

Use the following sections to install the Oracle Fusion Middleware Infrastructure software in preparation for configuring a new domain for an enterprise deployment.

Installing a Supported JDK

Starting the Infrastructure Installer on SOAHOST1

Navigating the Infrastructure Installation Screens

Installing Oracle Fusion Middleware Infrastructure on the Other Host Computers

Checking the Directory Structure
After you install the Oracle Fusion Middleware Infrastructure and create the Oracle home, you should see the directory and sub-directories listed in this topic. The contents of your installation vary based on the options you selected during the installation.

10.3.1 Installing a Supported JDK

Oracle Fusion Middleware requires that a certified Java Development Kit (JDK) is installed on your system. See the following sections for more information:

Locating and Downloading the JDK Software

Installing the JDK Software

10.3.1.1 Locating and Downloading the JDK Software

To find a certified JDK, see the certification document for your release on the Oracle Fusion Middleware Supported System Configurations page.

After you identify the Oracle JDK for the current Oracle Fusion Middleware release, you can download an Oracle JDK from the following location on Oracle Technology Network:

```
http://www.oracle.com/technetwork/java/index.html
```

Be sure to navigate to the download for the Java SE JDK.

10.3.1.2 Installing the JDK Software

Install the JDK in the following locations:

- On the shared storage device, where it will be accessible from each of the application tier host computers. Install the JDK in the `/u01/oracle/products/jdk` directory.
- On the local storage device for each of the Web tier host computers.

  The Web tier host computers, which reside in the DMZ, do not necessarily have access to the shared storage on the application tier.

For more information about the recommended location for the JDK software, see the Understanding the Recommended Directory Structure for an Enterprise Deployment.

The following example describes how to install a recent version of JDK 1.8.0_101.

1. Change directory to the location where you downloaded the JDK archive file.

   ```
   cd download_dir
   ```

2. Unpack the archive into the JDK home directory, and then run the following commands:

   ```
   tar -xzvf jdk-8u101-linux-x64.tar.gz
   ```

Note that the JDK version listed here was accurate at the time this document was published. For the latest supported JDK, see the *Oracle Fusion Middleware System Requirements and Specifications* for the current Oracle Fusion Middleware release.

3. Move the JDK directory to the recommended location in the directory structure.

   For example:

   ```
   mv ./jdk1.8.0_101 /u01/oracle/products/jdk
   ```

   For more information, see File System and Directory Variables Used in This Guide.

4. Define the *JAVA_HOME* and *PATH* environment variables for running Java on the host computer.

   For example:

   ```
   export JAVA_HOME=/u01/oracle/products/jdk
   ```

   ```
   export PATH=$JAVA_HOME/bin:$PATH
   ```

5. Run the following command to verify that the appropriate `java` executable is in the path and your environment variables are set correctly:

   ```
   java -verison
   ```

   The Java version in the output should be displayed as “1.8.0_101”.

10.3.2 Starting the Infrastructure Installer on SOAHOST1

To start the installation program, perform the following steps.

1. Log in to SOAHOST1.

2. Go to the directory where you downloaded the installation program.

3. Launch the installation program by invoking the `java` executable from the JDK directory on your system, as shown in the example below.

   ```
   $JAVA_HOME/bin/java -d64 -jar distribution_file_name.jar
   ```

   In this example:

   - Replace *`JAVA_HOME`* with the environment variable or actual JDK location on your system.

   - Replace *`distribution_file_name`* with the actual name of the distribution JAR file.

     If you download the distribution from the Oracle Technology Network (OTN), then the JAR file is typically packaged inside a downloadable ZIP file.

     To install the software required for the initial Infrastructure domain, the distribution you want to install is **fmw_12.2.1.2_infrastructure_generic.jar**.

     For more information about the actual file names of each distribution, see Identifying and Obtaining Software Downloads for an Enterprise Deployment.

When the installation program appears, you are ready to begin the installation. See Navigating the Installation Screens for a description of each installation program screen.

10.3.3 Navigating the Infrastructure Installation Screens

The installation program displays a series of screens, in the order listed in the following table.

If you need additional help with any of the installation screens, click the screen name or click the **Help** button on the screen.

Table 10-1 Navigating the Infrastructure Installation Screens

Screen	Description
Installation Inventory Setup	On UNIX operating systems, this screen appears if you are installing any Oracle product on this host for the first time. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Understanding the Oracle Central Inventory in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Welcome	This screen introduces you to the product installer.
Auto Updates	Use this screen to search My Oracle Support automatically for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. For the purposes of an enterprise deployment, enter the value of the *ORACLE_HOME* variable listed in Table 7-2.
Installation Type	Use this screen to select the type of installation and as a consequence, the products and feature sets you want to install. For this topology, select **Fusion Middleware Infrastructure**. **Note:** The topology in this document does not include server examples. Oracle strongly recommends that you do not install the examples into a production environment.
Prerequisite Checks	This screen verifies that your system meets the minimum requirements. If there are any warning or error messages, refer to the Oracle Fusion Middleware System Requirements and Specifications document on the Oracle Technology Network (OTN).
Security Updates	If you already have an Oracle Support account, use this screen to indicate how you would like to receive security updates. If you do not have one and are sure that you want to skip this step, clear the check box and verify your selection in the follow-up dialog box.

Table 10-1 (Cont.) Navigating the Infrastructure Installation Screens

Screen	Description
Installation Summary	Use this screen to verify the installation options that you have selected. If you want to save these options to a response file, click **Save Response File** and provide the location and name of the response file. Response files can be used later in a silent installation situation. For more information about silent or command-line installation, see Using the Oracle Universal Installer in Silent Mode in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Installation Progress	This screen allows you to see the progress of the installation.
Installation Complete	This screen appears when the installation is complete. Review the information on this screen, then click **Finish** to dismiss the installer.

10.3.4 Installing Oracle Fusion Middleware Infrastructure on the Other Host Computers

If you have configured a separate shared storage volume or partition for SOAHOST2, then you must also install the Infrastructure on SOAHOST2.

For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

To install the software on the other host computers in the topology, log in to each host, and use the instructions in Starting the Infrastructure Installer on SOAHOST1 and Navigating the Infrastructure Installation Screens to create the Oracle home on the appropriate storage device.

Note:

In previous releases, the recommended enterprise topology included a colocated set of Oracle HTTP Server instances. In those releases, there was a requirement to install the Infrastructure on the Web Tier hosts (WEBHOST1 and WEBHOST2). However, for this release, the enterprise deployment topology assumes that the Web servers are installed and configured in standalone mode, so they are not considered part of the application tier domain. For more information, see Configuring Oracle HTTP Server for an Enterprise Deployment

10.3.5 Checking the Directory Structure

After you install the Oracle Fusion Middleware Infrastructure and create the Oracle home, you should see the directory and sub-directories listed in this topic. The contents of your installation vary based on the options you selected during the installation.

To check the directory structure:

1. Change to the *ORACLE_HOME* directory where you installed the Infrastructure.
2. Enter the following command:

```
ls --format=single-column
```

The directory structure on your system must match the structure shown in the following example:

```
cfgtoollogs
coherence
em
install
inventory
OPatch
oracle_common
oraInst.loc
oui
wlserver
```

For more information about the directory structure after the installation complete, see What are the Key Oracle Fusion Middleware Directories? in *Understanding Oracle Fusion Middleware*.

10.4 Creating the Database Schemas

Oracle Fusion Middleware components require the existence of schemas in a database before you configure a Fusion Middleware Infrastructure domain. Install the schemas listed in this topic in a certified database for use with this release of Oracle Fusion Middleware.

- Metadata Services (MDS)
- Audit Services (IAU)
- Audit Services Append (IAU_APPEND)
- Audit Services Viewer (IAU_VIEWER)
- Oracle Platform Security Services (OPSS)
- User Messaging Service (UMS)
- WebLogic Services (WLS)
- Common Infrastructure Services (STB)

Use the Repository Creation Utility (RCU) to create the schemas. This utility is installed in the Oracle home for each Oracle Fusion Middleware product. For more information about RCU and how the schemas are created and stored in the database, see Preparing for Schema Creation in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

Complete the following steps to install the required schemas:

Installing and Configuring a Certified Database

Starting the Repository Creation Utility (RCU)

Navigating the RCU Screens to Create the Schemas

10.4.1 Installing and Configuring a Certified Database

Make sure you have installed and configured a certified database, and that the database is up and running.

For more information, see the Preparing the Database for an Enterprise Deployment.

10.4.2 Starting the Repository Creation Utility (RCU)

To start the Repository Creation Utility (RCU):

1. Navigate to the *ORACLE_HOME*/oracle_common/bin directory on your system.
2. Make sure the *JAVA_HOME* environment variable is set to the location of a certified JDK on your system. The location should be up to but not including the bin directory. For example, if your JDK is located in /u01/oracle/products/jdk:

   On UNIX operating systems:

   ```
   export JAVA_HOME=/u01/oracle/products/jdk
   ```

3. Start RCU:

   On UNIX operating systems:

   ```
   ./rcu
   ```

Note:

If your database has Transparent Data Encryption (TDE) enabled, and you want to encrypt your tablespaces created by the RCU, provide the -encryptTablespace true option when you start the RCU.

This will default the appropriate RCU GUI Encrypt Tablespace checkbox selection on the Map Tablespaces screen without further effort during the RCU execution. For more information, see olink:RCUUG-GUID-D4AE68B4-11DF-459B-A5F1-D4DAAA3B7233 in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

10.4.3 Navigating the RCU Screens to Create the Schemas

Follow the instructions in this section to create the schemas for the Fusion Middleware Infrastructure domain:

- Task 1, Introducing RCU
- Task 2, Selecting a Method of Schema Creation
- Task 3, Providing Database Credentials
- Task 4, Specifying a Custom Prefix and Selecting Schemas
- Task 5, Specifying Schema Passwords
- Task 6, Completing Schema Creation

Task 1 Introducing RCU

Review the Welcome screen and verify the version number for RCU. Click **Next** to begin.

Task 2 Selecting a Method of Schema Creation

If you have the necessary permission and privileges to perform DBA activities on your database, select **System Load and Product Load** on the Create Repository screen. The procedure in this document assumes that you have the necessary privileges.

If you do not have the necessary permission or privileges to perform DBA activities in the database, you must select **Prepare Scripts for System Load** on this screen. This option will generate a SQL script, which can be provided to your database administrator. See Understanding System Load and Product Load in *Creating Schemas with the Repository Creation Utility*.

> **Tip:**
>
> For more information about the options on this screen, see Create repository in *Creating Schemas with the Repository Creation Utility*.

Task 3 Providing Database Credentials

On the Database Connection Details screen, provide the database connection details for RCU to connect to your database.

In the **Host Name** field, enter the SCAN address of the Oracle RAC Database.

Click **Next** to proceed, then click **OK** in the dialog window confirming that connection to the database was successful.

> **Tip:**
>
> For more information about the options on this screen, see Database Connection Details in *Creating Schemas with the Repository Creation Utility*.

Task 4 Specifying a Custom Prefix and Selecting Schemas

1. Specify the custom prefix you want to use to identify the Oracle Fusion Middleware schemas.

   The custom prefix is used to logically group these schemas together for use in this domain. For the purposes of this guide, use the prefix `FMW12212`.

   > **Tip:**
   >
   > Make a note of the custom prefix you choose to enter here; you will need this later, during the domain creation process.
   >
   > For more information about custom prefixes, see Understanding Custom Prefixes in *Creating Schemas with the Repository Creation Utility*.

2. Select **AS Common Schemas**.

   When you select **AS Common Schemas**, all of the schemas in this section are automatically selected.

   If the schemas in this section are not automatically selected, then select the required schemas.

A schema called **Common Infrastructure Services** is also automatically created; this schema is grayed out and cannot be selected or deselected. This schema (the STB schema) enables you to retrieve information from RCU during domain configuration. For more information, see Understanding the Service Table Schema in *Creating Schemas with the Repository Creation Utility*.

Tip:
For more information about how to organize your schemas in a multi-domain environment, see Planning Your Schema Creation in *Creating Schemas with the Repository Creation Utility*.

Click **Next** to proceed, then click **OK** on the dialog window confirming that prerequisite checking for schema creation was successful.

Task 5 Specifying Schema Passwords

Specify how you want to set the schema passwords on your database, then specify and confirm your passwords.

Tip:
You must make a note of the passwords you set on this screen; you will need them later on during the domain creation process.

Task 6 Completing Schema Creation

Navigate through the remainder of the RCU screens to complete schema creation.

For the purposes of this guide, you can accept the default settings on the remaining screens, or you can customize how RCU creates and uses the required tablespaces for the Oracle Fusion Middleware schemas.

Note:
You can configure a Fusion Middleware component to use JDBC stores for JMS servers and Transaction Logs, by using the Configuration Wizard. These JDBC stores are placed in the WLS Services component tablespace. Depending on the environment load, you can change the default size of the <*PREFIX*>_WLS tablespace.

For more information about RCU and its features and concepts, see About the Repository Creation Utility in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

When you reach the Completion Summary screen, click **Close** to dismiss RCU.

10.5 Configuring the Infrastructure Domain

The following topics provide instructions for creating a WebLogic Server domain using the Fusion Middleware Configuration wizard.

For more information on other methods available for domain creation, see Additional Tools for Creating, Extending, and Managing WebLogic Domains in *Creating WebLogic Domains Using the Configuration Wizard*.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Configure the Infrastructure Domain

10.5.1 Starting the Configuration Wizard

To begin domain configuration, run the following command in the Oracle Fusion Middleware Oracle home on SOAHOST1.

```
ORACLE_HOME/oracle_common/common/bin/config.sh
```

10.5.2 Navigating the Configuration Wizard Screens to Configure the Infrastructure Domain

Follow the instructions in the following sections to create and configure the domain for the topology, with static clusters.

Creating the Domain with Static Clusters

10.5.2.1 Creating the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology.

Domain creation and configuration includes the following tasks.

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Templates
- Task 3, Selecting the Application Home Location
- Task 4, Configuring the Administrator Account
- Task 5, Specifying the Domain Mode and JDK
- Task 6, Specifying the Database Configuration Type
- Task 7, Specifying JDBC Component Schema Information
- Task 8, Providing the GridLink Oracle RAC Database Connection Details
- Task 9, Testing the JDBC Connections
- Task 10, Selecting Advanced Configuration
- Task 11, Configuring the Administration Server Listen Address
- Task 12, Configuring Node Manager
- Task 13, Configuring Managed Servers
- Task 14, Configuring a Cluster
- Task 15, Assigning Server Templates
- Task 16, Configuring Dynamic Servers
- Task 17, Assigning Managed Servers to the Cluster
- Task 18, Configuring Coherence Clusters
- Task 19, Creating Machines
- Task 20, Assigning Servers to Machines
- Task 21, Creating Virtual Targets
- Task 23, Configuring the File Store

- Task 24, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 25, Writing Down Your Domain Home and Administration Server URL

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Create a new domain**.

In the Domain Location field, specify the value of the *ASERVER_HOME* variable, as defined in File System and Directory Variables Used in This Guide.

> **Tip:**
> More information about the other options on this screen of the Configuration Wizard, see Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Templates

On the Templates screen, make sure **Create Domain Using Product Templates** is selected, then select the following templates:

- **Oracle Enterprise Manager - 12.2.1.2.0[em]**

  Selecting this template automatically selects the following dependencies:

  – Oracle JRF - 12.2.1.2[oracle_common]

  – WebLogic Coherence Cluster Extension - 12.2.1.2[wlserver]

- **Oracle WSM Policy Manager - 12.2.1.2.0[oracle_common]**

> **Tip:**
> More information about the options on this screen can be found in Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Selecting the Application Home Location

On the Application Location screen, specify the value of the *APPLICATION_HOME* variable, as defined in File System and Directory Variables Used in This Guide.

> **Tip:**
> More information about the options on this screen can be found in Application Location in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 4 Configuring the Administrator Account

On the Administrator Account screen, specify the user name and password for the default WebLogic Administrator account for the domain.

Make a note of the user name and password specified on this screen; you will need these credentials later to boot and connect to the domain's Administration Server.

Task 5 Specifying the Domain Mode and JDK

On the Domain Mode and JDK screen:

- Select **Production** in the Domain Mode field.
- Select the **Oracle Hotspot** JDK in the JDK field.

Selecting **Production Mode** on this screen gives your environment a higher degree of security, requiring a user name and password to deploy applications and to start the Administration Server.

Tip:
More information about the options on this screen, including the differences between development mode and production mode, can be found in Domain Mode and JDK in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

In production mode, a boot identity file can be created to bypass the need to provide a user name and password when starting the Administration Server. For more information, see Creating the boot.properties File.

Task 6 Specifying the Database Configuration Type

Select **RCU Data** to activate the fields on this screen.

The **RCU Data** option instructs the Configuration Wizard to connect to the database and Service Table (STB) schema to automatically retrieve schema information for the schemas needed to configure the domain.

Note:
If you choose to select **Manual Configuration** on this screen, you will have to manually fill in the parameters for your schema on the JDBC Component Schema screen.

After selecting **RCU Data**, fill in the fields as shown in the following table.

Field	Description
DBMS/Service	Enter the service name for the Oracle RAC database where you will install the product schemas. For example: `orcl.example.com` Specify the service name that you created for the application you are deploying. Do not use the default database service name. For more information, see Preparing the Database for an Enterprise Deployment.
Host Name	Enter the Single Client Access Name (SCAN) Address for the Oracle RAC database, which you entered in the *Enterprise Deployment Workbook*.
Port	Enter the port number on which the database listens. For example, `1521`.

Field	Description
Schema Owner Schema Password	Enter the user name and password for connecting to the database's Service Table schema. This is the schema user name and password that was specified for the Service Table component on the "Schema Passwords" screen in RCU (see Creating the Database Schemas). The default user name is *`prefix`*`_STB`, where *`prefix`* is the custom prefix that you defined in RCU.

Click **Get RCU Configuration** when you are finished specifying the database connection information. The following output in the Connection Result Log indicates that the operating succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK

Successfully Done.
```

Click **Next** if the connection to the database is successful.

> **Tip:**
> More information about the **RCU Data** option can be found in Understanding the Service Table Schema in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.
>
> More information about the other options on this screen can be found in Datasource Defaults in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 7 Specifying JDBC Component Schema Information

Verify that the values on the JDBC Component Schema screen are correct for all schemas.

The schema table should be populated, because you selected **Get RCU Data** on the previous screen. As a result, the Configuration Wizard locates the database connection values for all the schemas required for this domain.

At this point, the values are configured to connect to a single-instance database. However, for an enterprise deployment, you should use a highly available Real Application Clusters (RAC) database, as described in Preparing the Database for an Enterprise Deployment.

In addition, Oracle recommends that you use an Active GridLink datasource for each of the component schemas. For more information about the advantages of using GridLink data sources to connect to a RAC database, see Database Considerations in the*Oracle Fusion Middleware High Availability Guide*.

To convert the data sources to GridLink:

1. Select all the schemas by selecting the checkbox at in the first header row of the schema table.

2. Click **Convert to GridLink** and click **Next**.

Task 8 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

For more information about specifying the information on this screen, as well as information about how to identify the correct SCAN address, see Configuring Active GridLink Data Sources with Oracle RAC in the *Oracle Fusion Middleware High Availability Guide*.

You can also click **Help** to display a brief description of each field on the screen.

Task 9 Testing the JDBC Connections

Use the JDBC Component Schema Test screen to test the data source connections you have just configured.

A green check mark in the Status column indicates a successful test. If you encounter any issues, see the error message in the Connection Result Log section of the screen, fix the problem, then try to test the connection again.

> **Tip:**
>
> More information about the other options on this screen can be found in Test Component Schema in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*

Task 10 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Administration Server**

  This is required to properly configure the listen address of the Administration Server.

- **Node Manager**

  This is required to configure Node Manager.

- **Topology**

This is required to add, delete, or modify the Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

- **File Store**

  This is required to configure the appropriate shared storage for JMS persistent stores.

> **Note:**
> When using the Advanced Configuration screen in the Configuration Wizard:
>
> - If any of the above options are not available on the screen, then return to the Templates screen, and be sure you selected the required templates for this topology.
> - Do not select the **Domain Frontend Host Capture** advanced configuration option. You will later configure the frontend host property for specific clusters, rather than for the domain.

Task 11 Configuring the Administration Server Listen Address

On the Administration Server screen:

1. In the **Server Name** field, retain the default value - AdminServer.
2. In the **Listen Address** field, enter the virtual host name that corresponds to the VIP of the ADMINVHN that you procured in Procuring Resources for an Enterprise Deployment and enabled in Preparing the Host Computers for an Enterprise Deployment.

   For more information on the reasons for using the ADMINVHN virtual host, see Reserving the Required IP Addresses for an Enterprise Deployment.
3. Leave the other fields at their default values.

   In particular, be sure that no server groups are assigned to the Administration Server.

Task 12 Configuring Node Manager

Select **Manual Node Manager Setup** as the Node Manager type.

> **Tip:**
> For more information about the options on this screen, see Node Manager in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.
>
> For more information about per domain and per host Node Manager implementations, see About the Node Manager Configuration in a Typical Enterprise Deployment.
>
> For additional information, see Configuring Node Manager on Multiple Machines in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

Task 13 Configuring Managed Servers

Use the Managed Servers screen to create two new Managed Servers:

1. Click the **Add** button to create a new Managed Server.
2. Specify `WLS_WSM1` in the **Server name** column.
3. In the **Listen Address** column, enter *SOAHOST1*.

   Be sure to enter the host name that corresponds to SOAHOST1; do not use the IP address.
4. In the **Listen Port** column, enter `7010`.
5. In the **Server Groups** drop-down list, select **JRF-MAN-SVR** and **WSMPM-MAN-SVR**.

   These server groups ensure that the Oracle JRF and Oracle Web Services Manager (OWSM) services are targeted to the Managed Servers you are creating.

   Server groups target Fusion Middleware applications and services to one or more servers by mapping defined groups of application services to each defined server group. Any application services that are mapped to a given server group are automatically targeted to all servers that are assigned to that group. For more information, see Application Service Groups, Server Groups, and Application Service Mappings in *Oracle Fusion Middleware Domain Template Reference*.

   Note:

   Nonce caching for Oracle Web Services is initialized automatically by the WSM-CACHE-SVR server group and is suitable for most custom applications. This initialization is automatically performed in SOA, OSB and other FMW servers that run JRF and create a coherence cluster. Nonce is a unique number that can be used only once in a SOAP request and is used to prevent replay attacks. Nonce caching will naturally scale with the number of added Managed Servers running Web service applications.

   For advanced caching configurations, see Caching the Nonce with Oracle Coherence in *Oracle Fusion Middleware Securing Web Services and Managing Policies with Oracle Web Services Manager*, which provides additional guidance for the use of nonce caching and the WSM-CACHE-SVR server-group in custom WLS servers.

6. Repeat this process to create a second Managed Server named `WLS_WSM2`.

   For the **Listen Address**, enter *SOAHOST2*. For the **Listen Port**, enter 7010. Apply the same server groups you applied to the first managed server to the WLS_WSM2.

The Managed Server names suggested in this procedure (WLS_WSM1 and WLS_WSM2) will be referenced throughout this document; if you choose different names then be sure to replace them as needed.

Tip:

More information about the options on this screen can be found in Managed Servers in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 14 Configuring a Cluster

Use the Clusters screen to create a new cluster:

1. Click the **Add** button.
2. Specify `WSM-PM_Cluster` in the **Cluster Name** field.
3. From the **Dynamic Server Groups** drop-down list, select `Unspecified`.

> **Tips:**
> For more information about the options on this screen, see Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 15 Assigning Server Templates

Click **Next** to continue.

Task 16 Configuring Dynamic Servers

Verify that all dynamic server options are disabled for clusters that are to remain as static clusters.

1. Confirm that the **Dynamic Cluster**, **Calculated Listen Port**, and **Calculated Machine Names** checkboxes on this screen are unchecked.
2. Confirm the **Server Template** selection is **Unspecified**.
3. Click **Next**.

Task 17 Assigning Managed Servers to the Cluster

Use the Assign Servers to Clusters screen to assign `WLS_WSM1` and `WLS_WSM2` to the new cluster `WSM-PM_Cluster`:

1. In the **Clusters** pane, select the cluster to which you want to assign the servers; in this case, `WSM-PM_Cluster`.
2. In the **Servers** pane, assign `WLS_WSM1` to `WSM-PM_Cluster` by doing one of the following:
   - Click once on `WLS_WSM1` to select it, then click on the right arrow to move it beneath the selected cluster (`WSM-PM_Cluster`) in the Clusters pane.

     OR
   - Double-click on `WLS_WSM1` to move it beneath the selected cluster (`WSM-PM_Cluster`) in the clusters pane.
3. Repeat these steps to assign the WLS_WSM2 Managed Server to the WSM-PM_Cluster.

> **Tip:**
> More information about the options on this screen can be found in Assign Servers to Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 18 Configuring Coherence Clusters

Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain.

In the **Cluster Listen Port**, enter `9991`.

> **Note:**
> For Coherence licensing information, Oracle Coherence Products in *Oracle Fusion Middleware Licensing Information User Manual*.

Task 19 Creating Machines

Use the Machines screen to create new machines in the domain. A machine is required in order for the Node Manager to be able to start and stop the servers.

1. Select the **Unix Machine** tab.
2. Click the **Add** button to create new UNIX machines.

   Use the values in Table 10-2 to define the Name and Node Manager Listen Address of each machine.
3. Verify the port in the Node Manager Listen Port field.

   The port number `5556`, shown in this example, may be referenced by other examples in the documentation. Replace this port number with your own port number as needed.

Name	Node Manager Listen Address	Node Manager Listen Port
ADMINHOST	Enter the value of the ADMINVHN variable.	5556
SOAHOST1	The value of the SOAHOST1 host name variable. For example, `SOAHOST1.example.com`.	5556
SOAHOST2	The value of the SOAHOST2 host name variable. For example, `SOAHOST2.example.com`.	5556

> **Tip:**
> More information about the options on this screen can be found in Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 20 Assigning Servers to Machines

Use the Assign Servers to Machines screen to assign any statically defined managed servers to the appropriate machines.

The Assign Servers to Machines screen is similar to the Assign Managed Servers to Clusters screen. Select the target machine in the Machines column, select the server name in the left column, and click the right arrow to assign the server to the appropriate machine.

Assign the servers as follows:

- Assign the AdminServer to the ADMINHOST machine.
- Assign the WLS-WSM1 Managed Server to the SOAHOST1 machine.
- Assign the WLS-WSM2 Managed Server to the SOAHOST2 machine.

> **Tip:**
> More information about the options on this screen can be found in Assign Servers to Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 21 Creating Virtual Targets

Click **Next**.

Task 22 Creating Partitions

Click **Next**.

Task 23 Configuring the File Store

When you configure the infrastructure domain by using the Oracle WSM Policy Manager configuration template, only the MDS OWSM file store is created. This file store is used only in development mode. Retain the default value and click **Next** to continue.

> **Note:**
> You do not need to customize the MDS file store locations. They are used only in development mode. In the production environments, MDS is persisted in the database.

Task 24 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Create**.

> **Tip:**
> More information about the options on this screen can be found in Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 25 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location

- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start the Administration Server.

Click **Finish** to dismiss the Configuration Wizard.

10.6 Configuring a Per Host Node Manager for an Enterprise Deployment

For specific enterprise deployments, Oracle recommends that you configure a per-host Node Manager, as opposed to the default per-domain Node Manager.

For more information about the advantages of a per host Node Manager, see About the Node Manager Configuration in a Typical Enterprise Deployment

Creating a Per Host Node Manager Configuration
The step in configuring a per-host Node Manager is to create a configuration directory and two new node manager configuration files. You must also edit the default `startNodeManager.sh` file.

Creating the boot.properties File
You must create a `boot.properties` if you want to start the Administrator Server without being prompted for the Administrator Server credentials. This step is required in an enterprise deployment. The credentials you enter in this file are encrypted when you start the Administration Server.

Starting the Node Manager on SOAHOST1
After you manually set up the Node Manager to use a per-host Node Manager configuration, you can start the Node Manager on SOAHOST1, using the `startNodeManager.sh` script.

Configuring the Node Manager Credentials and Type
By default, a per-host Node Manager configuration does not use Secure Socket Layer (SSL) for Node Manager-to-server communications. As a result, you must configure each machine in the domain to use a communication type of "plain," rather than SSL. In addition, you have to set the Node Manager credentials so you can connect to the Administration Server and Managed Servers in the domain.

10.6.1 Creating a Per Host Node Manager Configuration

The step in configuring a per-host Node Manager is to create a configuration directory and two new node manager configuration files. You must also edit the default `startNodeManager.sh` file.

To create a per-host Node Manager configuration, perform the following tasks, first on SOAHOST1, and then on SOAHOST2:

1. Log in to SOAHOST1 and create a directory for the Node Manager configuration files :

   For example:

   ```
   mkdir –p /u02/oracle/config/nodemanager
   ```

   Note that this directory should be on a local disk, because it is specific to the host. This directory location is known as the Node Manager home, and it is identified by the NM_HOME directory variable in examples in this guide.

2. Change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

3. Create a new text file called `nodemanager.properties` and add the values shown in Example 10-1 to this new file.

   For more information about the properties you can add to the nodemanager.properties file, see Node Manager Properties in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

   As part of this configuration in the `nodemanager.properties` file, you will enable Crash Recovery for servers. For more information, see Node Manager and System Crash Recovery in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

4. Locate the `startNodeManager.sh` file in the following directory:

   ```
   WL_HOME/server/bin
   ```

5. Copy the `startNodeManager.sh` file to the Node Manager home directory.

6. Edit the new `startNodeManager.sh` file and add the `NODEMGR_HOME` property as follows:

   ```
   NODEMGR_HOME="NM_HOME"
   ```

   In this example, replace *NM_HOME* with the actual path to the Node Manager home.

7. Create another new file in the Node Manager home directory, called `nodemanager.domains`.

   The `nodemanager.domains` file provides additional security by restricting Node Manager client access to the domains listed in this file.

8. Perform steps 1 through 7 on SOAHOST2.

9. Add the following entries to the new `nodemanager.domains` files:

   On SOAHOST1, add values for both the Administration Server domain home and the Managed Servers domain home:

   ```
   soaedg_domain=MSERVER_HOME;ASERVER_HOME
   ```

   Note:

   The path that is mentioned first (*MSERVER_HOME*) is considered as the primaryDomainPath and Managed Servers will be run from this location.

   On SOAHOST2, add the value for the Managed Servers domain home only:

   ```
   soaedg_domain=MSERVER_HOME
   ```

   In these examples, replace *ASERVER_HOME* and *MSERVER_HOME* with the values of the respective variables, as described in File System and Directory Variables Used in This Guide.

Example 10-1 Contents of the nodemanager.properties File

```
DomainsFile=/u02/oracle/config/nodemanager/nodemanager.domains
LogLimit=0
PropertiesVersion=12.2.1.2.0
AuthenticationEnabled=true
NodeManagerHome=/u02/oracle/config/nodemanager
#Include the specific JDK home
JavaHome=/u01/oracle/products/jdk
LogLevel=INFO
DomainsFileEnabled=true
StartScriptName=startWebLogic.sh
#Leave blank for listening on ANY
ListenAddress=
NativeVersionEnabled=true
ListenPort=5556
LogToStderr=true
SecureListener=false
LogCount=1
StopScriptEnabled=false
QuitEnabled=false
LogAppend=true
StateCheckInterval=500
CrashRecoveryEnabled=true
StartScriptEnabled=true
LogFile=/u02/oracle/config/nodemanager/nodemanager.log
LogFormatter=weblogic.nodemanager.server.LogFormatter
ListenBacklog=50
```

10.6.2 Creating the boot.properties File

You must create a `boot.properties` if you want to start the Administrator Server without being prompted for the Administrator Server credentials. This step is required in an enterprise deployment. The credentials you enter in this file are encrypted when you start the Administration Server.

To create a `boot.properties` file for the Administration Server:

1. Create the following directory structure:

   ```
   mkdir -p ASERVER_HOME/servers/AdminServer/security
   ```

2. In a text editor, create a file called `boot.properties` in the `security` directory created in the previous step, and enter the Administration Server credentials that you defined when you ran the Configuration Wizard to create the domain:

   ```
   username=adminuser
   password=password
   ```

   Note:

   When you start the Administration Server, the `username` and `password` entries in the file get encrypted.

   For security reasons, minimize the amount of time the entries in the file are left unencrypted; after you edit the file, you should start the server as soon as possible so that the entries get encrypted.

3. Save the file and close the editor.

10.6.3 Starting the Node Manager on SOAHOST1

After you manually set up the Node Manager to use a per-host Node Manager configuration, you can start the Node Manager on SOAHOST1, using the `startNodeManager.sh` script.

To start the Node Manager on SOAHOST1:

1. Change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

2. Run the following command to start the Node Manager and send the output of the command to an output file, rather than to the current terminal shell:

   ```
   nohup ./startNodeManager.sh > ./nodemanager.out 2>&1 &
   ```

3. Monitor the the nodemanager.out file; make sure the NodeManager starts successfully. The output should eventually contain a string similar to the following:

   ```
   <INFO><Plain socket listener started on port 5556>
   ```

10.6.4 Configuring the Node Manager Credentials and Type

By default, a per-host Node Manager configuration does not use Secure Socket Layer (SSL) for Node Manager-to-server communications. As a result, you must configure each machine in the domain to use a communication type of “plain,” rather than SSL. In addition, you have to set the Node Manager credentials so you can connect to the Administration Server and Managed Servers in the domain.

The following procedure temporarily starts the Administration Server with the default start script, so you can perform these tasks. After you perform these tasks, you can stop this temporary session and use the Node Manager to start the Administration Server.

1. Start the Administration Server, using the default start script:

   a. Change directory to the following directory:

      ```
      cd ASERVER_HOME/bin
      ```

   b. Run the start script:

      ```
      ./startWebLogic.sh
      ```

      Watch the output to the terminal, until you see the following:

      ```
      <Server state changed to RUNNING>
      ```

2. Log in to the WebLogic Server Administration Console, using the WebLogic administrator user and password.

3. Configure the Node Manager type:

   Note:

   Be sure to perform this task for each WebLogic Server machine in the domain.

a. Click **Lock & Edit**.

b. In the **Domain Structure** navigation tree, expand the name of the domain that you had created through the Configuration Wizard, and then expand **Environment**.

c. Click **Machines**.

d. Click the link for the **ADMINHOST** machine.

e. Click the **Node Manager** tab.

f. Change the **Type** property from SSL to **Plain**.

g. Click **Save**.

h. Repeat this task for each machine in the domain.

i. Click **Activate Changes**.

4. Set the Node Manager credentials:

a. Click **Lock & Edit**.

b. In the **Domain Structure** navigation pane, click the name of the domain.

c. Select the **Security** tab.

The **Security > General** tab must be selected.

d. Scroll down and expand the **Advanced** security options.

e. Make a note of the user name in the **NodeManager Username** field.

Optionally, you can edit the value to create a new Node Manager user name.

f. Enter a new password in the **NodeManager Password** and Confirm **NodeManager Password** fields

g. Click **Save** and then **Activate Changes**.

h. Restart AdminServer.

5. Restart Node Manager.

6. In a new terminal window, use the following steps to refresh the `SystemSerialized.dat` file. Without this step, you cannot connect to the Node Manager and use it to start the servers in the domain:

a. Change the directory to the

```
cd ORACLE_COMMON_HOME/common/bin
```

b. Start the WebLogic Server Scripting Tool (WLST):

```
./wlst.sh
```

c. Connect to the Administration Server, using the following WLST command:

```
connect('admin_user','admin_password','admin_url')
```

For example:

```
connect('weblogic','mypassword','t3://ADMINVHN:7001')
```

d. Use the `nmEnroll` command to enable the Node Manager to manage servers in a specified WebLogic domain.

```
nmEnroll('ASERVER_HOME')
```

For example:

```
nmEnroll('/u01/oracle/config/domains/soaedg_domain')
```

7. Optionally, if you want to customize any startup properties for the Administration Server, you can use the following WLST command to create a `startup.properties` file for the Administration Server:

```
nmGenBootStartupProps('AdminServer')
```

The `startup.properties` file is created in the following directory:

```
ASERVER_HOME/servers/AdminServer/data/nodemanager/
```

8. Return to the terminal window where you started the Administration Server with the start script.

9. Press **Ctrl/C** to stop the Administration Server process.

   Wait for the Administration Server process to end and for the terminal command prompt to appear.

10.7 Configuring the Domain Directories and Starting the Servers on SOAHOST1

After the domain is created and the node manager is configured, you can then configure the additional domain directories and start the Administration Server and the Managed Servers on SOAHOST1.

Starting the Administration Server Using the Node Manager
After you have configured the domain and configured the Node Manager, you can start the Administration Server, using the Node Manager. In an enterprise Deployment, the Node Manager is used to start and stop the Administration Server and all the Managed Servers in the domain.

Validating the Administration Server
Before proceeding with the configuration steps, validate that the Administration Server has started successfully by making sure you have access to the Oracle WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control, which both are installed and configured on the Administration Servers.

Disabling the Derby Database

Creating a Separate Domain Directory for Managed Servers on SOAHOST1
When you initially create the domain for enterprise deployment, the domain directory resides on a shared disk. This default domain directory will be used to run the Administration Server. You can now create a copy of the domain on the local storage for both SOAHOST1 and SOAHOST2. The domain directory on the local (or private) storage will be used to run the Managed Servers.

Starting and Validating the WLS_WSM1 Managed Server on SOAHOST1
After you have configured Node Manager and created the Managed Server domain directory, you can use Oracle Enterprise Manager Fusion Middleware Control to start the WLS_WSM1 Managed Server on SOAHOST1.

10.7.1 Starting the Administration Server Using the Node Manager

After you have configured the domain and configured the Node Manager, you can start the Administration Server, using the Node Manager. In an enterprise Deployment, the Node Manager is used to start and stop the Administration Server and all the Managed Servers in the domain.

To start the Administration Server using the Node Manager:

1. Start the WebLogic Scripting Tool (WLST):

```
cd ORACLE_COMMON_HOME/common/bin
./wlst.sh
```

2. Connect to Node Manager using the Node Manager credentials:

```
wls:/offline>nmConnect('nodemanager_username','nodemanager_password',
             'ADMINVHN','5556','domain_name',
             'ASERVER_HOME','PLAIN')
```

Note:

This user name and password are used only to authenticate connections between Node Manager and clients. They are independent of the server administrator ID and password and are stored in the `nm_password.properties` file located in the following directory:

```
ASERVER_HOME/config/nodemanager
```

3. Start the Administration Server:

```
nmStart('AdminServer')
```

Note:

When you start the Administration Server, it attempts to connect to Oracle Web Services Manager for WebServices policies. It is expected that, since the WSM-PM Managed Servers are not yet started, the following message appears in the Administration Server log:

```
<Warning><oracle.wsm.resources.policymanager>
<WSM-02141><Unable to connect to the policy access service due to Oracle WSM
policy manager host server being down.>
```

4. Exit WLST:

```
exit()
```

10.7.2 Validating the Administration Server

Before proceeding with the configuration steps, validate that the Administration Server has started successfully by making sure you have access to the Oracle WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control, which both are installed and configured on the Administration Servers.

To navigate to Fusion Middleware Control, enter the following URL, and log in with the Oracle WebLogic Server administrator credentials:

```
ADMINVHN:7001/em
```

To navigate to the Oracle WebLogic Server Administration Console, enter the following URL, and log in with the same administration credentials:

```
ADMINVHN:7001/console
```

10.7.3 Disabling the Derby Database

Before you create the Managed Server directory and start the Managed Servers, disable the embedded Derby database, which is a file-based database, packaged with Oracle WebLogic Server. The Derby database is used primarily for development environments. As a result, you must disable it when you are configuring a production-ready enterprise deployment environment; otherwise, the Derby database process starts automatically when you start the Managed Servers.

To disable the Derby database:

1. Navigate to the following directory in the Oracle home.

   ```
   WL_HOME/common/derby/lib
   ```

2. Rename the Derber library jar file:

   ```
   mv derby.jar disable_derby.jar
   ```

3. Complete steps 1 through 2 on each `ORACLE_HOME` for SOAHOST1 and SOAHOST2 if they use separate shared filesystems.

10.7.4 Creating a Separate Domain Directory for Managed Servers on SOAHOST1

When you initially create the domain for enterprise deployment, the domain directory resides on a shared disk. This default domain directory will be used to run the Administration Server. You can now create a copy of the domain on the local storage for both SOAHOST1 and SOAHOST2. The domain directory on the local (or private) storage will be used to run the Managed Servers.

Placing the MSERVER_HOME on local storage is recommended to eliminate the potential contention and overhead cause by servers writing logs to shared storage. It is also faster to load classes and jars need from the domain directory, so any temporary or cache data that Managed Servers use from the domain directory is processed quicker.

As described in Preparing the File System for an Enterprise Deployment, the path to the Administration Server domain home is represented by the ASERVER_HOME variable, and the path to the Managed Server domain home is represented by the MSERVER_HOME variable.

To create the Managed Server domain directory:

1. Sign in to SOAHOST1 and run the `pack` command to create a template as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./pack.sh -managed=true
             -domain=ASERVER_HOME
             -template=/full_path/soadomaintemplate.jar
             -template_name=soa_domain_template
         -log_priority=DEBUG -log=/tmp/pack.log
   ```

   In this example:

   - Replace *ASERVER_HOME* with the actual path to the domain directory you created on the shared storage device.
   - Replace *full_path* with the complete path to the location where you want to create the domain template jar file. You will need to reference this location when you copy or unpack the domain template jar file. It is recommended to choose a shared volume other than *ORACLE_HOME*, or write to `/tmp/` and copy the files manually between servers.

     You must specify a full path for the template jar file as part of the `-template` argument to the pack command:

     ```
     SHARED_CONFIG_DIR/domains/template_filename.jar
     ```

   - `soadomaintemplate.jar` is a sample name for the jar file you are creating, which will contain the domain configuration files.
   - `soa_domain_template` is the label assigned to the template data stored in the template file.

2. Make a note of the location of the `soadomaintemplate.jar` file you just created with the pack command.

   Tip:

   For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

3. If you haven't already, create the recommended directory structure for the Managed Server domain on the SOAHOST1 local storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.

4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./unpack.sh -domain=MSERVER_HOME \
               -overwrite_domain=true \
               -template=/full_path/soadomaintemplate.jar
               -log_priority=DEBUG \
               -log=/tmp/unpack.log \
               -app_dir=APPLICATION_HOME \
   ```

Note:

The `-overwrite_domain` option in the unpack command allows unpacking a managed server template into an existing domain and existing applications directories. For any file that is overwritten, a backup copy of the original is created. If any modifications had been applied to the start scripts and ear files in the managed server domain directory, they must be restored after this unpack operation.

Additionally, to customize server startup parameters that apply to all servers in a domain, you can create a file called setUserOverrides.sh and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

In this example:

- Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.
- Replace *full_path* with the complete path to the location where you created or copied the template jar file.
- `soadomaintemplate.jar` is the name of the template jar file you created when you ran the pack command to pack up the domain on the shared storage device.

Tip:

For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created Managed Server directory and verify that the domain configuration files were copied to the correct location on the SOAHOST1 local storage device.

10.7.5 Starting and Validating the WLS_WSM1 Managed Server on SOAHOST1

After you have configured Node Manager and created the Managed Server domain directory, you can use Oracle Enterprise Manager Fusion Middleware Control to start the WLS_WSM1 Managed Server on SOAHOST1.

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

```
http://ADMINVHN:7001/em
```

In this example:

- Replace *ADMINVHN* with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Downloads for an Enterprise Deployment.

- Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that was displayed at the end of the Configuration Wizard session when you created the domain.

  Tip:

  For more information about managing Oracle Fusion Middleware using Oracle Enterprise Manager Fusion Middleware, see Getting Started Using Oracle Enterprise Manager Fusion Middleware Control in *Oracle Fusion Middleware Administering Oracle Fusion Middleware*.

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. Select the **Servers** pane to view the Managed Servers in the domain.

4. Select only the **WLS_WSM1** Managed Server, and note the assigned port number

5. Click **Control** > **Start** on the tool bar to start the selected **WLS_WSM1** Managed Server.

6. To verify that the Managed Server is working correctly, open your browser and enter the following URL, using the appropriate port number:

   ```
   SOAHOST1:<port-number>/wsm-pm/
   ```

   Enter the domain admin user name and password when prompted.

10.8 Propagating the Domain and Starting the Servers on SOAHOST2

After you start and validate the Administration Server and WLS_WSM1 Managed Server on SOAHOST1, you can then perform the following tasks on SOAHOST2.

Unpacking the Domain on SOAHOST2

Starting the Node Manager on SOAHOST2

Starting and Validating the WLS_WSM2 Managed Server on SOAHOST2

10.8.1 Unpacking the Domain on SOAHOST2

This procedure assumes you have copied the file that you created earlier in a location that is accessible from both SOAHOST1 and SOAHOST2; such as the *ASERVER_HOME* directory, which is located on the shared storage filer:

1. Log in to SOAHOST2.

2. If you haven't already, create the recommended directory structure for the Managed Server domain on the SOAHOST2 storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.

3. Make sure the `soadomaintemplate.jar` accessible to SOAHOST2.

   For example, if you are using a separate shared storage volume or partition for SOAHOST2, then copy the template to the volume or partition mounted to SOAHOST2.

4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./unpack.sh -domain=MSERVER_HOME
               -overwrite_domain=true
               -template=complete_path/soadomaintemplate.jar
               -log_priority=DEBUG
               -log=/tmp/unpack.log
               -app_dir=APPLICATION_HOME
   ```

   Note:

   The `-overwrite_domain` option in the unpack command allows unpacking a managed server template into an existing domain and existing applications directories. For any file that is overwritten, a backup copy of the original is created. If any modifications had been applied to the start scripts and ear files in the managed server domain directory, they must be restored after this unpack operation.

   Additionally, to customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

   In this example:

   - Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.

   - Replace *complete_path*/`soadomaintemplate.jar` with the complete path and file name of the domain template jar file that you created when you ran the pack command to pack up the domain on the shared storage device.

   - Replace *APPLICATION_HOME* with the complete path to the Application directory for the domain on shared storage. For more information, see File System and Directory Variables Used in This Guide.

     Tip:

     For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created MSERVER_HOME directory and verify that the domain configuration files were copied to the correct location on the SOAHOST2 local storage device.

10.8.2 Starting the Node Manager on SOAHOST2

After you manually set up the Node Manager to use a per host Node Manager configuration, you can start the Node Manager using the following commands on SOAHOST2:

1. Change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

2. Run the following command to start the Node Manager and send the output of the command to an output file, rather than to the current terminal shell:

   ```
   nohup ./startNodeManager.sh > nodemanager.out 2>&1 &
   ```

10.8.3 Starting and Validating the WLS_WSM2 Managed Server on SOAHOST2

Use the procedure in Starting and Validating the WLS_WSM1 Managed Server on SOAHOST1 to start and validate the WLS_WSM2 Managed Server on SOAHOST2.

10.9 Modifying the Upload and Stage Directories to an Absolute Path

After configuring the domain and unpacking it to the Managed Server domain directories on all the hosts, verify and update the upload and stage directories for Managed Servers in the new clusters.

This step is necessary to avoid potential issues when performing remote deployments and for deployments that require the stage mode.

To update these directory paths for all the Managed Servers in the Managed Server domain home directory:

1. Log in to the Oracle WebLogic Server Administration Console.
2. In the left navigation tree, expand **Domain**, and then **Environment**.
3. Click **Lock & Edit**.
4. Navigate to and edit the appropriate objects for your cluster type.
   a. For Static Clusters, navigate to Servers and click on the name of the Managed Server to be edited.
5. For each new Managed Server or Server Template to be edited:
   a. Click the **Configuration** tab, and then click the **Deployment** tab.
   b. Verify that the **Staging Directory Name** is set to the following:

      ```
      MSERVER_HOME/servers/server_or_template_name/stage
      ```

      Replace *MSERVER_HOME* with the directory path for the *MSERVER_HOME* directory; If using static clusters, update with the correct name of the Managed Server you are editing.

   c. Update the **Upload Directory Name** to the following value:

      ```
      ASERVER_HOME/servers/AdminServer/upload
      ```

Replace *ASERVER_HOME* with the directory path for the ASERVER_HOME directory.

  d. Click **Save**.

  e. Return to the Summary of Servers or Summary of Server Templates screen as applicable.

6. When you have modified all of the appropriate objects, click **Activate Changes**.

7. Restart all Managed Servers effected by these change.

10.10 Creating a New LDAP Authenticator and Provisioning Enterprise Deployment Users and Group

When you configure an Oracle Fusion Middleware domain, the domain is configured by default to use the WebLogic Server authentication provider (`DefaultAuthenticator`). However, for an enterprise deployment, Oracle recommends that you use a dedicated, centralized LDAP-compliant authentication provider.

The following topics describe how to use the Oracle WebLogic Server Administration Console to create a new authentication provider for the enterprise deployment domain. This procedure assumes you have already installed and configured a supported LDAP directory, such as Oracle Unified Directory or Oracle Internet Directory.

10.10.1 About the Supported Authentication Providers

Oracle Fusion Middleware supports a variety of LDAP authentication providers. For more information, see Identity Store Types and WebLogic Authenticators in *Securing Applications with Oracle Platform Security Services*.

The instructions in this guide assume you will be using one of the following providers:

- Oracle Unified Directory
- Oracle Internet Directory
- Oracle Virtual Directory

Note:

By default, the instructions here describe how to configure the identity service instance to support querying against a single LDAP identity store with an unencrypted connection.

If the connection to your identity provider has to be secured through SSL, then additional keystone configuration is required for role management in the Enterprise Manager Fusion Middleware Control to function correctly. For additional configuration information, see Doc ID 1670789.1 at support.oracle.com.

Also, you can configure the service to support a virtualized identity store, which queries multiple LDAP identity stores, by using LibOVD.

For more information about configuring a Multi-LDAP lookup, refer to Configuring the Identity Store Service in *Securing Applications with Oracle Platform Security Services*.

10.10.2 About the Enterprise Deployment Users and Groups

The following topics provide important information on the purpose and characteristics of the enterprise deployment administration users and groups.

10.10.2.1 About Using Unique Administration Users for Each Domain

When you use a central LDAP user store, you can provision users and groups for use with multiple Oracle WebLogic Server domains. As a result, there is a possibility that one WebLogic administration user can have access to all the domains within an enterprise.

Such an approach is not recommended. Instead, it is a best practice to assign a unique distinguished name (DN) within the directory tree for the users and groups you provision for the administration of your Oracle Fusion Middleware domains.

For example, if you plan to install and configure an Oracle SOA Suite enterprise deployment domain, then create a user called **`weblogic_soa`** and an administration group called **`SOA Administrators`**.

10.10.2.2 About the Domain Connector User

Oracle recommends that you create a separate domain connector user (for example, `soaLDAP`) in your LDAP directory. This user allows the domain to connect to the LDAP directory for the purposes of user authentication. It is recommended that this user be a non-administrative user.

In a typical Oracle Identity and Access Management deployment, you create this user in the `systemids` container. This container is used for system users that are not normally visible to users. Placing the user into the `systemids` container ensures that customers who have Oracle Identity Manager do not reconcile this user.

10.10.2.3 About Adding Users to the Central LDAP Directory

After you configure a central LDAP directory to be the authenticator for the enterprise domain, then you should add all new users to the new authenticator and not to the default WebLogic Server authenticator.

To add new users to the central LDAP directory, you cannot use the WebLogic Administration Console. Instead, you must use the appropriate LDAP modification tools, such as ldapbrowser or JXplorer.

When you are using multiple authenticators (a requirement for an enterprise deployment), login and authentication will work, but role retrieval will not. The role is retrieved from the first authenticator only. If you want to retrieve roles using any other authenticator, then you must enable virtualization for the domain.

To enable virtualization:

1. Locate and open the following configuration file with a text editor:

   ```
   ASERVER_HOME/config/fmwconfig/jps-config.xml
   ```

2. Find the following section:

   ```
    <serviceInstance name="idstore.ldap" provider="idstore.ldap.provider">
   ```

3. Add the following line under the `serviceInstance` section or update the virtualize property as follows:

   ```
   <property name="virtualize" value="true"/>
   ```

   For more information about the virtualize property, see OPSS System and Configuration Properties in *Securing Applications with Oracle Platform Security Services*.

10.10.2.4 About Product-Specific Roles and Groups for Oracle SOA Suite

Each Oracle Fusion Middleware product implements its own predefined roles and groups for administration and monitoring.

As a result, as you extend the domain to add additional products, you can add these product-specific roles to the `SOA Administrators` group. After they are added to the `SOA Administrators` group, each product administrator user can administer the domain with the same set of privileges for performing administration tasks.

Instructions for adding additional roles to the `SOA Administrators` group are provided in Common Configuration and Management Tasks for an Enterprise Deployment.

10.10.2.5 Example Users and Groups Used in This Guide

In this guide, the examples assume that you provision the following administration user and group with the DNs shown below:

- Admin User DN:

  ```
  cn=weblogic_soa,cn=users,dc=example,dc=com
  ```

- Admin Group DN:

  ```
  cn=SOA Administrators,cn=groups,dc=example,dc=com
  ```

- Product-specific LDAP Connector User:

```
cn=soaLDAP,cn=systemids,dc=example,dc=com
```

This is the user you will use to connect WebLogic Managed Servers to the LDAP authentication provider. This user must have permissions to read and write to the Directory Trees:

```
cn=users,dc=example,dc=com
cn=groups,dc=example,dc=com
```

Note:

When using Oracle Unified Directory, this user will need to be granted membership in the following groups to provide read and write access:

```
cn=orclFAUserReadPrivilegeGroup,cn=groups,dc=example,dc=com
cn=orclFAUserWritePrivilegeGroup,cn=groups,dc=example,dc=com
cn=orclFAGroupReadPrivilegeGroup,cn=groups,dc=example,dc=com
cn=orclFAGroupWritePrivilegeGroup,cn=groups,dc=example,dc=com
```

10.10.3 Prerequisites for Creating a New Authentication Provider and Provisioning Users and Groups

Before you create a new LDAP authentication provider, back up the relevant configuration files:

```
ASERVER_HOME/config/config.xml
ASERVER_HOME/config/fmwconfig/jps-config.xml
ASERVER_HOME/config/fmwconfig/system-jazn-data.xml
```

In addition, back up the `boot.properties` file for the Administration Server in the following directory:

```
ASERVER_HOME/servers/AdminServer/security
```

10.10.4 Provisioning a Domain Connector User in the LDAP Directory

This example shows how to create a user called `soaLDAP` in the central LDAP directory.

To provision the user in the LDAP provider:

1. Create an ldif file named `domain_user.ldif` with the contents shown below and then save the file:

   ```
   dn: cn=soaLDAP,cn=systemids,dc=example,dc=com
   changetype: add
   orclsamaccountname: soaLDAP
   userpassword: password
   objectclass: top
   objectclass: person
   objectclass: organizationalPerson
   objectclass: inetorgperson
   objectclass: orcluser
   objectclass: orcluserV2
   mail: soaLDAP@example.com
   givenname: soaLDAP
   sn: soaLDAP
   ```

```
cn: soaLDAP
uid: soaLDAP
```

Note:

If you are using Oracle Unified Directory, then add the following four group memberships to the end of the LDIF file to grant the appropriate read/write privileges:

```
dn:
cn=orclFAUserReadPrivilegeGroup,cn=groups,dc=example,dc=com
changetype: modify
add: uniquemember
uniquemember: cn=soaLDAP,cn=systemids,dc=example,dc=com

dn: cn=orclFAGroupReadPrivilegeGroup,cn=groups,dc=example,dc=com
changetype: modify
add: uniquemember
uniquemember: cn=soaLDAP,cn=systemids,dc=example,dc=com

dn: cn=orclFAUserWritePrivilegeGroup,cn=groups,dc=example,dc=com
changetype: modify
add: uniquemember
uniquemember: cn=soaLDAP,cn=systemids,dc=example,dc=com

dn: cn=orclFAGroupWritePrivilegeGroup,cn=groups,dc=example,dc=com
changetype: modify
add: uniquemember
uniquemember: cn=soaLDAP,cn=systemids,dc=example,dc=com
```

2. Provision the user in the LDAP directory.

   For example, for an Oracle Unified Directory LDAP provider:

```
OUD_INSTANCE_HOME/bin/ldapmodify -a \
                                 -h oudhost.example.com
                                 -D "cn=oudadmin" \
                                 -w password \
                                 -p 1389 \
                                 -f domain_user.ldif
```

   For Oracle Internet Directory:

```
OID_ORACLE_HOME/bin/ldapadd -h oidhost.example.com \
                            -p 3060 \
                            -D cn="orcladmin" \
                            -w password \
                            -c \
                            -v \
                            -f domain_user.ldif
```

10.10.5 Creating the New Authentication Provider

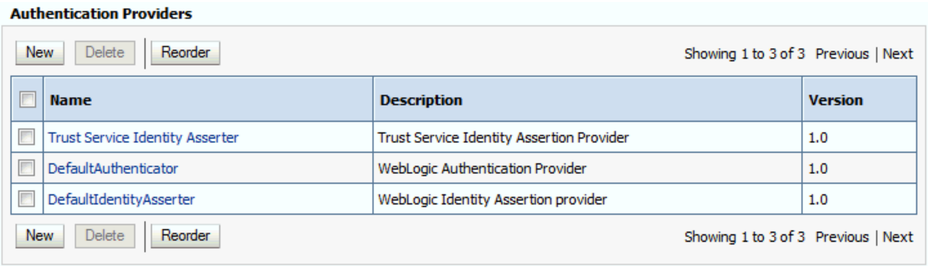
To configure a new LDAP-based authentication provider:

1. Log in to the WebLogic Server Administration Console.
2. Click **Security Realms** in the left navigational bar.

3. Click the **myrealm** default realm entry.

4. Click the **Providers** tab.

   Note that there is a `DefaultAuthenticator` provider configured for the realm. This is the default WebLogic Server authentication provider.



Authentication Providers

New
Delete
Reorder
Showing 1 to 3 of 3 Previous | Next

☐	Name	Description	Version
☐	Trust Service Identity Asserter	Trust Service Identity Assertion Provider	1.0
☐	DefaultAuthenticator	WebLogic Authentication Provider	1.0
☐	DefaultIdentityAsserter	WebLogic Identity Assertion provider	1.0

New
Delete
Reorder
Showing 1 to 3 of 3 Previous | Next

5. Click **Lock & Edit** in the Change Center.

6. Click the **New** button below the **Authentication Providers** table.

7. Enter a name for the provider.

   Use one of the following names, based on the LDAP directory service you are planning to use as your credential store:

   - `OUDAuthenticator` for Oracle Unified Directory
   - `OIDAuthenticator` for Oracle Internet Directory
   - `OVDAuthenticator` for Oracle Virtual Directory

8. Select the authenticator type from the **Type** drop-down list.

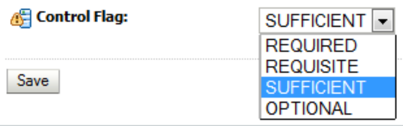
   Select one of the following types, based on the LDAP directory service you are planning to use as your credential store:

   - `OracleUnifiedDirectoryAuthenticator` for Oracle Unified Directory
   - `OracleInternetDirectoryAuthenticator` for Oracle Internet Directory
   - `OracleVirtualDirectoryAuthenticator` for Oracle Virtual Directory

9. Click **OK** to return to the Providers screen.

10. On the Providers screen, click the newly created authenticator in the table.

11. Select **SUFFICIENT** from the **Control Flag** drop-down menu.



Control Flag: SUFFICIENT

Setting the control flag to **SUFFICIENT** indicates that if the authenticator can successfully authenticate a user, then the authenticator should accept that authentication and should not continue to invoke any additional authenticators.

If the authentication fails, it will fall through to the next authenticator in the chain. Make sure all subsequent authenticators also have their control flags set to

SUFFICIENT; in particular, check the `DefaultAuthenticator` and make sure that its control flag is set to **SUFFICIENT**.

12. Click **Save** to save the control flag settings.

13. Click the **Provider Specific** tab and enter the details specific to your LDAP server, as shown in the following table.

    Note that only the required fields are discussed in this procedure. For information about all the fields on this page, consider the following resources:

    - To display a description of each field, click **Help** on the **Provider Specific** tab.
    - For more information on setting the **User Base DN**, **User From Name Filter**, and **User Attribute** fields, see Configuring Users and Groups in the Oracle Internet Directory and Oracle Virtual Directory Authentication Providers in *Oracle Fusion Middleware Administering Security for Oracle WebLogic Server*.

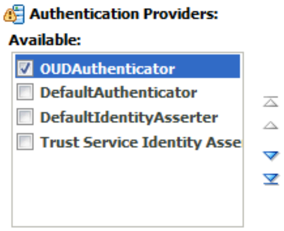
Parameter	Sample Value	Value Description
Host	For example: `oud.example.com`	The LDAP server's server ID.
Port	For example: `1689`	The LDAP server's port number.
Principal	For example: `cn=soaLDAP, cn=systemids,dc=example,dc=com`	The LDAP user DN used to connect to the LDAP server.
Credential	Enter LDAP password.	The password used to connect to the LDAP server.
SSL Enabled	Unchecked (clear)	Specifies whether SSL protocol is used when connecting to the LDAP server.
User Base DN	For example: `cn=users,dc=example,dc=com`	Specify the DN under which your users start.
All Users Filter	`(&(uid=*)(objectclass=person))`	Instead of a default search criteria for **All Users Filter**, search all users based on the `uid` value. If the **User Name Attribute** for the user object class in the LDAP directory structure is a type other than `uid`, then change that type in the **User From Name Filter** field. For example, if the **User Name Attribute** type is `cn`, then this field should be set to: `(&(cn=*)(objectclass=person)))`

Parameter	Sample Value	Value Description
User From Name Filter	For example: `(&(uid=%u)(objectclass=person))`	If the **User Name Attribute** for the user object class in the LDAP directory structure is a type other than `uid`, then change that type in the settings for the **User From Name** Filter. For example, if the **User Name Attribute** type is `cn`, then this field should be set to: `(&(cn=%u)(objectclass=person)))`.
User Name Attribute	For example: `uid`	The attribute of an LDAP user object that specifies the name of the user.
Group Base DN	For example: `cn=groups,dc=example,dc=com`	Specify the DN that points to your Groups node.
Use Retrieved User Name as Principal	Checked	Must be turned on.
GUID Attribute	`entryuuid`	This value is prepopulated with `entryuuid` when `OracleUnifiedDirectoryAuthenticator` is used for OUD. Check this value if you are using Oracle Unified Directory as your authentication provider.

14. Click **Save** to save the changes.

15. Return to the Providers page by clicking **Security Realms** in the right navigation pane, clicking the default realm name (**myrealm**), and then **Providers**.

16. Click **Reorder**, and then use the resulting page to make the Provider you just created first in the list of authentication providers.



Authentication Providers:

Available:

☑ OUDAuthenticator
□ DefaultAuthenticator
□ DefaultIdentityAsserter
□ Trust Service Identity Asse

17. Click **OK**.

18. On the Providers Page, click **DefaultAuthenticator**.

19. From the Control Flag drop-down, select **SUFFICIENT**.

20. Click **Save** to update the DefaultAuthenticator settings.

21. In the Change Center, click **Activate Changes**.

22. Restart the Administration Server and all managed servers.

To stop the Managed Servers, log in to Fusion Middleware Control, select the Managed Servers in the Target Navigator and click **Shut Down** in the toolbar.

To stop and start the Administration Server using the Node Manager:

a. Start WLST:

```
cd ORACLE_COMMON_HOME/common/bin
./wlst.sh
```

b. Connect to Node Manager using the Node Manager credentials you defined in when you created the domain in the Configuration Wizard:

```
wls:/offline>nmConnect('nodemanager_username','nodemanager_password',
            'ADMINVHN','5556','domain_name',
            'ASERVER_HOME','PLAIN')
```

c. Stop the Administration Server:

```
nmKill('AdminServer')
```

d. Start the Administration Server:

```
nmStart('AdminServer')
```

e. Exit WLST:

```
exit()
```

To start the Managed Servers, log in to Fusion Middleware Control, select the Managed Servers, and click **Start Up** in the toolbar.

Note:

If you plan to log in to the system immediately by using the central LDAP user role, you can skip the restart until you have assigned the Administration role to the new enterprise deployment administration group. For more information, see Adding the New Administration User to the Administration Group.

---

23. After the restart, review the contents of the following log file:

```
ASERVER_HOME/servers/AdminServer/logs/AdminServer.log
```

Verify that no LDAP connection errors occurred. For example, look for errors such as the following:

```
The LDAP authentication provider named "OUDAuthenticator" failed to make
connection to ldap server at ...
```

If you see such errors in the log file, then check the authorization provider connection details to verify they are correct and try saving and restarting the Administration Server again.

24. After you restart and verify that no LDAP connection errors are in the log file, try browsing the users and groups that exist in the LDAP provider:

In the Administration Console, navigate to the **Security Realms > myrealm > Users and Groups** page. You should be able to see all users and groups that exist in the LDAP provider structure.

10.10.6 Provisioning an Enterprise Deployment Administration User and Group

This example shows how to create a user called **`weblogic_soa`** and a group called **`SOA Administrators`**.

To provision the administration user and group in LDAP provider:

1. Create an ldif file named `admin_user.ldif` with the contents shown below and then save the file:

   ```
   dn: cn=weblogic_soa,cn=users,dc=example,dc=com
   changetype: add
   orclsamaccountname: weblogic_soa
   userpassword: password
   objectclass: top
   objectclass: person
   objectclass: organizationalPerson
   objectclass: inetorgperson
   objectclass: orcluser
   objectclass: orcluserV2
   mail: weblogic_soa@example.com
   givenname: weblogic_soa
   sn: weblogic_soa
   cn: weblogic_soa
   uid: weblogic_soa
   ```

2. Provision the user in the LDAP directory.

   For example, for an Oracle Unified Directory LDAP provider:

   ```
   OUD_INSTANCE_HOME/bin/ldapmodify -a \
                                  -h oudhost.example.com
                                  -D "cn=oudadmin" \
                                  -w password \
                                  -p 1389 \
                                  -f admin_user.ldif
   ```

   For Oracle Internet Directory:

   ```
   OID_ORACLE_HOME/bin/ldapadd -h oidhost.example.com \
                              -p 3060 \
                              -D cn="orcladmin" \
                              -w password \
                              -c \
                              -v \
                              -f admin_user.ldif
   ```

3. Create an `ldif` file named `admin_group.ldif` with the contents shown below and then save the file:

   ```
   dn: cn=SOA Administrators,cn=Groups,dc=example,dc=com
   displayname: SOA Administrators
   objectclass: top
   objectclass: GroupOfUniqueNames
   objectclass: orclGroup
   uniquemember: cn=weblogic_soa,cn=users,dc=example,dc=com
   cn:SOA Administrators
   description: Administrators Group for the Oracle SOA Suite Domain
   ```

4. Provision the group in the LDAP Directory.

For Oracle Unified Directory:

```
OUD_INSTANCE_HOME/bin/ldapmodify -a \
                                 -D "cn=oudadmin" \
                                 -h oudhost.example.com \
                                 -w password \
                                 -p 1380 \
                                 -f admin_group.ldif
```

For Oracle Internet Directory:

```
OID_ORACLE_HOME/bin/ldapadd -h oid.example.com \
                            -p 3060 \
                            -D cn="orcladmin" \
                            -w password \
                            -c \
                            -v \
                            -f admin_group.ldif
```

5. Verify that the changes were made successfully:

   a. Log in to the Oracle WebLogic Server Administration Console.

   b. In the left pane of the console, click **Security Realms**.

   c. Click the default security realm (**myrealm**).

   d. Click the **Users and Groups** tab.

   e. Verify that the administrator user and group you provisioned are listed on the page.

10.10.7 Adding the Administration Role to the New Administration Group

After adding the users and groups to Oracle Internet Directory, the group must be assigned the Administration role within the WebLogic domain security realm. This enables all users that belong to the group to be administrators for the domain.

To assign the Administration role to the new enterprise deployment administration group:

1. Log in to the WebLogic Administration Server Console using the administration credentials that you provided in the Configuration Wizard.

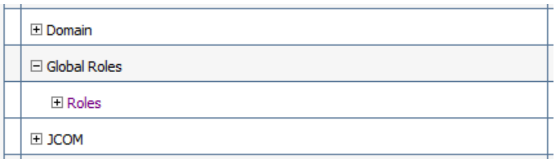
   Do not use the credentials for the administration user you created and provided for the new authentication provider.

2. In the left pane of the Administration Console, click **Security Realms**.

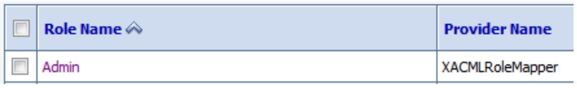
3. Click the default security realm (**myrealm**).

4. Click the **Roles and Policies** tab.

5. Expand the **Global Roles** entry in the table and click **Roles**.



6. Click the **Admin** role.



□	Role Name	Provider Name
□	Admin	XACMLRoleMapper

7. Click **Add conditions**.

8. Select **Group** from the **Predicate List** drop-down menu, and then click **Next**.

9. Enter `SOA Administrators` in the **Group Argument Name** field, and then click **Add**.

   `SOA Administrators` is added to the list box of arguments.

10. Click **Finish** to return to the Edit Global Role page.

    The `SOA Administrators` group is now listed.

11. Click **Save** to finish adding the **Admin** Role to the `SOA Administrators` group.

12. Validate that the changes were made by logging in to the WebLogic Administration Server Console using the new `weblogic_soa` user credentials.

    If you can log in to the Oracle WebLogic Server Administration Console and Fusion Middleware Control with the credentials of the new administration user you just provisioned in the new authentication provider, then you have configured the provider successfully.

10.10.8 Updating the boot.properties File and Restarting the System

After you create the new administration user and group, you must update the Administration Server `boot.properties` file with the administration user credentials that you created in the LDAP directory:

1. On SOAHOST1, go the following directory:

   ```
   ASERVER_HOME/servers/AdminServer/security
   ```

2. Rename the existing `boot.properties` file:

   ```
   mv boot.properties boot.properties.backup
   ```

3. Use a text editor to create a file called `boot.properties` under the security directory.

4. Enter the following lines in the file:

   ```
   username=weblogic_soa
   password=password
   ```

5. Save the file.

6. Restart the Administration Server.

10.11 Adding the wsm-pm Role to the Administrators Group

After you configure a new LDAP-based Authorization Provider and restart the Administration Server, add the enterprise deployment administration LDAP group (`SOA Administrators`) as a member to the `policy.Updater` role in the `wsm-pm` application stripe.

1. Use the Oracle WebLogic Server Administration Server credentials to log in to Oracle Enterprise Manager Fusion Middleware Control.

   These are the credentials you created when you initially configured the domain and created the Oracle WebLogic Server Administration user name (typically, `weblogic_soa`) and password.

2. From the **WebLogic Domain** menu, select **Security**, and then **Application Roles**.

3. Select the **wsm-pm** application stripe from the Application Stripe drop-down menu.

4. Click the triangular `play` icon ▶ next to the role name text box to search for all role names in the wsm-pm application stripe.

5. Select the row for the **policy.Updater** role to be edited.

6. Click the Edit icon ✎ to edit the role.

7. Click the Add icon ✚ on the Edit Application Role page.

8. In the Add Principal dialog box, select **Group** from the **Type** drop-down menu.

9. Search for the enterprise deployment administrators group, by entering the group name `SOA Administrators` in the **Principal Name Starts With** field and clicking the right arrow to start the search.

10. Select the appropriate administrators group in the search results and click **OK**.

11. Click **OK** on the Edit Application Role page.

For additional steps in preparation for possible scale out scenarios, see Considerations for Cross-Component Wiring.

11

Configuring Oracle HTTP Server for an Enterprise Deployment

When configuring the Web tier, you have the option of using Oracle HTTP Server or Oracle Traffic Director. If you choose to use Oracle HTTP Server, then you must install Oracle HTTP Server on each of the Web tier hosts and configure Oracle HTTP standalone domains on each host.

The Oracle HTTP Server instances on the Web tier direct HTTP requests from the hardware load balancer to specific Managed Servers in the application tier.

Before you configure Oracle HTTP Server, be sure to review Understanding the Web Tier.

Note:

If you plan to configure Oracle Managed File Transfer, then you must configure Oracle Traffic Director to route FTP and SFTP requests over TCP. For more information, see Configuring Oracle Managed File Transfer in an Enterprise Deployment.

Configuring Oracle HTTP Server to Route Requests to the Application Tier
It is important to understand how to update the Oracle HTTP Server configuration files so that the web server instances route requests to the servers in the domain.

11.1 About the Oracle HTTP Server Domains

In an enterprise deployment, each Oracle HTTP Server instance is configured on a separate host and in its own standalone domain. This allows for a simple configuration that requires a minimum amount of configuration and a minimum amount of resources to run and maintain.

Note:

Oracle Fusion Middleware requires that a certified Java Development Kit (JDK) is installed on your system and JAVA_HOME is set on the Web tier hosts.

For more information about the role and configuration of the Oracle HTTP Server instances in the web tier, see Understanding the Web Tier.

11.2 Variables Used When Configuring the Oracle HTTP Server

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this topic.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- *OHS_ORACLE_HOME*
- *OHS_DOMAIN_HOME*

In addition, you'll be referencing the following virtual IP (VIP) address and host names:

- ADMINVHN
- WEBHOST1
- WEBHOST2

11.3 Installing Oracle HTTP Server on WEBHOST1

It is important to understand the procedure for installing the Oracle HTTP Server software on the web tier.

Starting the Installer on WEBHOST1

Navigating the Oracle HTTP Server Installation Screens

Verifying the Oracle HTTP Server Installation

11.3.1 Starting the Installer on WEBHOST1

To start the installation program, perform the following steps.

1. Log in to WEBHOST1.

2. Go to the directory in which you downloaded the installation program.

3. Launch the installation program by entering the following command:

   ```
   ./fmw_12.2.1.2.0_ohs_linux64.bin
   ```

   When the installation program appears, you are ready to begin the installation.

11.3.2 Navigating the Oracle HTTP Server Installation Screens

The following table lists the screens in the order that the installation program displays them.

If you need additional help with any of the installation screens, click the screen name.

Table 11-1 Oracle HTTP Server Installation Screens

Screen	Description
Welcome	This screen introduces you to the product installer.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. For the purposes of an enterprise deployment, enter the value of the OHS_ORACLE_HOME variable listed in Table 7-3.
Installation Type	Select **Standalone HTTP Server (Managed independently of WebLogic server)**. This installation type allows you to configure the Oracle HTTP Server instances independently from any other existing Oracle WebLogic Server domains.
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. If there are any warning or error messages, verify that your host computers and the required software meet the system requirements and certification information described in Host Computer Hardware Requirements and Operating System Requirements for the Enterprise Deployment Topology.
Security Updates	If you already have an Oracle Support account, use this screen to indicate how you would like to receive security updates. If you do not have an account, or if you are sure you want to skip this step, then clear the check box and verify your selection in the follow-up dialog box.

Table 11-1 (Cont.) Oracle HTTP Server Installation Screens

Screen	Description
Installation Summary	Use this screen to verify the installation options you selected. If you want to save these options to a response file, click **Save Response File** and provide the location and name of the response file. Response files can be used later in a silent installation situation. For more information about silent or command line installation, see Using the Oracle Universal Installer in Silent Mode in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Installation Progress	This screen allows you to see the progress of the installation.
Installation Complete	This screen appears when the installation is complete. Review the information on this screen, then click **Finish** to close the installer.

11.3.3 Verifying the Oracle HTTP Server Installation

To verify that your Oracle HTTP Server installation completed successfully, list files that were installed in the new Oracle home directory. You should see the following directories in the Oracle HTTP Server Oracle home:

```
ldap
ohs
srvm
has
css
crs
nls
oracore
precomp
rdbms
plsql
jlib
slax
sqlplus
xdk
oracle_common
webgate
bin
wlserver
OPatch
plugins
oui
perl
network
lib
oraInst.loc
install
cfgtoollogs
inventory
```

11.4 Creating an Oracle HTTP Server Domain on WEBHOST1

The following topics describe how to create a new Oracle HTTP Server standalone domain on the first Web tier host.

Starting the Configuration Wizard on WEBHOST1

Navigating the Configuration Wizard Screens for an Oracle HTTP Server Domain

11.4.1 Starting the Configuration Wizard on WEBHOST1

To start the Configuration Wizard, navigate to the following directory and start the WebLogic Server Configuration Wizard, as follows:

```
cd OHS_ORACLE_HOME/oracle_common/common/bin
./config.sh
```

11.4.2 Navigating the Configuration Wizard Screens for an Oracle HTTP Server Domain

Oracle recommends that you create a standalone domain for the Oracle HTTP Server instances on each Web tier host.

The following topics describe how to create a new standalone Oracle HTTP Server domain:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Templates
- Task 3, Selecting the JDK for the Web Tier Domain.
- Task 4, Configuring System Components
- Task 5, OHS Server Screen
- Task 7, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 8, Writing Down Your Domain Home

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Create a new domain**.

In the **Domain Location** field, enter the value assigned to the OHS_DOMAIN_HOME variable.

Note the following:

- The Configuration Wizard will create the new directory that you specify here.
- Create the directory on local storage, so the web servers do not have any dependencies on on storage devices outside the DMZ.

Task 2 Selecting the Configuration Templates

On the Templates screen, select **Oracle HTTP Server (Standalone) - 12.2.1.2.0 [ohs]**.

Tip:

More information about the options on this screen can be found in Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Selecting the JDK for the Web Tier Domain.

Select the Oracle Hotspot JDK, which was installed in the Web tier Oracle home when you installed the Oracle HTTP Server software.

Task 4 Configuring System Components

On the System Components screen, configure one Oracle HTTP Server instance. The screen should by default have a single instance defined. This is the only instance you need to create.

1. Note that the default instance name is `ohs1` in the **System Component** field. You use this default name.
2. Make sure `OHS` is selected in the **Component Type** field.
3. Use the **Restart Interval Seconds** field to specify the number of seconds to wait before attempting a restart if an application is not responding.
4. Use the **Restart Delay Seconds** field to specify the number of seconds to wait between restart attempts.

Task 5 OHS Server Screen

Use the OHS Server screen to configure the OHS servers in your domain:

1. Select **ohs1** from the **System Component** drop-down menu.
2. In the **Listen Address** field, enter *`WEBHOST1`*.

   All of the remaining fields are pre-populated, but you can change the values as required for your organization. For more information about the fields on this screen, see OHS Server in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.
3. In the **Server Name** field, verify the value of the listen address and listen port.

   It should appear as follows:

   ```
   http://WEBHOST1:7777
   ```

Task 6 Configuring Node Manager

Select **Per Domain Default Location** as the Node Manager type, and specify the user name and password for the Node Manager.

Note:
For more information about the options on this screen, see Node Manager in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

For additional information, see Configuring Node Manager on Multiple Machines in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

Task 7 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Click **Update** to execute the domain extension.

Tip:
More information about the options on this screen can be found in Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 8 Writing Down Your Domain Home

The Configuration Success screen will show the domain home location.

Make a note of the information provided here, as you will need it to start the servers and access the Administration Server.

Click **Finish** to close the Configuration Wizard.

11.5 Installing and Configuring an Oracle HTTP Server Domain on WEBHOST2

After you install Oracle HTTP Server and configure a domain on WEBHOST1, then you must also perform the same tasks on WEBHOST2.

1. Log in to WEBHOST2 and install Oracle HTTP Server, using the instructions in Installing Oracle HTTP Server on WEBHOST1.

2. Configure a new standalone domain on WEBHOST2, using the instructions in Creating a Web Tier Domain on WEBHOST1.

   Use the name `ohs2` for the instance on WEBHOST2, and be sure to replace all occurrences of WEBHOST1 with WEBHOST2 and all occurrences of `ohs1` with `ohs2` in each of the examples.

11.6 Starting the Node Manager and Oracle HTTP Server Instances on WEBHOST1 and WEBHOST2

It is important to understand how to start the Oracle HTTP Server instances on WEBHOST1 and WEBHOST2.

Starting the Node Manager on WEBHOST1 and WEBHOST2

11.6.1 Starting the Node Manager on WEBHOST1 and WEBHOST2

Before you can start the Oracle HTTP Server instances, you must start the Node Manager on WEBHOST1 and WEBHOST2:

1. Log in to WEBHOST1 and navigate to the following directory:

   ```
   OHS_DOMAIN_HOME/bin
   ```

2. Start the Node Manager as shown below, using `nohup` and `nodemanager.out` as an example output file:

   ```
   nohup OHS_DOMAIN_HOME/bin/startNodeManager.sh > OHS_DOMAIN_HOME/nodemanager/
   nodemanager.out 2>&1 &
   ```

3. Log in to WEBHOST2 and perform steps 1 and 2.

For more information about additional Node Manager configuration options, see Advanced Node Manager Configuration in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

11.6.2 Starting the Oracle HTTP Server Instances

To start the Oracle HTTP Server instances:

1. Navigate to the following directory on WEBHOST1:

   ```
   OHS_DOMAIN_HOME/bin
   ```

   For more information about the location of the OHS_DOMAIN_HOME directory, see File System and Directory Variables Used in This Guide.

2. Enter the following command:

   ```
   ./startComponent.sh ohs1
   ```

3. When prompted, enter the Node Manager password.

4. Repeat steps 1 through 3 to start the `ohs2` instance on WEBHOST2.

For more information, see Starting Oracle HTTP Server Instances in *Administering Oracle HTTP Server*.

11.7 Configuring Oracle HTTP Server to Route Requests to the Application Tier

It is important to understand how to update the Oracle HTTP Server configuration files so that the web server instances route requests to the servers in the domain.

11.7.1 About the Oracle HTTP Server Configuration for an Enterprise Deployment

The following topics provide overview information about the changes required to the Oracle HTTP Server configuration in an enterprise deployment.

11.7.1.1 Purpose of the Oracle HTTP Server Virtual Hosts

The reference topologies in this guide require that you define a set of virtual servers on the hardware load balancer. You can then configure Oracle HTTP Server to recognize requests to specific virtual hosts (that map to the load balancer virtual servers) by adding `<VirtualHost>` directives to the Oracle HTTP Server instance configuration files.

For each Oracle HTTP Server virtual host, you define a set of specific URLs (or context strings) that route requests from the load balancer through the Oracle HTTP Server instances to the appropriate Administration Server or Managed Server in the Oracle WebLogic Server domain.

11.7.1.2 About the WebLogicCluster Parameter of the <VirtualHost> Directive

A key parameter of the Oracle HTTP Server `<VirtualHost>` directive is the `WebLogicCluster` parameter, which is part of the WebLogic Proxy Plug-In for Oracle HTTP Server. When configuring Oracle HTTP Server for an enterprise deployment, consider the following information when adding this parameter to the Oracle HTTP Server configuration files.

The servers specified in the `WebLogicCluster` parameter are important only at startup time for the plug-in. The list needs to provide at least one running cluster member for the plug-in to discover other members of the cluster. The listed cluster member must be running when Oracle HTTP Server is started. Oracle WebLogic Server and the plug-in work together to update the server list automatically with new, failed, and recovered cluster members.

Some example scenarios:

- Example 1: If you have a two-node cluster and then add a third member, you do not need to update the configuration to add the third member. The third member will be discovered on the fly at runtime.

- Example 2: You have a three-node cluster but only two nodes are listed in the configuration. However, if both listed nodes are down when you start Oracle HTTP Server, then the plug-in would fail to route to the cluster. You must ensure that at least one of the listed nodes is running when you start Oracle HTTP Server.

  If you list all members of the cluster, then you guarantee you can route to the cluster, assuming at least one member is running when Oracle HTTP Server is started.

11.7.1.3 Recommended Structure of the Oracle HTTP Server Configuration Files

Rather than adding multiple virtual host definitions to the httpd.conf file, Oracle recommends that you create separate, smaller, and more specific configuration files for each of the virtual servers required for the products you are deploying. This avoids populating an already large httpd.conf file with additional content, and it can make troubleshooting configuration problems easier.

For example, in a typical Oracle Fusion Middleware Infrastructure domain, you can add a specific configuration file called admin_vh.conf that contains the virtual host definition for the Administration Server virtual host (ADMINVHN).

11.7.2 Modifying the httpd.conf File to Include Virtual Host Configuration Files

Perform the following tasks to prepare the httpd.conf file for the additional virtual hosts required for an enterprise topology:

1. Log in to WEBHOST1.

2. Locate the httpd.conf file for the first Oracle HTTP Server instance (ohs1) in the domain directory:

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/
   ```

3. Verify if the httpd.conf file has the appropriate configuration as follows:

   a. Run the following command to verify the ServerName parameter, assure it is set correctly, substituting the correct value for the current WEBHOST*n*:

   ```
   grep "ServerName http" httpd.conf
   ServerName http://WEBHOST1:7777
   ```

   b. Run the following command to verify there is an include statement that includes all *.conf files from the moduleconf subdirectory:

   ```
   grep moduleconf httpd.conf
   IncludeOptional "moduleconf/*.conf"
   ```

   c. If either validation fails to return results, or returns results that are commented out, open the httpd.conf file in a text editor and make the required changes in the appropriate locations.

   ```
   #
   # ServerName gives the name and port that the server uses to identify
   itself.
   # This can often be determined automatically, but we recommend you specify
   # it explicitly to prevent problems during startup.
   #
   # If your host doesn't have a registered DNS name, enter its IP address
   here.
   #
   ServerName http://WEBHOST1:7777
   #  and at the end of the file:
   # Include the admin virtual host (Proxy Virtual Host) related configuration
   include "admin.conf"
   IncludeOptional "moduleconf/*.conf"
   ```

   d. Save the httpd.conf file.

4. Log in to WEBHOST2 and perform steps 2 and 3 for the httpd.conf file, replacing any occurrences of WEBHOST1 or ohs1 with WEBHOST2 or ohs2 in the instructions as necessary.

11.7.3 Creating the Virtual Host Configuration Files

To create the virtual host configuration files:

> **Note:** Before you create the virtual host configuration files, be sure you have configured the virtual servers on the load balancer, as described in Purpose of the Oracle HTTP Server Virtual Hosts.

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Create the admin_vh.conf file and add the following directive:

   ```
   <VirtualHost WEBHOST1:7777>
       ServerName admin.example.com:80
       ServerAdmin you@your.address
       RewriteEngine On
       RewriteOptions inherit
   </VirtualHost>
   ```

3. Create the soainternal_vh.conf file and add the following directive:

   ```
   <VirtualHost WEBHOST1:7777>
       ServerName soainternal.example.com:80
       ServerAdmin you@your.address
       RewriteEngine On
       RewriteOptions inherit
   </VirtualHost>
   ```

4. Restart the ohs1 instance:

   a. Change directory to the following location:

      ```
      cd OHS_DOMAIN_HOME/bin
      ```

   b. Enter the following commands to stop and start the instance; provide the node manager password when prompted:

      ```
      ./stopComponent.sh ohs1
      ./startComponent.sh ohs1
      ```

5. Copy the admin_vh.conf file and the soainternal_vh.conf file to the configuration directory for the second Oracle HTTP Server instance (ohs2) on WEBHOST2:

   ```
   OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

6. Edit the admin_vh.conf and soainternal_vh.conf files and change any references from WEBHOST1 to WEBHOST2 in the <VirtualHost> directives.

7. Restart the ohs2 instance:

   a. Change directory to the following location:

```
cd OHS_DOMAIN_HOME/bin
```

b. Enter the following commands to stop and start the instance:

```
./stopComponent.sh ohs2
./startComponent.sh ohs2
```

11.7.4 Validating the Virtual Server Configuration on the Load Balancer

From the load balancer, access the following URLs to ensure that your load balancer and Oracle HTTP Server are configured properly. These URLs should show the initial Oracle HTTP Server 12*c* web page.

- `http://admin.example.com/index.html`
- `http://soainternal.example.com/index.html`

11.7.5 Configuring Routing to the Administration Server and Oracle Web Services Manager

To enable Oracle HTTP Server to route to the Administration Server and the WSM-PM_Cluster, which contain the WLS_WSM managed servers, you must add a set of `<Location>` directives and add the `WebLogicCluster` parameter to the list of nodes in the cluster.

To set the `WebLogicCluster` parameter:

1. Log in to WEBHOST1, and change directory to the following location:

```
cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf/
```

2. Add the following directives to the `admin_vh.conf` file within the `<VirtualHost>` tags:

```
# Admin Server and EM
<Location /console>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /consolehelp>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /em>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>
```

The `admin_vh.conf` file should appear as it does in Example 1, admin_vh.conf file.

3. Add the following directives to the `soainternal_vh.conf` file within the `<VirtualHost>` tag:

> **Note:** Set the port numbers appropriately based on your WebLogic Managed Servers.

```
# WSM-PM
<Location /wsm-pm>
    WLSRequest ON
    WebLogicCluster SOAHOST1:7010,SOAHOST2:7010
    WLProxySSL OFF
    WLProxySSLPassThrough OFF
</Location>
```

The `soainternal_vh.conf` file should appear as it does in Example 2, soainternal_vh.conf file.

For more information about the WebLogicCluster parameter in this example, see About the WebLogicCluster Parameter of the <VirtualHost> Directive.

4. Restart the ohs1 instance:

   a. Change directory to the following location:

      ```
      cd OHS_DOMAIN_HOME/bin
      ```

   b. Enter the following commands to stop and start the instance:

      ```
      ./stopComponent.sh ohs1
      ./startComponent.sh ohs1
      ```

5. Copy the `admin_vh.conf` file and the `soainternal_vh.conf` file to the configuration directory for the second Oracle HTTP Server instance (ohs2) on WEBHOST2:

   ```
   OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf/
   ```

6. Edit the `admin_vh.conf` and `soainternal_vh.conf` files and change any references to WEBHOST1 to WEBHOST2 in the `<VirtualHost>` directives.

7. Restart the ohs2 instance:

   a. Change directory to the following location:

      ```
      cd OHS_DOMAIN_HOME/bin
      ```

   b. Enter the following commands to stop and start the instance:

      ```
      ./stopComponent.sh ohs2
      ./startComponent.sh ohs2
      ```

Example 1 admin_vh.conf file

```
<VirtualHost WEBHOST1:7777>
    ServerName admin.example.com:80
    ServerAdmin you@your.address
    RewriteEngine On
    RewriteOptions inherit

# Admin Server and EM
<Location /console>
```

```
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /consolehelp>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /em>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>
</VirtualHost>
```

Example 2 `soainternal_vh.conf` file

Contents of this file:

```
<VirtualHost WEBHOST1:7777>
    ServerName soainternal.example.com:80
    ServerAdmin you@your.address
    RewriteEngine On
    RewriteOptions inherit

# WSM-PM
<Location /wsm-pm>
    WLSRequest ON
    WebLogicCluster SOAHOST1:7010,SOAHOST2:7010
    WLProxySSL OFF
    WLProxySSLPassThrough OFF
</Location>
</VirtualHost>
```

11.7.6 Validating Access to the Management Consoles and Administration Server

To verify the changes you have made in this chapter:

1. Use the following URL to the hardware load balancer to display the Oracle WebLogic Server Administration Console, and log in using the Oracle WebLogic Server administrator credentials:

   ```
   http://admin.example.com/console
   ```

   This validates that the `admin.example.com` virtual host on the load balancer is able to route requests to the Oracle HTTP Server instances on the web tier, which in turn can route requests for the Oracle WebLogic Server Administration Console to the Administration Server in the application tier.

2. Similarly, you should be able to access the Fusion Middleware Control using a similar URL:

   ```
   http://admin.example.com/em
   ```

12

Configuring Oracle Traffic Director for an Enterprise Deployment

When configuring the Web tier, you have the option of using Oracle Traffic Director to route requests to the application tier, rather than Oracle HTTP Server. The procedure for configuring Oracle Traffic Director is different than the procedure for configuring Oracle HTTP Server. If you decide to use Oracle Traffic Director, then you must install Oracle Traffic Director on both the Web tier hosts and the Application Tier hosts. Then, you extend the enterprise deployment domain to include Oracle Traffic Director.

Before you configure Oracle Traffic Director, be sure to review Understanding the Web Tier.

Note:

If you plan to configure Oracle Managed File Transfer, then you must configure Oracle Traffic Director to route FTP and SFTP requests over TCP. For more information, see Configuring Oracle Managed File Transfer in an Enterprise Deployment.

Traffic Director for high availability, perform the steps on two mount points.

Installing Oracle Traffic Director in Standalone Mode on the Web Tier Hosts
You can install Oracle Traffic Director by using an interactive graphical wizard provided by the Oracle Universal Installer. This standalone installation is performed on the two WEBHOST systems that is used in enterprise deployment.

Extending the Domain with Oracle Traffic Director System Components
You need to perform certain tasks in order to extend the enterprise deployment domain with the Oracle Traffic Director software.

Propagating the Domain and Starting the Node Manager on the Web Tier Hosts
After you have installed Oracle Traffic Director on the application tier hosts and you have extended the domain with Oracle Traffic Director system components, you can then copy the domain configuration to the hosts on the Web tier and configure the Node Manager.

Creating an Oracle Traffic Director Configuration
An Oracle Traffic Director configuration is a collection of metadata that defines the run-time characteristics of an Oracle Traffic Director server. After you create a configuration, you can use it to create instances of Oracle Traffic Director servers on one or more administration nodes.

Starting the Oracle Traffic Director Default Instance
You can use the Oracle Traffic Director configuration to create instances of Oracle Traffic Director servers on one or more administration nodes.

Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment
By default, when you created the configuration, a default virtual server for HTTP access was created, named `edg_config`. However, each enterprise deployment uses additional Oracle Traffic Director virtual servers and origin-server pools for specific purposes. For example, each time you extend the domain with a new Fusion Middleware product, there are additional virtual servers that must to be defined.

Creating a TCP Proxy for an Enterprise Deployment
Oracle MFT uses a TCP proxy to route SFTP requests to the backend MFT WLS servers.

Creating a Failover Group for Virtual Hosts
A failover group ensures high availability of Oracle Traffic Director instances by combining two Oracle Traffic Director instances.

12.1 About Oracle Traffic Director

Oracle Traffic Director is a software load balancer for load balancing HTTP/S and TCP traffic to application tier. The application-tier servers that receive the requests from Oracle Traffic Director are referred to as Oracle Traffic Director origin servers. Origin servers can be application servers, Web servers, Oracle Managed File Transfer, LDAP directory servers, MLLP servers, or any type of TCP server.

Starting with Oracle Fusion Middleware 12*c* (12.2.1), in addition to being available for use with the engineered systems (Oracle Exalogic running either Oracle Linux or Oracle Solaris or Oracle SuperCluster running Oracle Solaris), Oracle Traffic Director is available for customers with the Oracle WebLogic Server Multi-tenancy or Oracle WebLogic Server Continuous Availability add-on options.

For more information, see Getting Started with Oracle Traffic Director in *Oracle Fusion Middleware Administering Oracle Traffic Director*.

12.2 About Oracle Traffic Director in an Enterprise Deployment

Oracle Traffic Director can be used as an alternative to Oracle HTTP Server on the Web tier. Like Oracle HTTP Server, it can route HTTP requests from the front-end load balancer to the application-tier WebLogic Managed Servers. However, only Oracle Traffic Director provides TCP load balancing and failover.

If you are configuring Managed File Transfer (which requires the routing and load balancing of the SFTP requests), then you must use Oracle Traffic Director.

In a enterprise deployment, you install Oracle Traffic Director on both the Web tier hosts and the Application Tier hosts, because Oracle Traffic Director is added to the domain in the application-tier hosts, for system management purposes.

On each Application Tier host, you install Oracle Traffic Director in collocated mode, in the same Oracle home where you installed the application tier software.

On each Web Tier host, you install Oracle Traffic Director in standalone mode.

You then use the Fusion Middleware Configuration Wizard to extend the application-tier domain to include the Oracle Traffic Director system components. This allows the Oracle Traffic Director components to be managed by the same Administration Server that is used to control the Managed Servers in the domain.

The following topics provide specific instructions for using the Oracle Traffic Director configuration required for Managed File Transfer. However, the procedures in these topics can be used to configure Oracle Traffic Director as the Web tier for other components in the enterprise deployment topology.

12.3 Variables Used When Configuring Oracle Traffic Director

The procedures for installing and configuring Oracle Traffic Director reference use a series of variables that you can replace with the actual values used in your environment.

The following directory location variables are used in these procedures:

- WEB_ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- WEB_DOMAIN_HOME
- JAVA_HOME
- NM_HOME
- WT_APPLICATION_HOME

For more information, see File System and Directory Variables Used in This Guide.

In addition, you'll be referencing the following virtual IP (VIP) address defined in Reserving the Required IP Addresses for an Enterprise Deployment:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- APPHOST1
- APPHOST2
- WEBHOST1
- WEBHOST2

> **Note:**
>
> Note that for this chapter, APPHOST1 and APPHOST2 provide a more generic variable for the application tier hosts. This is because, depending upon the domain you are creating, the host name variable will vary.
>
> For example, if you are configuring Oracle Traffic Director for an Oracle SOA Suite domain, APPHOST1 is the same as SOAHOST1. However, if you are configuring Oracle Traffic Director for an Oracle Managed File Transfer domain, which is typically configured in its own domain, then APPHOST1 is the same as MFTHOST1.

12.4 Installing Oracle Traffic Director in Collocated Mode on the Application Tier Hosts

You can install Oracle Traffic Director by using an interactive graphical wizard provided by the Oracle Universal Installer. To configure Oracle Traffic Director for high availability, perform the steps on two mount points.

Starting the Oracle Traffic Director Installer

Navigating the Oracle Traffic Director Installation Screens (Collocated)

Verifying the Installation on the Application Tier Hosts

12.4.1 Starting the Oracle Traffic Director Installer

To start the installation program:

1. Go to the directory in which you downloaded the installer.
2. Run the following command to launch the installation wizard:
   - On Linux

     ```
     fmw_12.2.1.2_otd_linux64.bin
     ```

When the installation program appears, you are ready to begin the installation.

12.4.2 Navigating the Oracle Traffic Director Installation Screens (Collocated)

The following table describes how to use the installer screens to install Oracle Traffic Director in colocated mode on the first application tier host.

If you need additional help with any of the installation screens, click the screen name.

Screen	Description
Welcome	This screen introduces you to the product installer. Click **Next**.
Installation Inventory Setup	On UNIX operating systems, this screen will appear if this is the first time you are installing any Oracle product on this host. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Oracle Fusion Middleware Installing Software with the Oracle Universal Installer in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Auto Updates	Select whether or not you want to receive automatic updates for this product.
Installation Location	Enter the path to the existing application tier Oracle home. Note that run-time processes cannot write to this directory. For the purposes of this enterprise deployment, enter the value of the ORACLE_HOME variable listed in Table 7-2.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. • Select **Collocated OTD (Managed through WebLogic server)**.
Prerequisite Checks	The installer analyzes the host computer to ensure that the prerequisites are fulfilled. The results of the prerequisite checks are displayed on this screen. If a prerequisite check fails, an error or warning message is displayed. • Fix the error and click **Rerun**. For example, if any of the required packages listed in Prerequisites for Installing Oracle Traffic Director are not available in the system, install them. • To ignore the error or warning and continue with the installation, click **Skip**. • To stop the prerequisite checking process, click **Stop**. Click **Next** to continue.

Screen	Description
Specify Security Updates	If you already have an Oracle Support account, use this screen to indicate how you would like to receive security updates. If you do not have one and are sure you want to skip this step, clear the check box and verify your selection in the follow-up dialog box.
Installation Summary	This screen displays the Oracle home directory that you specified earlier. It also indicates the amount of disk space that will be used for the installation and the free space available. Review information on this screen. To save the settings specified so far in the installation wizard in a text file (called a *response* file), click **Save**. If necessary, you can use the response file to perform the same installation from the command line. Click **Install** to begin the installation. For more information about silent or command line installation, see "Using the Oracle Universal Installer in Silent Mode" in Installing Software with the Oracle Universal Installer.
Installation Progress	This screen shows the progress and status of the installation process. If you want to cancel the installation, click **Cancel**. The files that were copied to your system before you canceled the installation will remain on the system; you should remove them manually. Click **Next** to continue.
Installation Complete	Click **Finish**.

12.4.3 Verifying the Installation on the Application Tier Hosts

After you complete the installation and the post-installation steps, verify that the Oracle home directory (ORACLE_HOME/otd) contains the following directories:

```
common
lib
plugins
```

12.5 Installing Oracle Traffic Director in Standalone Mode on the Web Tier Hosts

You can install Oracle Traffic Director by using an interactive graphical wizard provided by the Oracle Universal Installer. This standalone installation is performed on the two WEBHOST systems that is used in enterprise deployment.

Starting the Oracle Traffic Director Installer

Navigating the Oracle Traffic Director Installation Screens (Standalone)

Verifying the installation on the Web Tier Hosts

12.5.1 Starting the Oracle Traffic Director Installer

To start the installation program:

1. Go to the directory in which you downloaded the installer.
2. Run the following command to launch the installation wizard:
   - On Linux

     ```
     fmw_12.2.1.2_otd_linux64.bin
     ```

When the installation program appears, you are ready to begin the installation.

12.5.2 Navigating the Oracle Traffic Director Installation Screens (Standalone)

The installation program displays a series of screens, in the order listed in the following table.

If you need additional help with any of the installation screens, click the screen name.

Screen	Description
Installation Inventory Setup	On UNIX operating systems, this screen will appear if this is the first time you are installing any Oracle product on this host. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Oracle Fusion Middleware Installing Software with the Oracle Universal Installer in Oracle Fusion Middleware Installing Software with the Oracle Universal Installer.
Welcome	Click **Next**.
Auto Updates	Select whether or not you want to receive automatic updates for this product.
Installation Location	Use this screen to specify the location of your Oracle home directory. Oracle home is the directory in which software binaries for Oracle products are stored. Note that run-time processes cannot write to this directory. For the purposes of an enterprise deployment, enter the value of the WEB_ORACLE_HOME variable listed in Table 7-3.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. • Select **Standalone OTD (Managed independently of WebLogic server)**.

Screen	Description
Prerequisite Checks	The installer analyzes the host computer to ensure that the prerequisites are fulfilled. The results of the prerequisite checks are displayed on this screen. If a prerequisite check fails, an error or warning message is displayed. • Fix the error and click **Rerun**. For example, if any of the required packages listed in Prerequisites for Installing Oracle Traffic Director are not available in the system, install them. • To ignore the error or warning and continue with the installation, click **Skip**. • To stop the prerequisite checking process, click **Stop**. Click **Next** to continue.
Specify Security Updates	If you already have an Oracle Support account, use this screen to indicate how you would like to receive security updates. If you do not have one and are sure you want to skip this step, clear the check box and verify your selection in the follow-up dialog box.
Installation Summary	This screen displays the Oracle home directory that you specified earlier. It also indicates the amount of disk space that will be used for the installation and the free space available. Review information on this screen. To save the settings specified so far in the installation wizard in a text file (called a *response* file), click **Save**. If necessary, you can use the response file to perform the same installation from the command line. Click **Install** to begin the installation. For more information about silent or command line installation, see "Using the Oracle Universal Installer in Silent Mode" in Installing Software with the Oracle Universal Installer.
Installation Progress	This screen shows the progress and status of the installation process. If you want to cancel the installation, click **Cancel**. The files that were copied to your system before you canceled the installation will remain on the system; you should remove them manually. Click **Next** to continue.
Installation Complete	Click **Finish**.

12.5.3 Verifying the installation on the Web Tier Hosts

After you complete the installation and the post-installation steps, verify that the Oracle home directory contains the following directories:

```
bin
cfgtoollogs
crs
css
has
install
inventory
jlib
ldap
lib
network
nls
OPatch
oracle_common
oracore
oraInst.loc
otd
oui
plsql
plugins
precomp
rdbms
slax
sqlplus
srvm
webgate
wlserver
xdk
```

12.6 Extending the Domain with Oracle Traffic Director System Components

You need to perform certain tasks in order to extend the enterprise deployment domain with the Oracle Traffic Director software.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Extend the Domain
After you start the Configuration Wizard, you can follow the instructions on the screen to provide the information required to extend the existing domain.

12.6.1 Starting the Configuration Wizard

To start the Configuration Wizard, navigate to the following directory and start the WebLogic Server Configuration Wizard:

```
cd ORACLE_HOME/oracle_common/common/bin
./config.sh
```

12.6.2 Navigating the Configuration Wizard Screens to Extend the Domain

After you start the Configuration Wizard, you can follow the instructions on the screen to provide the information required to extend the existing domain.

12.6.2.1 Selecting the Domain Type and Domain Location

To select the domain type and domain location:

1. On the Configuration Type screen, select **Update an existing domain**.
2. In the **Domain Location** field, enter the value assigned to the ASERVER_HOME variable.

Note:

- More information about the Domain home directory can be found in Choosing a Domain Home in *Planning an Installation of Oracle Fusion Middleware*.
- More information about the other options on this screen can be found in Configuration Type in *Creating WebLogic Domains Using the Configuration Wizard*.
- For more information about the Web tier and the DMZ, see Understanding the Firewalls and Zones of a Typical Enterprise Deployment.
- For more information about the ASERVER_HOME directory variable, see File System and Directory Variables Used in This Guide.

12.6.2.2 Selecting the Configuration Templates for Oracle Traffic Director

To select the configuration templates:

1. On the Templates screen, select **Oracle Traffic Director -12.2.1.2.0[otd]**.

Tip:

More information about the options on this screen can be found in Templates in *Creating WebLogic Domains Using the Configuration Wizard*.

12.6.2.3 Providing the GridLink Oracle RAC Database Connection Details

No new datasources needs to be created in the GridLink Oracle RAC Component Schema screen.

Click **Next**.

12.6.2.4 Testing the JDBC Connections

In the JDBC Component Schema Test screen, test the data source connections that you have just configured.

Review that all the tests are successful and click **Next**.

12.6.2.5 Selecting Advanced Configuration Options

To complete the domain configuration for the topology, select the following option on the Advanced Configuration screen:

- System Components

12.6.2.6 Adding System Components for Oracle Traffic Director

On the System Components screen, click **Next**.

It is not necessary to configure the system components in the configuration wizard. For instructions on how to create the Oracle Traffic Director instances required for the enterprise deployment, see Starting the Oracle Traffic Director Instances.

12.6.2.7 Creating WebLogic Server Machines for Oracle Traffic Director

Use the Machines screen to create two new machines in the domain. A machine is required in order for the Node Manager to be able to start and stop the servers.

1. Select the **Unix Machine** tab.

2. Click the **Add** button to create two new Unix machines, one for each OTD instances.

3. Specify `WebHOSTn` in the **Node Manger Listen Address** field and `5556` in the **Node Manager Listen Port** field, for each machine.

12.6.2.8 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Update**.

> **Tip:**
>
> More information about the options on this screen can be found in Configuration Summary in *Creating WebLogic Domains Using the Configuration Wizard*.

12.6.2.9 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location

- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start the Administration Server.

Click **Finish** to dismiss the configuration wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

12.7 Propagating the Domain and Starting the Node Manager on the Web Tier Hosts

After you have installed Oracle Traffic Director on the application tier hosts and you have extended the domain with Oracle Traffic Director system components, you can then copy the domain configuration to the hosts on the Web tier and configure the Node Manager.

Packing Up the Domain on the Application Tier

Unpacking the Domain Configuration on the Web Tier Hosts

Configuring and Starting Node Manager on the Web Tier Hosts

Oracle Traffic Director runs alone in the Web tier hosts, and therefore, it is not necessary to create a per node Node Manager for each Web tier host. Instead, Oracle Traffic Director nodes use the default per domain Node Manager.

12.7.1 Packing Up the Domain on the Application Tier

Use the following steps to create a template JAR file that contains the domain configuration information:

1. Log in to APPHOST1, and run the `pack` command to create a template JAR file as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./pack.sh -managed=true
             -domain=ASERVER_HOME
             -template=full_path/extend_otd_template
             -template_name=extend_otd_template
   ```

   In this example:

   - Replace *ASERVER_HOME* with the actual path to the domain directory you created on the shared storage device.
   - Replace *full_path* with the complete path to the directory where you want the template jar file saved.
   - `extend_otd_template` is a sample name for the JAR file you are creating, which will contain the domain configuration files, including the configuration files for the Oracle HTTP Server instances.
   - `extend_otd_template` is the name assigned to the domain template file.
   - You must specify a full path for the template jar file as part of the `-template` argument to the `pack` command.

2. Make a note of the location of the template JAR file you just created with the `pack` command.

   Tip:

   For more information about the `pack` and `unpack` commands, see Overview of the Pack and Unpack Commands in *Creating Templates and Domains Using the Pack and Unpack Commands*.

3. Copy the template JAR file to a location available to the Web tier hosts.

12.7.2 Unpacking the Domain Configuration on the Web Tier Hosts

Use the following procedure to copy the Oracle Traffic Directory domain configuration information to the Web Tier hosts.

1. Log in to WEBHOST1.

2. If you haven't already, create the recommended directory structure for the Managed Server domain on the WEBHOST1 storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.

3. Make sure the template JAR file you created with the pack command is accessible to WEBHOST1.

4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./unpack.sh -domain=MSERVER_HOME
               -overwrite_domain=true
               -template=complete_path/extend_otd_template.jar
               -log_priority=DEBUG
               -log=/tmp/unpack.log
               -app_dir=WT_APPLICATION_HOME
   ```

   In this example:

   - Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.

   - Replace *complete_path* with the complete path to the domain template jar file that you created when you ran the pack command to pack up the domain on the shared storage device.

   - Replace *WT_APPLICATION_HOME* with the complete path to the Application directory for the domain on local storage. For more information, see File System and Directory Variables Used in This Guide.

   Tip:

   For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created MSERVER_HOME directory and verify that the domain configuration files were copied to the correct location on the WEBHOST1 local storage device.

6. Repeat the unpack steps on WEBHOST2.

12.7.3 Configuring and Starting Node Manager on the Web Tier Hosts

Oracle Traffic Director runs alone in the Web tier hosts, and therefore, it is not necessary to create a per node Node Manager for each Web tier host. Instead, Oracle Traffic Director nodes use the default per domain Node Manager.

Oracle also recommends that you use the SSL Node Manager in the DMZ for security reasons.

To create the required Node Manager configuration and start Node Manager on each Web tier host, follow these steps. Repeat for each Web tier host.

1. Navigate to `WEB_DOMAIN_HOME/nodemanager`.
2. Edit the `nodemanager.properties` file and change the following properties:
   - ListenAddress = WEBHOST*n*
   - SecureListener = false
3. Change the directory to `WEB_DOMAIN_HOME/bin` .
4. Run this command to start Node Manager:`./startNodeManager.sh`

After this, log in to WebLogic Server Administration Console to configure the Node Manager type:

1. Click **Lock & Edit**.
2. In the Domain Structure navigation tree, expand the name of the domain, and then expand **Environment**.
3. Click **Machines**, and then click the link for the WEBHOST1 machine.
4. Click the **Node Manager** tab.
5. Change the **Type** property from SSL to Plain.
6. Click **Save**.
7. Repeat this task for WEBHOST2.
8. Click **Activate Changes**.

12.8 Creating an Oracle Traffic Director Configuration

An Oracle Traffic Director configuration is a collection of metadata that defines the run-time characteristics of an Oracle Traffic Director server. After you create a configuration, you can use it to create instances of Oracle Traffic Director servers on one or more administration nodes.

Note:

The server user that you specify for a configuration must meet the following requirements:

- When the administration server is running as root, the server user must be either root or belong to the same group as the user that installed Oracle Traffic Director .
- When the administration server is running as a non-root user, the server user must be the same as the administration server's server user.

The nodes to which a configuration is deployed must be homogenous in terms of the user accounts and groups that are configured on those systems.

To create a configuration:

1. Log in to Fusion Middleware Control for the application tier domain.
2. From the **WebLogic Domain** menu, select **Administration** > **OTD Configurations**.
3. From the **Change Center** menu (the lock icon), select **Lock & Edit**.
4. Click **Create**

   The New Configuration Wizard screen is displayed.
5. Specify a name for the configuration, and an origin server type.

   For example, specify `edgconfig` as the configuration name, select **HTTP** as the Origin Server Type, and then click **Next**.
6. In the Create Configuration: Listener screen, accept the default values and click **Next**.
7. In the Create Configuration: Origin Server Pool screen, click **Next**.

   You can later add additional origin servers and origin-server pools for the products you are configuring in the enterprise deployment.
8. In the Create Configuration: Deployment screen, select `WEBHOST1` and `WEBHOST2` as WebLogic Server machines for deployment. Click **Next**.
9. Review the screen with the configuration definitions and click **Create Configuration** to create the configuration.
10. From the Change Center menu (the lock icon), select **Activate Changes** to make the changes effective.

Note:

The following are automatically created after you create the configuration:

- One virtual servers named `edgconfig`.
- One instance on each of the hosts defined for the configuration.

12.9 Starting the Oracle Traffic Director Default Instance

You can use the Oracle Traffic Director configuration to create instances of Oracle Traffic Director servers on one or more administration nodes.

To start the Oracle Traffic Director default instance:

1. Log in to Fusion Middleware Control for Traffic Director.
2. From the **WebLogic Domain**, select **Administration** > **OTD Configurations**.
3. .

   A list of the available configurations is displayed.
4. Select the configuration that you created earlier. For more information, see Creating an Oracle Traffic Director Configuration.
5. From the **Traffic Director Configuration** menu, select **Administration** > **Instances**.

   The Instances page is displayed.
6. Select the instance from the list of instances, click **Start**, and then verify that the operation completes successfully.

12.10 Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment

By default, when you created the configuration, a default virtual server for HTTP access was created, named `edg_config`. However, each enterprise deployment uses additional Oracle Traffic Director virtual servers and origin-server pools for specific purposes. For example, each time you extend the domain with a new Fusion Middleware product, there are additional virtual servers that must to be defined.

For a complete list of the virtual servers required for the enterprise deployment, see Summary of the Virtual Servers Required for an Enterprise Deployment

For general information about creating Oracle Traffic Director virtual servers, see Creating a Virtual Server in the *Fusion Middleware Administering Oracle Traffic Director*.

To create and configure virtual servers, you must create the origin server pools and then define the virtual servers.

Creating the Required Origin Server Pools

Creating the Virtual Servers

Creating the Virtual Server Routes

12.10.1 Creating the Required Origin Server Pools

Table 12-1 lists the origin server pools required for an enterprise deployment. To create the required origin server pools by using Fusion Middleware Control:

1. Log in to Fusion Middleware Control.
2. From the **WebLogic Domain** menu, select **Administration** > **OTD Configurations**.

   A list of the available configurations is displayed.

3. Select the configuration for which you want to add the Origin-Server Pool.

4. From the **Traffic Director Configuration** menu, select **Administration** > **Origin Server Pools**.

   The Server Pools page is displayed. It displays a list of the server pools (HTTP/Sand TCP server pools) defined for the configuration.

5. From the Change Center menu (the lock icon), select **Lock and Edit**.

6. Under **HTTP/S Origin Server Pools**, click **Create** to create any required HTTP origin-server pools.

7. Under **Origin Server Information**, specify the address of the servers that are associated with the origin server pool.

8. Click **OK** on the right-top of the screen.

   You are returned to the Origin Pools page.

9. Under **TCP Origin Server Pools**, click **Create** to create any TCP origin-server pools.

10. Under **Origin Server Information**, specify the address of the servers that are associated with origin server pool.

11. Click **OK** on the right-top of the screen.

    You are returned to the Origin Pools page.

12. Select **Activate Changes** in the submenu that shows up when clicking the lock icon on the upper-right corner of the screen.

    The details of the origin-server pool that you just created are displayed on the Origin-Server Pools page.

13. Repeat the steps for any additional origin server pools required for the enterprise deployment.

    After the origin-server pool is created, the Results screen of the New Origin-Server Pool wizard displays a message confirming successful creation of the origin-server pool.

14. Select **Activate Changes** in the submenu that shows up when clicking the lock icon on the upper-right corner of the screen.

Table 12-1 lists the origin server pools required by the Fusion Middleware products. You can use this information as you create the origin server pools, using the Oracle Traffic Director management pages in Fusion Middleware Control.

Table 12-1 Origin Server Pools Required for Each Product

Product	Origin-Server Pool	Type	Origin Servers
All products; one for each domain	admin-pool	HTTP	`ADMINVHN.example.com:7001`

Table 12-1 (Cont.) Origin Server Pools Required for Each Product

Product	Origin-Server Pool	Type	Origin Servers
Oracle Web Services Manager	wsm-pool	HTTP	`soahost1.example.com:7010` `soahost2.example.com:7010`
Oracle SOA Suite Business Process Management Oracle SOA Suite for Healthcare	soa-pool	HTTP	`soahost1.example.com:8001` `soahost2.example.com:8001`
Oracle Enterprise Scheduler	ess-pool	HTTP	`soahost1.example.com:8021` `soahost2.example.com:8021`
Business Activity Monitoring	bam-pool	HTTP	`soahost1.example.com:9001` `soahost2.example.com:9001`
Oracle Service Bus	osb-pool	HTTP	`soahost1.example.com:8011` `soahost2.example.com:8011`
Oracle Managed File Transfer	mft-pool	HTTP	`mfthost1.example.com:7500` `mfthost2.example.com:7500`
Oracle Managed File Transfer	mft-sftp-pool	TCP	`mfthost1.example.com:7022*` `mfthost2.example.com:7022*`
Oracle SOA Suite for Healthcare	healthcare-tcp-pool	TCP	`soahost1.example.com:95`*nn* `soahost2.example.com:95`*nn*

Note:

*7022 is the default port that is used for the SFTP listeners on the Managed File Transfer servers.

12.10.2 Creating the Virtual Servers

Table 12-2 lists the virtual servers required for an enterprise deployment. To create a virtual server do the following:

1. Log in to Fusion Middleware Control.
2. From the **WebLogic Domain** menu, select **Administration** > **OTD Configurations**

   A list of the available configurations is displayed.
3. Select the configuration for which you want to create a virtual server.
4. From the **Traffic Director Configuration** menu, select **Administration** > **virtual server**.
5. From the Change Center menu (the lock icon), select **Lock and Edit**.
6. Under **Virtual Servers**, click **Create**.

   The New Virtual Server wizard starts.
7. Enter the name of the virtual server.
8. Select **Select listeners for this virtual server** and click **Next**.
9. Select the listener that was created with the configuration and accept other defaults. Click **Next**.
10. In the Create Virtual Server: Origin Server Pool screen, select **Select a pool of origin servers**.
11. For each of the Virtual Servers, select the pool as indicated in Table 12-2.

    When you are finished providing the required information, click **Next**
12. Review the data in the Create Virtual Server: Review screen, and click **Create Virtual Server**.

    After the virtual server is created, the Results screen of the New Virtual Server wizard displays a message confirming a successful creation of the virtual server.
13. Select **Activate Changes** in the submenu that shows up when clicking the lock icon on the upper-right corner of the screen.

Table 12-2 lists the virtual servers required by the Fusion Middleware products. You can use this information as you create the required virtual servers, using the Oracle Traffic Director management pages in Fusion Middleware Control.

Table 12-2 Virtual Servers Required for Each Product

Product	Virtual Server Name	Host Served	Pool	Listener
All products; one for each domain	admin.example.com	admin.example.com	admin-pool	*

Table 12-2 (Cont.) Virtual Servers Required for Each Product

Product	Virtual Server Name	Host Served	Pool	Listener
Oracle SOA Suite Business Process Management Oracle SOA Suite for Healthcare	soa.example.com	soa.example.com	soa-pool	*
Oracle Enterprise Scheduler	soa.example.com	soa.example.com	ess-pool	*
Business Activity Monitoring	soa.example.com	soa.example.com	bam-pool	*
Oracle SOA Suite Business Process Management	soainternal.example.com	WEBHOST1-V1*	soa-pool	*
Oracle Web Services Manager	soainternal.example.com	WEBHOST1-V1*	wsm-pool	*
Oracle Enterprise Scheduler	soainternal.example.com	WEBHOST1-V1*	ess-pool	*
Business Activity Monitoring	soainternal.example.com	WEBHOST1-V1*	bam-pool	*
Oracle Service Bus	osb.example.com	osb.example.com	osb-pool	*
Oracle Service Bus	osbinternal.example.com	WEBHOST2-V1*	osb-pool	*
Oracle Managed File Transfer	mft-http.example.com	mft.example.com	mft-pool	*

Note:

*`WEBHOST1-V1` and `WEBHOST2-V1` are the VIPS that will be used for the corresponding Oracle Traffic Director failover groups.

12.10.3 Creating the Virtual Server Routes

Some of the Oracle Fusion Middleware products require specific URIs defined, so specific requests can be routed to the correct Managed Servers and with the correct protocol. In Oracle Traffic Director, you can define these URIs by creating specific routes for the selected virtual servers you have created.

1. Review the information available in Table 12-3.

   This topic lists all the routes required for each of the specific Oracle Fusion Middleware products. For the products you are deploying, note the virtual server, then name of the route, the list of URIs, and the origin server pool. You can use that information to create each required route.

2. Log in to Fusion Middleware Control.
3. From the **WebLogic Domain** menu, select **Administration** > **OTD Configurations**

   A list of the available configurations is displayed.
4. Click the configuration for which you want to create a virtual server.

   The Traffic Director Configuration page appears.
5. From the **Traffic Director Configuration** menu, select **Administration** > **virtual server**.
6. Click the name of the virtual server you want to edit.
7. Select the **Routes** tab.
8. From the Change Center menu (the lock icon), select **Lock and Edit**.
9. Click **Create**.

   The Create Route page appears.
10. In the **Name** field, enter a name for the Route.

    Refer to for the list of routes you need to create for each Fusion Middleware product.
11. In the **Condition** field, enter the following syntax to identify a specific URI to which the routing information will be assigned:

    ```
    $uri =~ '/context_string'
    ```

    For example:

    ```
    $uri =~ '/soa-infra'
    ```

    If you have to enter multiple URIs, then separate them with “or”. For example:

    ```
    $uri =~ '/soa-infra' or $uri=~'/inspection.wsil'
    ```
12. From the **Origin Server Pool** drop-down menu, select the pool associated with this route.

    Requests that meet the conditions of this route will be directed to the selected pool.

Table 12-3 lists the virtual server routes (or URIs) required by the Fusion Middleware products. You can use this information as you create the required routes, using the Oracle Traffic Director management pages in Fusion Middleware Control.

Table 12-3 Virtual Server Routes Required for Each Product

Product	Virtual Server Name	Route	Origin-server pool	URIs
All products; one for each domain	admin.example.com	admin-route	admin-pool	/console /em /consolehelp

Table 12-3 (Cont.) Virtual Server Routes Required for Each Product

Product	Virtual Server Name	Route	Origin-server pool	URIs
Oracle Service Bus	admin.example.com	osbadmin-route	admin-pool	`/sbconsole` `/servicebus`
Oracle Web Services Manager	soainternal.example.com	wsm-route	wsm-pool	`/wsm-pm`

Oracle SOA Suite	soa.example.com	soa-route	soa-pool	`/soa-infra`
				`/inspection.wsil`
				`/integration`
				`/b2bconsole`
				`/b2b/services/ws/`
				`sdpmessaging/`
				`userprefs-ui`
				`/`
				`DefaultToDoTaskFlow`
				`/workflow`
				`/`
				`ADFAttachmentHelper`
				`/soa/composer`
				`/frevvo`
				`/insight-soa/`
				`/sdpmessaging/`
				`userprefs-ui`

Oracle Service Bus	osb.example.com	osb-route	osb-pool	`/sbinspection.wsil`
				`/sbresource`
				`/osb`
				`/alsb`
				`/insight-osb/`
				`resources/`

Business Process Management	soa.example.com	soa-route	soa-pool	`/bpm/composer` `/bpm/workspace`

Oracle Enterprise Scheduler	soa.example.com	ess.route	ess-pool	`/ess`
				`/EssHealthCheck`
				`/ess-async`
				`/ess-wsjob`

Business Activity Monitoring	soa.example.com	bam-route	bam-pool	`/bam/composer`
				`/OracleBAMWS`
				`/oracle/bam/`
				`/insight`

Table 12-3 (Cont.) Virtual Server Routes Required for Each Product

Product	Virtual Server Name	Route	Origin-server pool	URIs
Oracle B2B	soa.example.com	soa-route	soa-pool	`/b2bconsole` `/b2b`
Oracle SOA Suite for Healthcare	sointernal.example.com	soa-route	healthcare-pool	`/healthcare`
Oracle Managed File Transfer	mft-http-example.com	mft-route	mft-pool	`/mftconsole`

12.11 Creating a TCP Proxy for an Enterprise Deployment

Oracle MFT uses a TCP proxy to route SFTP requests to the backend MFT WLS servers.

To create a TCP Proxy, do the following:

1. Log in to Fusion Middleware Control. Click the **WebLogic Domain** button at the upper-left corner of the page.
2. Select **Administration** > **OTD Configurations**.

   A list of the available configurations is displayed.
3. Select the configuration for which you want to create a TCP Proxy.
4. In the Common Tasks pane, click **Traffic Director Configuration**.
5. Select **Administration** > **TCP proxies**.
6. In the TCP Proxies table, click **Lock & Edit**, and then **Create**.

   The New TCP Proxy wizard starts. Table 12-4 lists the TCP proxies that are required for an enterprise deployment.
7. Enter a name for the proxy without selecting FTP, and click **Next**.
8. In the Create TCP Proxy: Listener screen, specify the name of the listener, the corresponding port, and * as address. Click **Next**.
9. In the Create TCP Proxy: Origin Server Pool screen, select the corresponding pool that you created in the previous steps. Click **Next**.
10. Review the next screen and click **Create TCP Proxy**.
11. Select **Activate Changes** in the submenu that shows up when you click the lock icon on the upper-right corner of the screen.

Table 12-4 Summary of the TCP Proxies

Product	TCP Proxy Name	Origin Server Pool	TCP Listener Name	TCP Listener Port
Oracle Managed File Transfer	mft-sftp.example.com	mft-sftp-pool	mft-ftp-listener	*:7022
Oracle SOA Suite for Healthcare	soahealthcare.example.com	healtchare-tcp-pool	healthcare-tcp-listener	*:9500

12.12 Creating a Failover Group for Virtual Hosts

A failover group ensures high availability of Oracle Traffic Director instances by combining two Oracle Traffic Director instances.

When a request is sent to one of the virtual hosts in the EDG, the front end load balancer redirects the request to the IP address that has been configured to load balance requests. This IP address is enabled on one of the OTD instances but it can be *migrated* to another OTD instance should a failure occur. You can combine two Oracle Traffic Director instances in a failover group represented by one or two virtual IP (VIP) addresses. You can do this by creating an active-passive failover group for the IP address. This failover group lists a primary and a number of secondary instances.

The following instructions explain how to create failover groups for the IP addresses associated with the different virtual servers in the configuration. The failover groups for the MFT OTD IP addresses are optional since the load balancer fails over requests between the two Oracle Traffic Director instances, but they will provide faster failure detection and failover than the typical load balancer monitors.

For more information about creating failover groups or other high availability configurations for Oracle traffic Director, see Configuring Oracle Traffic Director for High Availability in the *Administrator's Guide*.

12.12.1 Creating Failover Groups

This section describes how to implement a highly available pair of Oracle Traffic Director instances by creating failover groups.

Before you begin:

- Decide the unique VIP address that you want to assign to the failover group.
  - The VIP addresses should belong to the same subnet as that of the nodes in the failover group.
  - The VIP addresses must be accessible to clients.

Note: To configure an active-active pair of Oracle Traffic Director instances, you must create two failover groups with the same instances, but with a distinct VIP address for each failover group, and with the primary and backup node roles reversed.

- Identify the Oracle Traffic Director administration nodes that you want to configure as primary and backup nodes in the failover group. The nodes should be in the same subnet.

  Note that the administration nodes that you select should have Oracle Traffic Director instances present on them for the specified configuration.

- Identify the network interface for each node.

  For each network interface that is currently up on the host, the administration server compares the network part of the interface's IP address with the network part of the specified VIP. The first network interface that results in a match is used as the network interface for the VIP.

  For this comparison, depending on whether the VIP specified for the failover group is an IPv4 or IPv6 address, the administration server considers only those network interfaces on the host that are configured with an IPv4 or IPv6 address, respectively.

- You can bind to a VIP IP address within the HTTP listener by performing a system configuration that allows you to bind to a non-existing address, as a sort of forward binding. Perform one of the following system configurations:

  ```
  echo 1 > /proc/sys/net/ipv4/ip_nonlocal_bind
  ```

  or

  ```
  sysctl net.ipv4.ip_nonlocal_bind=1
  ```

  (change in `/etc/sysctl.conf` to keep after a reboot)

  Make sure that the IP addresses of the listeners in the configuration for which you want to create a failover group are either an asterisk (*) or the same address as the VIP. Otherwise, requests sent to the VIP will not be routed to the virtual servers.

- Make sure that the router ID for each failover group is unique. For every subsequent failover group that you create, the default router ID is decremented by one: 254, 253, and so on.

To create a failover group by using the Fusion Middleware Control, do the following:

1. Log in to Fusion Middleware Control.

2. Click the **WebLogic Domain** button at the upper left corner of the page.

3. Select **Administration** > **OTD Configurations**.

   A list of the available configurations is displayed.

4. Select the configuration for which you want to create a failover group.

5. Click the **Traffic Director Configuration** in the Common Tasks pane.

6. Select **Administration** > **Failover Groups**.

   The Failover Groups page is displayed. It shows a list of the Failover Groups defined for the configuration.

7. Click **Lock & Edit**, and then click **Create** in the **Active Passive Failover Groups** tab.

8. In the Failover Group Creation screen, enter the following

   - **Virtual IP**: Enter the floating hostname that will be moved across nodes. This needs to map top a valid Virtual IP that can be enabled both in WEBHOST1 and WEBHOST2. Make sure this VIP is not yet enabled in the nodes.
   - **Router ID**: Enter a number from 1 to 255. The value must be unique across failover groups because this value is the identifier for the VRRP process that performs the IP failover.
   - Select the Primary and Backup Instance to host the VIP and enter the required network interfaces where the VIPs will be enabled.

9. Click **Close** on the Results screen.

   The details of the failover group that you just created are displayed on the Failover Groups page.

Note:

- At this point, the two nodes form an active-passive pair. To convert them into an active-active pair, create another failover group with the same two nodes, but with a different VIP and with the primary and backup roles reversed.
- When creating a failover group you must run otd_startFailover on those machines as a root user. This is to manually start the failover. If this command is not executed, failover will not start and there will be no high availability. For more information about otd_startFailover, see *WebLogic Scripting Tool Command Reference for Oracle Traffic Director*.

  To run the `otd_startFailover` command, follow these steps:

  Start WLST as `root` or as a user with `sudo` rights.

```
          [root@webhost1]# ./wlst.sh
          Initializing WebLogic Scripting Tool (WLST) ...
          Jython scans all the jar files it can find at first startup.
Depending on the
          system, this process may take a few minutes to complete, and
WLST may not
          return a prompt right away.

          wls:/offline> wls:/offline> props = {}

          wls:/offline> props['domain-home'] =
          '/u01/oracle/config/domains/mftedg_domain/'

          wls:/offline> props['instance'] ='otd_mftedg_WEBHOST1'

          wls:/offline> otd_startFailover(props)
```

- The operating system`keepalived` package is needed for `otd_startFailover`. This package is not bundled with all Linux distribution and it needs to manually installed on the operating system. Refer to your operating system for details and installation.

13

Extending the Domain with Oracle SOA Suite

You need to perform certain tasks in order to extend the enterprise deployment domain with the Oracle SOA Suite software.

Validating the Location and Creation of the Transaction Logs
After WLS_SOA1 and WLS_SOA2 are up and running, verify that the transaction log directory and transaction logs were created as expected.

Configuring the Web Tier for the Extended Domain
Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Post-Configuration Steps for Oracle SOA Suite
After you install and configure Oracle SOA Suite, consider the following post-configuration tasks.

Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle SOA Suite
To ensure that Oracle SOA Suite is configured for high availability, configure the Oracle SOA Suite Managed Servers for automatic service migration.

13.1 Variables Used When Configuring Oracle SOA Suite

While extending the domain with Oracle SOA Suite, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- APPLICATION_HOME
- DEPLOY_PLAN_HOME
- OHS_DOMAIN_HOME
- JAVA_HOME
- ORACLE_RUNTIME

In addition, you'll be referencing the following virtual IP (VIP) address defined in Reserving the Required IP Addresses for an Enterprise Deployment:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2

13.2 Synchronizing the System Clocks

Before you extend the domain to include Oracle SOA Suite, verify that the system clocks on each host computer are synchronized. You can do this by running the `date` command simultaneously on all the hosts in each cluster.

Alternatively, there are third-party and open-source utilities you can use for this purpose.

13.3 Installing the Software for an Enterprise Deployment

The procedure for installing the software for an enterprise deployment is explained in this section.

- Starting the Oracle SOA Suite Installer on SOAHOST1
- Navigating the Installation Screens
- Installing Oracle SOA Suite on the Other Host Computers
- Verifying the Installation

13.3.1 Starting the Oracle SOA Suite Installer on SOAHOST1

To start the installation program:

1. Log in to SOAHOST1.
2. Go to the directory where you downloaded the installation program.
3. Launch the installation program by invoking the `java` executable from the JDK directory on your system, as shown in the example below.

   ```
   JAVA_HOME/bin/java -d64 -jar Installer File Name
   ```

   Be sure to replace the JDK location in these examples with the actual JDK location on your system.

   Replace *`Installer File Name`* with the name of the actual installer file for your product listed in Identifying and Obtaining Software Distributions for an Enterprise Deployment.

When the installation program appears, you are ready to begin the installation.

13.3.2 Navigating the Installation Screens

The installation program displays a series of screens, in the order listed in the following table.

If you need additional help with any of the installation screens, click the screen name.

Screen	Description
Welcome	This screen introduces you to the product installer.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.

Screen	Description
Installation Location	Use this screen to specify the location of your Oracle home directory. For more information about Oracle Fusion Middleware directory structure, see Selecting Directories for Installation and Configuration in *Planning an Installation of Oracle Fusion Middleware*.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. - Select **SOA Suite**
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. Roadmap for Verifying Your System Environment section in *Oracle Fusion Middleware Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
Installation Summary	Use this screen to verify the installation options you selected. Click **Install** to begin the installation.
Installation Progress	This screen allows you to see the progress of the installation. Click **Next** when the progress bar reaches 100% complete.
Installation Complete	Review the information on this screen, then click **Finish** to dismiss the installer.

13.3.3 Installing Oracle SOA Suite on the Other Host Computers

If you have configured a separate shared storage volume or partition for the products mount point and *ORACLE_HOME* on SOAHOST2, then you must also perform the product installation on SOAHOST2.

For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

To install the software on the other host computers in the topology, log in to each host, and use the instructions in Starting the Infrastructure Installer on SOAHOST1 and Navigating the Infrastructure Installation Screens to create the Oracle home on the appropriate storage device.

Note:

In previous releases, the recommended enterprise topology included a colocated set of Oracle HTTP Server instances. In those releases, there was a requirement to install the Infrastructure on the Web Tier hosts (WEBHOST1 and WEBHOST2). However, for this release, the enterprise deployment topology assumes the Web servers are installed and configured in standalone mode, so they are not considered part of the application tier domain. For more information, see Configuring Oracle HTTP Server for an Enterprise Deployment

13.3.4 Verifying the Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

- Reviewing the Installation Log Files
- Checking the Directory Structure
- Viewing the Contents of Your Oracle Home

13.3.4.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

13.3.4.2 Checking the Directory Structure

The contents of your installation vary based on the options you selected during the installation.

The addition of Oracle SOA Suite adds the following directory and sub-directories:

```
/u01/oracle/products/fmw/soa

bam
bin
bpm
common
integration
jlib
plugins
readme.txt
reports
soa
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Understanding Oracle Fusion Middleware*.

13.3.4.3 Viewing the Contents of Your Oracle Home

You can also view the contents of your Oracle home using the `viewInventory` script. For more information, see Viewing the contents of an Oracle home in *Installing Software with the Oracle Universal Installer*.

13.4 Creating the Oracle SOA Suite Database Schemas

Before you can configure an Oracle SOA Suite domain, you must install the required schemas in a certified database for use with this release of Oracle Fusion Middleware.

- Starting the Repository Creation Utility (RCU)
- Navigating the RCU Screens to Create the Schemas
- Configuring SOA Schemas for Transactional Recovery

13.4.1 Starting the Repository Creation Utility (RCU)

To start the Repository Creation Utility (RCU):

1. Navigate to the *`ORACLE_HOME`*`/oracle_common/bin` directory on your system.
2. Make sure the *`JAVA_HOME`* environment variable is set to the location of a certified JDK on your system. The location should be up to but not including the `bin` directory. For example, if your JDK is located in `/u01/oracle/products/jdk`:

   On UNIX operating systems:

   ```
   export JAVA_HOME=/u01/oracle/products/jdk
   ```
3. Start RCU:

   On UNIX operating systems:

   ```
   ./rcu
   ```

> **Note:**
>
> If your database has Transparent Data Encryption (TDE) enabled, and you want to encrypt your tablespaces created by the RCU, provide the `-encryptTablespace true` option when you start the RCU.
>
> This will default the appropriate RCU GUI Encrypt Tablespace checkbox selection on the Map Tablespaces screen without further effort during the RCU execution. For more information, see olink:RCUUG-GUID-D4AE68B4-11DF-459B-A5F1-D4DAAA3B7233 in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

13.4.2 Navigating the RCU Screens to Create the Schemas

Schema creation involves the following tasks:

- Task 1, Introducing RCU
- Task 2, Selecting a Method of Schema Creation
- Task 3, Providing Database Connection Details
- Task 4, Specifying a Custom Prefix and Selecting Schemas
- Task 5, Specifying Schema Passwords
- Task 6, Specifying Custom Variables
- Task 7, Verifying the Tablespaces for the Required Schemas
- Task 8, Completing Schema Creation
- Task 9, Verifying the Schema Creation

Task 1 Introducing RCU
Click **Next**.

Task 2 Selecting a Method of Schema Creation

If you have the necessary permission and privileges to perform DBA activities on your database, select **System Load and Product Load**. This procedure assumes that you have the necessary privileges.

If you do not have the necessary permission or privileges to perform DBA activities in the database, you must select **Prepare Scripts for System Load** on this screen. This option will generate a SQL script, which can be provided to your database administrator to create the required schema. See Understanding System Load and Product Load in *Creating Schemas with the Repository Creation Utility*.

Task 3 Providing Database Connection Details

Provide the database connection details for RCU to connect to your database.

In the **Host Name** field, enter the SCAN address of the Oracle RAC Database.

Enter the **DBMS/Service** details.

Enter the **Schema Owner** and **Schema Password** details.

Click **Next** to proceed, then click **OK** on the dialog window confirming that connection to the database was successful.

Task 4 Specifying a Custom Prefix and Selecting Schemas

Choose **Select existing prefix**, and then select the prefix you used when you created the initial domain.

From the list of schemas, select the **SOA Suite** schema. This will automatically select **SOA Infrastructure**. In addition, the following dependent schemas have already been installed with the Infrastructure and are grayed out:

- **Common infrastructure Services**
- **User Messaging Service**
- **Metadata Services**
- **Weblogic Services**
- **Oracle Platform Security Services**
- **Audit Services**
- **Audit Services Append**
- **Audit Services Viewer**

The custom prefix is used to logically group these schemas together for use in this domain only; you must create a unique set of schemas for each domain as schema sharing across domains is not supported.

> **Tip:**
>
> For more information about custom prefixes, see Understanding Custom Prefixes in *Creating Schemas with the Repository Creation Utility*.
>
> For more information about how to organize your schemas in a multi-domain environment, see Planning Your Schema Creation in *Creating Schemas with the Repository Creation Utility*.

Click **Next** to proceed, then click **OK** on the dialog window confirming that prerequisite checking for schema creation was successful.

Task 5 Specifying Schema Passwords

Specify how you want to set the schema passwords on your database, then specify and confirm your passwords.

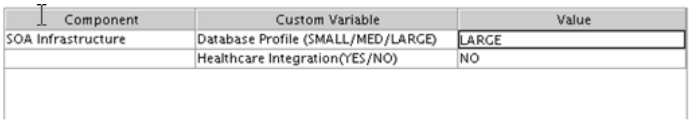
> **Tip:**
>
> You must make a note of the passwords you set on this screen; you will need them later on during the domain creation process.

Task 6 Specifying Custom Variables

Specify the custom variables for the SOA Infrastructure schema.

For the enterprise deployment topology, enter `LARGE` for the **Database Profile** custom variable; if you are planning on using Oracle Healthcare, then enter `YES` for the **Healthcare Integration** variable.

For more information, see About the Custom Variables Required for the SOA Suite Schemas in *Installing and Configuring Oracle SOA Suite and Business Process Management*.



Component	Custom Variable	Value
SOA Infrastructure	Database Profile (SMALL/MED/LARGE)	LARGE
	Healthcare Integration(YES/NO)	NO

Task 7 Verifying the Tablespaces for the Required Schemas

On the Map Tablespaces screen, review the information, and then click **Next** to accept the default values.

Click **OK** in the confirmation dialog box.

Task 8 Completing Schema Creation

Navigate through the remainder of the RCU screens to complete schema creation. When you reach the Completion Summary screen, click **Close** to dismiss RCU.

Task 9 Verifying the Schema Creation

To verify that the schemas were created successfully, and to verify the database connection details, use SQL*Plus or another utility to connect to the database, using the SOAINFRA schema name and the password you provided.

For example:

```
./sqlplus

SQL*Plus: Release 12.1.0.2.0 Production on Wed Aug 31 05:41:31 2016

Copyright (c) 1982, 2014, Oracle.  All rights reserved.

Enter user-name: FMW1221_SOAINFRA
Enter password: soainfra_password
```

```
Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management,
OLAP, Advanced Analytics and Real Application Testing options

SQL>
```

13.4.3 Configuring SOA Schemas for Transactional Recovery

After you have installed the Oracle SOA Suite schemas successfully, use the procedure in this section to configure the schemas for transactional recovery.

This procedure sets the appropriate database privileges so that the Oracle WebLogic Server transaction manager can query the schemas for transaction state information and issue the appropriate commands, such as commit and rollback, during recovery of in-flight transactions after a WebLogic Server is unexpectedly unavailable.

These privileges should be granted to the owner of the SOAINFRA schema, which you defined when you created the schemas with the Repository Creation Utility.

To configure the SOA schemas for transactional recovery privileges:

1. Log on to SQL*Plus as a user with sysdba privileges. For example:

   ```
   sqlplus "/ as sysdba"
   ```

2. Enter the following commands:

   ```
   SQL> Grant select on sys.dba_pending_transactions to soa_schema_prefix_soainfra;

   Grant succeeded.

   SQL> Grant force any transaction to soa_schema_prefix_soainfra;

   Grant succeeded.

   SQL>
   ```

13.5 Extending the Enterprise Deployment Domain with Oracle SOA Suite

Perform the following tasks for extending the existing enterprise deployment domain with the Oracle SOA Suite software.

Note:

For an improved footprint and to optimize startup, only core adapters are targeted to the SOA cluster (MFT Cluster if you are configuring MFT) after the Configuration Wizard session. You must target the following second-tier adapters manually, if needed:

- MSMQAdapter
- SocketAdapter
- OracleBamAdapter
- CoherenceAdapter
- SAPAdapter
- SiebelAdapter
- ERPAdapter
- Oracle SalesCloudAdapter
- RightNowAdapter
- EloquaAdapter
- NetSuiteAdapter

For instructions for targeting adapters manually, see Targeting Adapters Manually.

Extending the domain involves the following tasks.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Extend the Domain with Oracle SOA Suite

Targeting Adapters Manually
Only core adapters are targeted to the SOA cluster after you run the Configuration Wizard. You must target second-tier adapters manually, on a need basis.

13.5.1 Starting the Configuration Wizard

To start the Configuration Wizard:

1. From the WebLogic Server Console, stop any managed servers that will be modified by this domain extension. Managed Servers that are not effected can remain on-line.

2. For any managed servers to be modified, verify the managed server shutdown has completed.

3. Stop the Administration Server once all managed servers are in a steady state.

4. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

```
cd ORACLE_HOME/oracle_common/common/bin
./config.sh -log=debug_soa.log -log_priority=FINEST
```

13.5.2 Navigating the Configuration Wizard Screens to Extend the Domain with Oracle SOA Suite

Follow the instructions in the following sections to create and configure the domain for the topology, with static clusters.

Extending the Domain with Static Clusters

13.5.2.1 Extending the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology with static clusters.

Note:

You can use the same procedure described in this section to extend an existing domain with static clusters. If your needs do not match the instructions given in the procedure, be sure to make your selections accordingly, or refer to the supporting documentation for additional details.

Domain creation and configuration includes the following tasks.

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Database Configuration Type
- Task 4, Specifying JDBC Component Schema Information
- Task 5, Providing the GridLink Oracle RAC Database Connection Details
- Task 6, Testing the JDBC Connections
- Task 7, Keystore
- Task 8, Selecting Advanced Configuration
- Task 9, Configuring Managed Servers
- Task 10, Configuring a Cluster
- Task 11, Assigning Server Templates
- Task 12, Configuring Dynamic Servers
- Task 13, Assigning Managed Servers to the Cluster
- Task 14, Configuring Coherence Clusters
- Task 15, Verifying the Existing Machines
- Task 16, Assigning Servers to Machines
- Task 17, Configuring Virtual Targets

- Task 18, Configuring Partitions
- Task 19, Configuring File Store
- Task 20, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 21, Writing Down Your Domain Home and Administration Server URL
- Task 22, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the **Domain Location** field, select the value of the *ASERVER_HOME* variable, which represents the complete path to the Administration Server domain home you created when you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

For more information about the other options on this screen, see Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following templates:

- **Oracle SOA Suite - 12.2.1.2.0[soa]**

For more information about the options on this screen, see Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Specifying the Database Configuration Type

On the Database Configuration Type screen, select **RCU Data**.

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain.

Verify and ensure that credentials in all the fields are the same that you have provided while configuring Oracle Fusion Middleware Infrastructure.

Click **Get RCU Configuration** after you finish verifying the database connection information. The following output in the Connection Result Log indicates that the operating succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK

Successfully Done.
```

Tip:

For more information about the **RCU Data** option, see Understanding the Service Table Schema in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

For more information about the other options on this screen, see Datasource Defaults in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 4 Specifying JDBC Component Schema Information

On the JDBC Component Schema screen, select all the SOA schemas in the table.

When you select the schemas, the fields on the page are activated and the database connection fields are populated automatically.

Click **Convert to GridLink** and click **Next**.

Task 5 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in the following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

Task 6 Testing the JDBC Connections

Use the JDBC Component Schema Test screen to test the data source connections you have just configured.

A green check mark in the **Status** column indicates a successful test. If you encounter any issues, see the error message in the Connection Result Log section of the screen, fix the problem, then try to test the connection again.

For more information about the other options on this screen, see Test Component Schema in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 7 Keystore

Use this screen to specify details about the keystore to be used in the domain.

For a typical enterprise deployment, you can leave the default values.

For more information, see Keystore in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 8 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Topology**

  Add, Delete, or Modify Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

- **File Store**

Task 9 Configuring Managed Servers

On the Managed Servers screen, a new Managed Server for Oracle SOA Suite appears in the list of servers. This server was created automatically by the Oracle SOA Suite configuration template you selected in Task 2, Selecting the Configuration Template.

Perform the following tasks to modify the default Oracle SOA Suite Managed Server and create a second Oracle SOA Suite Managed Server:

1. Rename the default Oracle SOA Suite Managed Server to `WLS_SOA1`.
2. Click **Add** to create a new Oracle SOA Suite Managed Server, and name it `WLS_SOA2`.

   Tip:

   The server names recommended here will be used throughout this document; if you choose different names, be sure to replace them as needed.

3. Use the information in #unique_290/unique_290_Connect_42_GUID-579F94E8-DCA0-486A-B006-5555CCB429F9to fill in the rest of the columns for each Oracle SOA Suite Managed Server.

For more information about the options on the Managed Server screen, see Managed Servers in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Server Name	Listen Address	Listen Port	Enable SSL	SSL Listen Port	Server Groups
WLS_WSM1	SOAHOST1	7010	No	Disabled	WSMPM-MAN-SVR, JRF-MAN-SVR, and WSM-CACHE-SVR
WLS_WSM2	SOAHOST2	7010	No	Disabled	WSMPM-MAN-SVR, JRF-MAN-SVR, and WSM-CACHE-SVR
WLS_SOA1	SOAHOST1	8001	No	Disabled	SOA-MGD-SVRS-ONLY
WLS_SOA2	SOAHOST2	8001	No	Disabled	SOA-MGD-SVRS-ONLY

Task 10 Configuring a Cluster

In this task, you create a cluster of Managed Servers to which you can target the Oracle SOA Suite software.

You will also set the **Frontend Host** property for the cluster, which ensures that, when necessary, WebLogic Server will redirect Web services callbacks and other redirects to `soa.example.com` on the load balancer rather than the address in the HOST header of each request.

For more information about the `soa.example.com` virtual server address, see Configuring Virtual Hosts on the Hardware Load Balancer.

Use the Clusters screen to create a new cluster:

1. Click the **Add** button.
2. Specify `SOA_Cluster` in the **Cluster Name** field.
3. Specify `soa.example.com` in the **Frontend Host** field.
4. Specify `80` as the **Frontend HTTP Port** and `443` as the **Frontend HTTPS** port.
5. From the **Dynamic Server Groups** drop-down list, select `Unspecified`.

> **Note:**
> By default, server instances in a cluster communicate with one another using unicast. If you want to change your cluster communications to use multicast, refer to Considerations for Choosing Unicast or Multicast in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

For more information about the options on this screen, see Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 11 Assigning Server Templates

Click **Next** to continue.

Task 12 Configuring Dynamic Servers

Verify that all dynamic server options are disabled for clusters that are to remain as static clusters.

1. Confirm that the **Dynamic Cluster**, **Calculated Listen Port**, and **Calculated Machine Names** checkboxes on this screen are unchecked.
2. Confirm the **Server Template** selection is **Unspecified**.
3. Click **Next**.

Task 13 Assigning Managed Servers to the Cluster

Use the Assign Servers to Clusters screen to assign `WLS_SOA1` and `WLS_SOA2` to the new cluster `SOA_Cluster`:

1. In the Clusters pane, select the cluster to which you want to assign the servers; in this case, `SOA_Cluster`.
2. In the Servers pane, assign `WLS_SOA1` to `SOA_Cluster` by doing one of the following:

- Click `WLS_SOA1` Managed Server once to select it, and then click on the right arrow to move it beneath the selected cluster in the Clusters pane.
- Double-click `WLS_SOA1` to move it beneath the selected cluster in the clusters pane.

3. Repeat to assign `WLS_SOA2` to `SOA_Cluster`.

For more information about the options on this screen, see Assign Servers to Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 14 Configuring Coherence Clusters

Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain. Leave the port number value at `9991`, as it was defined during the initial Infrastructure domain creation.

For Coherence licensing information, see Oracle Coherence Products in *Oracle Fusion Middleware Licensing Information User Manual*.

Task 15 Verifying the Existing Machines

Click **Next** to proceed.

Task 16 Assigning Servers to Machines

Use the Assign Servers to Machines screen to assign the Oracle SOA Suite Managed Servers you just created to the corresponding machines in the domain.

Assign `WLS_SOA1` to `SOAHOST1`, and assign `WLS_SOA2` to SOAHOST2.

For more information about the options on this screen, see Assign Servers to Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 17 Configuring Virtual Targets

Click **Next**.

Task 18 Configuring Partitions

Click **Next**.

Task 19 Configuring File Store

In the JMS File Stores screen, assign the following directory for each of the SOA Persistence stores, including UMS and BPM file stores:

```
ORACLE_RUNTIME/domain_name/SOA_Cluster/jms
```

Note:

- Create the `jms` folder before starting the managed servers.
- You do not need to customize the MDS file store locations. They are used only in development mode. In the production environments, MDS is persisted in the database.

In this example, replace *ORACLE_RUNTIME* with the value of the variable for your environment. Replace *domain_name* with the name you assigned to the domain. Replace `SOA_Cluster` with the name you assigned to the cluster.

Task 20 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Click **Update** to execute the domain extension.

For more information about the options on this screen, see Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 21 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured, including:

- Domain Location
- Administration Server URL

Make a note of both these items, because you will need them later; you will need the domain location to access the scripts used to start the Administration Server, and you will need the Administration Server URL to access the WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control.

Click **Finish** to dismiss the Configuration Wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 22 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

13.5.3 Targeting Adapters Manually

Only core adapters are targeted to the SOA cluster after you run the Configuration Wizard. You must target second-tier adapters manually, on a need basis.

To target a second-tier adapter manually:

1. Navigate to and log into the Oracle WebLogic Server Administration Console. For example: `http://ADMINVHN:7001/console`.

   Note:

   If you have already configured Web tier, use `http://admin.example.com/console`.

   ---

2. In the left pane of the console, click **Deployments**.
3. Locate and click the name of the adapter in the Summary of the Deployments table.
4. Click **Lock & Edit**.
5. In the **Targets** tab, select **SOA_Cluster**.

   Note:

   If you are deploying MFT, select MFT_Cluster as the target.

   ---

6. Click **Save**.
7. Activate the changes.
8. In the left pane of the console, click **Deployments** and verify that the adapter is in the Active state.

13.6 Configuring a Default Persistence Store for Transaction Recovery

Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Each Managed Server uses a transaction log that stores information about committed transactions that are coordinated by the server and that may not have been completed.

Oracle WebLogic Server uses this transaction log for recovery from system crashes or network failures. To leverage the migration capability of the Transaction Recovery Service for the Managed Servers within a cluster, store the transaction log in a location accessible to each Managed Server and its backup server.

Note:

To enable migration of the Transaction Recovery Service, specify a location on a persistent storage solution that is available to other servers in the cluster. All Managed Servers in the cluster must be able to access this directory. This directory must also exist before you restart the server.

The recommended location is a dual-ported SCSI disk or on a Storage Area Network (SAN). Note that it is important to set the appropriate replication and backup mechanisms at the storage level to guarantee protection in cases of a storage failure.

This information applies for file-based transaction logs. You can also configure a database-based persistent store for translation logs. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster

13.6.1 Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster

To set the location for the default persistence stores for each managed server in a static cluster, complete the following steps:

1. Log into the Oracle WebLogic Server Administration Console:

   ```
   ADMINVHN:7001/console
   ```

   > **Note:**
   >
   > If you have already configured Web tier, use `http://admin.example.com/console`.

2. In the Change Center section, click **Lock & Edit**.

3. For each of the Managed Servers in the cluster:

   a. In the Domain Structure window, expand the **Environment** node, and then click the **Servers** node.

      The Summary of Servers page appears.

   b. Click the name of the server (represented as a hyperlink) in the **Name** column of the table.

      The settings page for the selected server appears and defaults to the Configuration tab.

   c. On the Configuration tab, click the **Services** tab.

   d. In the Default Store section of the page, enter the path to the folder where the default persistent stores will store its data files.

      For the enterprise deployment, use the *ORACLE_RUNTIME* directory location. This subdirectory serves as the central, shared location for transaction logs for the cluster. For more information, see File System and Directory Variables Used in This Guide.

      For example:

      ```
      ORACLE_RUNTIME/domain_name/cluster_name/tlogs
      ```

      In this example, replace *ORACLE_RUNTIME* with the value of the variable for your environment. Replace *domain_name* with the name you assigned to the domain. Replace *cluster_name* with the name of the cluster you just created.

   e. Click **Save**.

4. Complete step 3 for all servers in the SOA_Cluster.

Note:

If you are configuring a default persistence store for ESS, BAM, or OSB, use ESS_Cluster, BAM_Cluster, and OSB_Cluster respectively, instead of SOA_Cluster.

5. Click **Activate Changes**.

Note:

You will validate the location and the creation of the transaction logs later in the configuration procedure.

13.7 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the Oracle SOA Suite instances, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

Table 13-1 summarizes the steps required to propagate the changes to all the domain directories and machines.

Note that there is no need to propagate the updated domain to the WEBHOST1 and WEBHOST2 machines because there are no changes to the Oracle HTTP Server instances on those host computers.

Table 13-1 Summary of Tasks Required to Propagate the Domain Changes to Domain Directories and Machines

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the `pack` command to create a new template JAR file that contains the new Oracle SOA Suite Managed Servers configuration. When you pack up the domain, create a template JAR file called `soadomaintemplate.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers directory on SOAHOST1	Unpack the template JAR file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template JAR file in the Managed Servers directory on the SOAHOST2local storage.	

Packing Up the Extended Domain on SOAHOST1

Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1

Unpacking the Domain on SOAHOST2

13.7.1 Packing Up the Extended Domain on SOAHOST1

Use the following steps to create a template JAR file that contains the domain configuration information:

1. Log in to SOAHOST1 and run the `pack` command to create a template JAR file as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./pack.sh -managed=true
             -domain=ASERVER_HOME
             -template=full_path/soadomaintemplate.jar
             -template_name=soa_domain_template
         -log=/tmp/pack_soa.log
         -log_priority=debug
   ```

   In this example:

   - Replace *ASERVER_HOME* with the actual path to the domain directory you created on the shared storage device.
   - Replace *full_path* with the complete path to the directory where you want the template jar file saved.
   - `soadomaintemplate.jar` is a sample name for the JAR file you are creating, which will contain the domain configuration files, including the configuration files for the Oracle HTTP Server instances.
   - `soa_domain_template` is the name assigned to the domain template file.

2. Make a note of the location of the template JAR file you just created with the `pack` command.

   Tip:

   For more information about the `pack` and `unpack` commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

13.7.2 Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1

To copy the updated domain configuration information from the Administration Server domain directory to the Managed Servers domain directory:

1. Log in to SOAHOST1 if you haven't already.

2. If you haven't already, create the recommended directory structure for the Managed Server domain on the SOAHOST1 local storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.

3. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./unpack.sh -domain=MSERVER_HOME  \
   ```

```
-template=full_path/soadomaintemplate.jar \
-overwrite_domain=true \
-app_dir=APPLICATION_HOME
```

In this example:

- Replace `MSERVER_HOME` with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.
- `soadomaintemplate.jar`is the directory path and name of the template you created when you ran the `pack` command to pack up the domain on the shared storage device.
- The `-overwrite_domain=true` argument is necessary when you are unpacking a Managed Server template into an existing domain and existing `applications` directories.

  For any file that is overwritten, a backup copy of the original is created. If any modifications have been applied to the start scripts and EAR files in the Managed Server domain directory, they must be restored after this unpack operation.
- Replace `APPLICATION_HOME` with the complete path to the applications directory for the domain on shared storage.

  Tip:

  For more information about the `pack` and `unpack` commands, see Overview of the Pack and Unpack Commands in *Creating Templates and Domains Using the Pack and Unpack Commands*.

4. Change directory to the newly created `MSERVER_HOME` directory and verify that the domain configuration files were copied to the correct location on the SOAHOST1 local storage device.

13.7.3 Unpacking the Domain on SOAHOST2

This procedure assumes you have copied the file that you created earlier in a location that is accessible from both SOAHOST1 and SOAHOST2; such as the *ASERVER_HOME* directory, which is located on the shared storage filer:

1. Log in to SOAHOST2.
2. If you haven't already, create the recommended directory structure for the Managed Server domain on the SOAHOST2 storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.
3. Make sure the `soadomaintemplate.jar` accessible to SOAHOST2.

   For example, if you are using a separate shared storage volume or partition for SOAHOST2, then copy the template to the volume or partition mounted to SOAHOST2.
4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

```
cd ORACLE_COMMON_HOME/common/bin

./unpack.sh -domain=MSERVER_HOME
            -overwrite_domain=true
            -template=complete_path/soadomaintemplate.jar
            -log_priority=DEBUG
            -log=/tmp/unpack.log
            -app_dir=APPLICATION_HOME
```

Note:

The `-overwrite_domain` option in the unpack command allows unpacking a managed server template into an existing domain and existing applications directories. For any file that is overwritten, a backup copy of the original is created. If any modifications had been applied to the start scripts and ear files in the managed server domain directory, they must be restored after this unpack operation.

Additionally, to customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

In this example:

- Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.
- Replace *complete_path*/`soadomaintemplate.jar` with the complete path and file name of the domain template jar file that you created when you ran the pack command to pack up the domain on the shared storage device.
- Replace *APPLICATION_HOME* with the complete path to the Application directory for the domain on shared storage. For more information, see File System and Directory Variables Used in This Guide.

Tip:

For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created MSERVER_HOME directory and verify that the domain configuration files were copied to the correct location on the SOAHOST2 local storage device.

13.8 Starting and Validating the WLS_SOA1 Managed Server

Now that you have extended the domain, started the Administration Server, and propagated the domain to the other hosts, you can start the newly configured Oracle SOA Suite Managed Servers.

This process involves three tasks as described in the following sections.

13.8.1 Starting the WLS_SOA1 Managed Server

To start the WLS_SOA1 Managed Server:

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

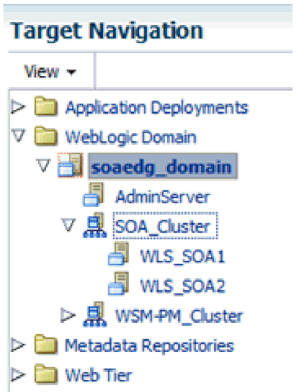
   ```
   http://ADMINVHN:7001/em
   ```

   Note:

   If you have already configured Web tier, use `http://admin.example.com/console`.

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the **Target Navigation** pane, expand the domain to view the Managed Servers in the domain.



4. Select only the **WLS_SOA1** Managed Server and click **Start Up** on the Oracle WebLogic Server toolbar.

   Note:

   SOA Servers depend on the policy access service to be functional. This implies that the WSM-PM Managed Servers in the domain need to be up and running and reachable before the SOA servers are started.

5. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_SOA1 Managed Server is up and running.

13.8.2 Adding the SOAAdmin Role to the Administrators Group

Before you validate the Oracle SOA Suite configuration on the WLS_SOA1 Managed Server, add the `SOAAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

To perform this task, refer to Configuring Roles for Administration of an Enterprise Deployment.

13.8.3 Validating the Managed Server by Logging in to the SOA Infrastructure

After you add the `SOAAdmin` role to the SOA Administrators group, you can then validate the configuration of the Oracle SOA Suite software on the WLS_SOA1 Managed Server as follows:

1. Use your Web browser to navigate to the following URL:

   ```
   http://SOAHOST1:8001/soa-infra/
   ```

2. Log in using the enterprise deployment administrator user credentials (`weblogic_soa`).

   You should see a web page with the following title:

   ```
   "Welcome to the Oracle SOA Platform on WebLogic"
   ```

13.9 Starting and Validating the WLS_SOA2 Managed Server

After validating the successful configuration and startup of the WLS_SOA1 Managed Server, you can start and validate the WLS_SOA2 Managed Server.

To start and validate the WLS_SOA2 Managed Server, use the procedure in Starting and Validating the WLS_SOA1 Managed Serverfor WLS_SOA2 Managed Server.

For the validation URL, enter the following URL in your web browser and log in using the enterprise deployment administrator user (`weblogic_soa`):

```
http://SOAHOST2:8001/soa-infra/
```

13.10 Validating the Location and Creation of the Transaction Logs

After WLS_SOA1 and WLS_SOA2 are up and running, verify that the transaction log directory and transaction logs were created as expected.

Run the following command to verify, based on the steps you performed in Configuring a Default Persistence Store for Transaction Recovery:

```
ls -al ORACLE_RUNTIME/domain_name/cluster_name/tlogs
```

- `_WLS_WLS_SOA1000000.DAT`
- `_WLS_WLS_SOA2000000.DAT`

13.11 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

13.11.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

13.11.2 Configuring Oracle HTTP Server for the WLS_SOA Managed Servers

To configure the Oracle HTTP Server instances in the Web tier so they route requests correctly to the Oracle SOA Suite cluster, use the following procedure to create an additional Oracle HTTP Server configuration file that creates and defines the parameters of the `soa.example.com` virtual server.

This procedure assumes you performed the Oracle HTTP Server configuration tasks described in Configuring Oracle HTTP Server to Route Requests to the Application Tier.

To create the virtual host configuration file so requests are routed properly to the Oracle SOA Suite clusters:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (OHS_1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf/
   ```

2. Create the `soa_vh.conf` file and add the following directive:

   ```
   <VirtualHost WEBHOST1:7777>
       ServerName https://soa.example.com:443
       ServerAdmin you@your.address
       RewriteEngine On
       RewriteOptions inherit
   </VirtualHost>
   ```

3. Add the following directives inside the `<VirtualHost>` tags:

   Note:

   The URL entry for `/workflow` is optional. It is for workflow tasks associated with Oracle ADF task forms. The `/workflow` URL itself can be a different value, depending on the form.

   ```
   <Location /soa-infra>
       WLSRequest ON
       WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
       WLProxySSL ON
       WLProxySSLPassThrough ON
   </Location>
   ```

```
# SOA inspection.wsil
<Location /inspection.wsil>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Worklist
<Location /integration>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# UMS prefs
<Location /sdpmessaging/userprefs-ui>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Default to-do taskflow
<Location /DefaultToDoTaskFlow>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Workflow
<Location /workflow>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

#Required if attachments are added for workflow tasks
<Location /ADFAttachmentHelper>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# SOA composer application
<Location /soa/composer>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>
```

The `soa_vh.conf` file will appear as it does in Example 13-1.

4. Copy the `soa_vh.conf` file to the configuration directory for the second Oracle HTTP Server instance (ohs2):

OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/**ohs2**/moduleconf/

5. Edit the `soa_vh.conf` and change any references to WEBHOST1 to WEBHOST2 in the `<VirtualHost>` directives.

6. Restart the Oracle HTTP servers on WEBHOST1 and WEBHOST2.

Example 13-1 `soa_vh.conf` file

```
<VirtualHost WEBHOST1:7777>
    ServerName https://soa.example.com:443
    ServerAdmin you@your.address
    RewriteEngine On
    RewriteOptions inherit

<Location /soa-infra>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# SOA inspection.wsil
<Location /inspection.wsil>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Worklist
<Location /integration>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# UMS prefs
<Location /sdpmessaging/userprefs-ui>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Default to-do taskflow
<Location /DefaultToDoTaskFlow>
    WLSRequest ON
    WebLogicCluster SSOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# Workflow
<Location /workflow>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
```

```
</Location>

#Required if attachments are added for workflow tasks
 <Location /ADFAttachmentHelper>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>

# SOA composer application
 <Location /soa/composer>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>
```

Note:

If internal invocations are going to be used in the system, add the appropriate locations to the soainternal virtual host.

13.11.3 Configuring the WebLogic Proxy Plug-In

Before you can validate that requests are routed correctly through the Oracle HTTP Server instances, you must set the `WebLogic Plug-In Enabled` parameter for the clusters you just configured.

1. Log in to the Oracle WebLogic Server Administration Console.

2. In the **Domain Structure** pane, expand the **Environment** node.

3. Click **Lock & Edit** in the Change Center.

4. Click **Clusters**.

5. Select the cluster to which you want to proxy requests from Oracle HTTP Server.

   The **Configuration: General** tab is displayed.

6. Scroll down to the **Advanced** section and expand it.

7. Set **WebLogic Plug-In Enabled** to **yes**.

8. Click **Save**.

9. If more than one cluster was deployed for the latest domain extension, repeat steps 4 through 8 until all the clusters are consistently updated.

10. Click **Activate Changes** in the Change Center.

11. Restart all Managed Servers in all of the clusters that you modified in this chapter.

13.11.4 Validating the Oracle SOA Suite URLs Through the Load Balancer

To validate the configuration of the Oracle HTTP Server virtual hosts and to verify that the hardware load balancer can route requests through the Oracle HTTP Server instances to the application tier:

1. Verify that the server status is reported as **Running** in the Administration Console.

   If the server is shown as **Starting** or **Resuming**, wait for the server status to change to **Started**. If another status is reported (such as **Admin** or **Failed**), check the server output log files for errors.

2. Verify that you can access these URLs:

   - `https://soa.example.com:443/soa-infra`
   - `https://soa.example.com:443/integration/worklistapp`
   - `https://soa.example.com:443/sdpmessaging/userprefs-ui`
   - `https://soa.example.com:443/soa/composer`

3. Verify that Identity Service can be invoked successfully on the application tier by accessing the following load balancer URL:

   ```
   https://soa.example.com:443/integration/services/IdentityService/identity?WSDL
   ```

13.12 Post-Configuration Steps for Oracle SOA Suite

After you install and configure Oracle SOA Suite, consider the following post-configuration tasks.

Configuring Oracle Adapters for Oracle SOA Suite

Enabling SSL Communication Between the SOA Servers and the Hardware Load Balancer

Considerations for sync-async interactions in a SOA cluster

13.12.1 Configuring Oracle Adapters for Oracle SOA Suite

If the Oracle SOA Suite applications you are developing take advantage of any of the Oracle adapters for Oracle SOA Suite, then you should make sure the adapters are configured to work efficiently and securely in the enterprise topology.

See the following topics for more information.

Enabling High Availability for Oracle File and FTP Adapters

Enabling High Availability for Oracle JMS Adapters

Enabling High Availability for the Oracle Database Adapter

13.12.1.1 Enabling High Availability for Oracle File and FTP Adapters

If the Oracle SOA Suite applications you are developing or deploying require the Oracle File and FTP Adapters, you must configure the adapters for high availability in the enterprise deployment topology.

Use the following sections to complete this task.

13.12.1.1.1 Understanding the Oracle File and FTP Adapter Configuration

The Oracle File and FTP adapters enable a BPEL process or an Oracle Mediator to read and write files on private file systems and on remote file systems through the FTP (File Transfer Protocol).

When configured properly, these adapters support high availability for an active-active topology with Oracle BPEL Process Manager and Oracle Mediator service engines for both inbound and outbound operations.

For general information about this task, see Configuring Oracle File and FTP Adapters in *Oracle Fusion Middleware Understanding Technology Adapters*. The instructions provided here are specific to the Oracle SOA Suite enterprise deployment.

> **Note:**
>
> The File Adapter picks up a file from the inbound directory, processes it, and then outputs a file to the output directory. Because the File Adapter is non-transactional, files can be processed twice. As a result, it is possible to get duplicate files when there is failover in the RAC backend or in the SOA managed servers.

13.12.1.1.2 Configuring the Oracle File Adapter in the Administration Console

To make the Oracle File Adapter highly available, first modify the Oracle File Adapter deployment descriptor for the connection-instance corresponding to `eis/HAFileAdapter`.

You can perform this task from the Oracle WebLogic Server console:

1. Navigate to and log into the Oracle WebLogic Server Administration Console.

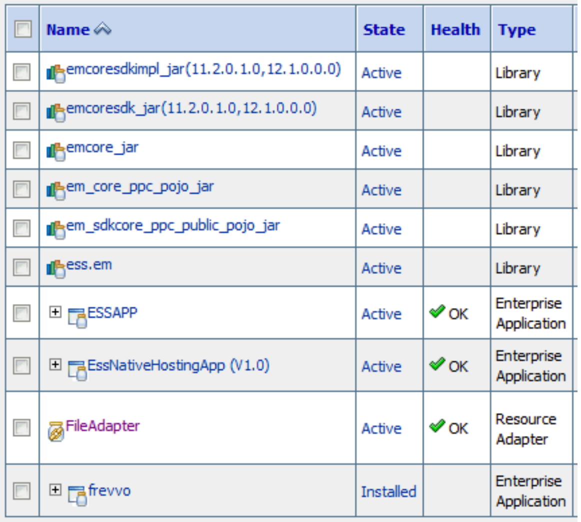
   For example:

   ```
   http://ADMINVHN:7001/console
   ```

   > **Note:**
   >
   > If you have already configured Web tier, use `http://admin.example.com/console`.

2. In the left pane of the console, click **Deployments**.

3. Locate the **FileAdapter** resource adapter in the Summary of Deployments table.



□	Name	State	Health	Type
□	emcoresdkimpl_jar(11.2.0.1.0,12.1.0.0.0)	Active		Library
□	emcoresdk_jar(11.2.0.1.0,12.1.0.0.0)	Active		Library
□	emcore_jar	Active		Library
□	em_core_ppc_pojo_jar	Active		Library
□	em_sdkcore_ppc_public_pojo_jar	Active		Library
□	ess.em	Active		Library
□	⊞ ESSAPP	Active	✓ OK	Enterprise Application
□	⊞ EssNativeHostingApp (V1.0)	Active	✓ OK	Enterprise Application
□	FileAdapter	Active	✓ OK	Resource Adapter
□	⊞ frevvo	Installed		Enterprise Application

4. Click **FileAdapter** to display the Settings for FileAdapter page.

5. Click **Configuration**.

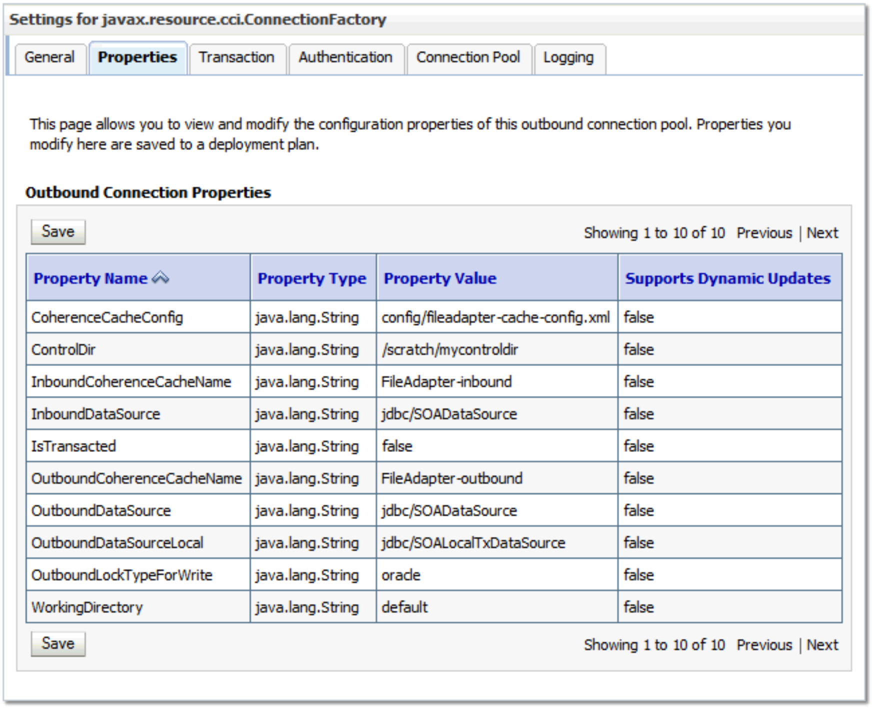
6. Click **Outbound Connection Pools**.

7. Expand **javax.resource.cci.ConnectionFactory** to see the configured connection factories.

8. Click **eis/HAFileAdapter**.

   The Outbound Connection Properties for the connection factory appears (Figure 13-1).

Figure 13-1 Oracle WebLogic Server Console - Settings for javax.resource.cci.Connectionfactory



Settings for javax.resource.cci.ConnectionFactory

This page allows you to view and modify the configuration properties of this outbound connection pool. Properties you modify here are saved to a deployment plan.

Outbound Connection Properties

Property Name	Property Type	Property Value	Supports Dynamic Updates
CoherenceCacheConfig	java.lang.String	config/fileadapter-cache-config.xml	false
ControlDir	java.lang.String	/scratch/mycontroldir	false
InboundCoherenceCacheName	java.lang.String	FileAdapter-inbound	false
InboundDataSource	java.lang.String	jdbc/SOADataSource	false
IsTransacted	java.lang.String	false	false
OutboundCoherenceCacheName	java.lang.String	FileAdapter-outbound	false
OutboundDataSource	java.lang.String	jdbc/SOADataSource	false
OutboundDataSourceLocal	java.lang.String	jdbc/SOALocalTxDataSource	false
OutboundLockTypeForWrite	java.lang.String	oracle	false
WorkingDirectory	java.lang.String	default	false

9. Click **Lock & Edit**.

   The property value column becomes editable (you can click on any of the rows in the Property Value column and modify the value).

10. Enter the values as shown in Table 13-2.

    Note:

    Update controlDir and check other values against the default values as mentioned in Table 13-2.

Table 13-2 Values to Provide for the javax.resource.cci.Connectionfactory

Parameter	Description
controlDir	Enter the directory where you want the control files to be stored. You must set it to a shared location if multiple WebLogic Server instances run in a cluster. Structure the directory for shared storage as follows: `ORACLE_RUNTIME/domain_name/cluster_name/fadapter`
inboundDataSource	Set the value to `jdbc/SOADataSource`.
outboundDataSource	Set the value to `jdbc/SOADataSource`.
outboundDataSourceLocal	Set the value to `jdbc/SOALocalTxDataSource`. This is the data source where the schemas corresponding to high availability are pre-created.
outboundLockTypeForWrite	Set the value to `oracle` if you are using Oracle Database. By default the Oracle File and FTP Adapters use an in-memory mutex to lock outbound write operations. You must choose from the following values for synchronizing write operations: • `memory`: The Oracle File and FTP Adapters use an in-memory mutex to synchronize access to the file system. • `oracle`: The adapter uses Oracle Database sequence. • `db`: The adapter uses a pre-created database table (`FILEADAPTER_MUTEX`) as the locking mechanism. You must use this option only if you are using a schema other than the Oracle Database schema. • `user-defined`: The adapter uses a user-defined mutex. To configure the user-defined mutex, you must implement the mutex interface: `"oracle.tip.adapter.file.Mutex"` and then configure a new binding-property with the name `"oracle.tip.adapter.file.mutex"` and value as the fully qualified class name for the mutex for the outbound reference.
workingDirectory	Leave this value as "default".

11. Click **Save** after you update the properties. The Save Deployment Plan page appears.

12. Create DEPLOY_PLAN_HOME directory.

```
mkdir -p DEPLOY_PLAN_HOME/soaedg_domain
```

In this example, replace *DEPLOY_PLAN_HOME* with the actual path to the deployment plan directory defined in File System and Directory Variables Used in This Guide.

13. Enter a shared storage location for the deployment plan. The directory structure is as follows:

    `DEPLOY_PLAN_HOME/soaedg_domain/FileAdapterPlan.xml`

14. Click **Save and Activate** to save and apply your changes.
15. Update the deployment in the console:
    a. Click **Deployments**.
    b. Click **Lock & Edit.**
    c. Select the File Adapter.
    d. Click **Update**.
    e. Select **Update this application in place with new deployment plan changes (A deployment plan must be specified for this option.)** and select the deployment plan saved in a shared storage location; all servers in the cluster must be able to access the plan.
    f. Click **Finish**.
    g. Activate the changes.
16. Verify that the FileAdapter deployment is activated and running:
    a. In the Administration Console, click **Deployments** in the left pane.
    b. Locate the FileAdapter deployment in the Deployments table.
    c. If it is not in the active state, then select **FileAdapter** under **Summary of Deployments**, Select **Start**, and then **Servicing All Requests**.

13.12.1.1.3 Editing the JCA File Within the Composite Application

After you have configured the FileAdapter deployment in the Administration Console, you can edit the .jca file that is included in the composite applications to be deployed so that they can use the connection factory configured in the previous steps, as shown in Example 13-2.

Note:

The location attribute is set to `eis/HAFileAdapter` for the connection factory.

Example 13-2 Example of the File Adapter .JCA File Modifications for an Enterprise Deployment

```
<adapter-config name="FlatStructureOut"
                adapter="File Adapter"
                xmlns="http://platform.integration.oracle/blocks/adapter/fw/metadata">
     <connection-factory location="eis/HAFileAdapter" adapterRef=""/>
     <endpoint-interaction portType="Write_ptt"
                           operation="Write">
```

```
          <interaction-spec className="oracle.tip.adapter.file.outbound.FileInteractionSpec">
                <property../>
                <property../>
          </interaction-spec>
     </endpoint-interaction>
</adapter-config>
```

13.12.1.1.4 Configuring the Oracle FTP Adapter

If your application requires an FTP Adapter, then repeat the procedures Configuring the Oracle File Adapter in the Administration Console and Editing the JCA File Within the Composite Application, with the following differences:

- Select the **FtpAdapter** deployment in the list of deployments in the Administration Console.
- Modify the adapter properties for high availability. Refer Table 13-2for details.
- Enter a shared storage location for the deployment plan. The directory structure is as follows:

  ```
  DEPLOY_PLAN_HOME/soaedg_domain/FtpAdapterPlan.xml
  ```

- Update the ControlDir property so it points to the following location:

  ```
  ORACLE_RUNTIME/domain_name/cluster_name/ftadapter
  ```

13.12.1.2 Enabling High Availability for Oracle JMS Adapters

When the Oracle JMS adapter communicates with multiple servers in a cluster, the adapter's connection factory property `FactoryProperties` must list available servers. If it does not list servers, the connection establishes to only one random server. If that particular server goes down, no further messages are processed.

To verify the adapter's JCA connection factory:

1. Log into your Oracle WebLogic Server Administration Console using the following URL:

   ```
   http://ADMINVHN:7001/console
   ```

   Note:

   If you have already configured Web tier, use `http://admin.example.com/console`.

2. Click **Deployments** in the left pane for Domain Structure.
3. Click **JmsAdapter** under **Summary of Deployments** on the right pane.
4. Click the **Configuration** tab.
5. Click the **Outbound Connection Pools** tab and expand `oracle.tip.adapter.jms.IJmsConnectionFactory` to see the configured connection factories.
6. Click the specific instance you are using (for example, `eis/wls/Queue`). The Outbound Connection Properties for the connection factory opens.
7. Click **Lock & Edit**.

8. In the **FactoryProperties** field (click on the corresponding cell under Property value), enter the following, all on one line, separated by semicolons:

```
java.naming.factory.initial=weblogic.jndi.WLInitialContextFactory;
java.naming.provider.url=t3://SOAHOST1:8001,SOAHOST2:8001;
java.naming.security.principal=weblogic;
java.naming.security.credentials=mypassword
```

9. Click **Save** after you update the properties. The Save Deployment Plan page appears.

10. Enter a shared storage location for the deployment plan. The directory structure is as follows:

```
DEPLOY_PLAN_HOME/soaedg_domain/JMSAdapterPlan.xml
```

11. Click **Save** and **Activate**.

Update the deployment in the console:

1. Click **Deployments**.
2. Click **Lock & Edit**
3. Select the JMS Adapter.
4. Click **Update**.
5. Select **Update this application in place with new deployment plan changes (A deployment plan must be specified for this option.)** and select the deployment plan saved in a shared storage location; all servers in the cluster must be able to access the plan.
6. Click **Finish**.
7. Activate the changes.

13.12.1.3 Enabling High Availability for the Oracle Database Adapter

To ensure High Availability while leveraging the Oracle Database Adapter, the Logical Delete Polling Strategy is used normally as it performs better than a physical delete. However, when you have a clustered environment where multiple nodes are polling for the same data, a single record might get processed more than once. To avoid this problem, Oracle Database Adapter uses a distributed polling technique that uses an Oracle Database feature called skip locking.

If you were using the Logical Delete Polling Strategy approach previously, you can simply remove (in db.jca) or clear (Logical Delete Page of wizard) the `MarkReservedValue`, and you automatically get skip locking.

The benefits of using skip locking over a reserved value include:

- Skip locking scales better in a cluster and under load.
- All work is in one transaction (as opposed to update/reserve, then commit, then select in a new transaction), so the risk of facing a non-recoverable situation in a high availability environment is minimized.

- No unique MarkReservedValue must be specified. Previously, for this to work you would have to configure a complex variable, such as `R${weblogic.Name-2}-${IP-2}-${instance}`.

If you are using Logical Delete polling, and you set `MarkReservedValue`, skip locking is not used.

For more information, see "Scalability" and "Polling Strategies" in the Oracle Fusion Middleware User's Guide for Technology Adapters.

13.12.2 Enabling SSL Communication Between the SOA Servers and the Hardware Load Balancer

After you extend the domain with Oracle SOA Suite, you should also ensure that the Administration Server and Managed Servers can access the front-end, SSL URL of the hardware load balancer.

This will allow SOA Composite applications and web services to invoke callbacks and other communications with the front-end, secure URL.

For more information, see Enabling SSL Communication Between the Middle Tier and the Hardware Load Balancer.

13.12.3 Considerations for sync-async interactions in a SOA cluster

In a SOA cluster, the following scenarios are not supported:

- Synchronous BPEL process with mid-process receive.
- Synchronous BPEL process calling asynchronous services.
- Callback from synchronous processes.

13.13 Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle SOA Suite

To ensure that Oracle SOA Suite is configured for high availability, configure the Oracle SOA Suite Managed Servers for automatic service migration.

For more information on enabling automatic service migration, see Configuring Automatic Service Migration in an Enterprise Deployment.

For additional high availability and reliability, Oracle recommends configuring transaction log stores and JMS stores in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

14

Extending the Domain with Oracle Service Bus

The procedures described in this chapter guide you through the process of extending the enterprise deployment topology with Oracle Service Bus (OSB).

Post-Configuration Tasks for Oracle Service Bus
After you install and configure Oracle Service Bus in the domain, consider the following post-configuration tasks.

Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle Service Bus
To ensure that Oracle Service Bus is configured for high availability, configure the Oracle Service Bus Managed Servers for automatic service migration for failover and zero data loss.

14.1 About Configuring Oracle Service Bus in Its Own Domain

When adding Oracle Service Bus to your enterprise topology, you can add it to the existing SOA domain, or you can create a new domain for Oracle Service Bus, separate from the Oracle SOA Suite domain.

For more information, see About the Topology Options for Oracle Service Bus.

If you decide to configure Oracle Service Bus in a separate domain, then keep in mind the following when you are using the instructions for adding Oracle Service Bus to your topology:

- Ignore any references to the SOA Managed Servers or the SOA Cluster. These elements of the domain will only exist if you are extending a domain that has already been extended with Oracle SOA Suite.
- You must run the Repository Creation Utility (RCU) to create the SOAINFRA schema for the Oracle Service Bus domain. This schemas is required by Oracle Service Bus. You must use a unique SOAINFRA schema and schema prefix for the Oracle Service Bus domain.

14.2 Variables Used When Configuring Oracle Service Bus

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- JAVA_HOME
- OHS_DOMAIN_HOME

In addition, you'll be referencing the following virtual IP (VIP) addresses defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in these topics will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1

- WEBHOST2

14.3 Overview of Adding OSB to the Topology

Before you add OSB to the topology, you must ensure that you have already performed the steps required to create an initial Infrastructure domain and then you have extended the domain to include Oracle SOA suite.

Table 14-1 lists and describes the high-level steps for extending an existing SOA domain or an existing Infrastructure domain for Oracle Service Bus.

Table 14-1 Steps for Extending a SOA Domain to Include Oracle Service Bus

Step	Description	More Information
Install Oracle Service Bus software	Install OSB software on the target system.	Installing Oracle Service Bus Software
Optionally, install the SOAINFRA schema in a supported database.	OSB requires the SOAINFRA schema for the `wlsbjmsrpDataSource` data source. If you are planning to run OSB in its own domain, then you must be sure that you have installed a separate SOAINFRA schema for OSB in a supported database. Be sure to use a unique schema for the SOAINFRA schema that will be used by the OSB domain.	Creating the Oracle SOA Suite Database Schemas
Optionally, create a new Infrastructure domain.	If you are planning to run OSB in its own domain, then you must first create an Infrastucture domain, so you can extend that domain with OSB.	Creating the Initial Infrastructure Domain for an Enterprise Deployment
Run the Configuration Wizard to Extend the Domain	Extend the SOA or Infrastructure domain to contain Oracle Service Bus components.	Extending the SOA or Infrastructure Domain to Include Oracle Service Bus
Configure a Default Persistence Store for Transaction Recovery	To leverage the migration capability of the Transaction Recovery Service for the servers within a cluster, store the transaction log in a location accessible to a server and its backup servers.	Configuring a Default Persistence Store for Transaction Recovery
Propagate the Domain Configuration to the Managed Server Directory in SOAHOST1 and to SOAHOST2	Oracle Service Bus requires some updates to the WebLogic Server start scripts. Propagate these changes using the pack and unpack commands.	Propagating the Extended Domain to the Domain Directories and Machines

Table 14-1 (Cont.) Steps for Extending a SOA Domain to Include Oracle Service Bus

Step	Description	More Information
Start the Oracle Service Bus Servers	Oracle Service Bus servers extend an already existing domain. As a result, the Administration Server and respective Node Managers are already running in SOAHOST1 and SOAHOST2.	Starting and Validating the WLS_OSB1 Managed Server
Validate the WLS_OSB Managed Servers	Verify that the server status is reported as Running in the Admin Console and access URLs to verify status of servers.	Starting and Validating the WLS_OSB2 Managed Server
Configuring Oracle HTTP Server for the WLS_OSBn Managed Servers	To enable Oracle HTTP Server to route to Oracle Service Bus console and Oracle Service Bus service, set the WebLogicCluster parameter to the list of nodes in the cluster.	Configuring Oracle HTTP Server for the Oracle Service Bus
Validating Access Through Oracle HTTP Server	Verify that the server status is reported as Running.	Validating the Oracle Service Bus URLs Through the Load Balancer
Enable High Availability for Oracle File and FTP Adapters	Make Oracle File and FTP Adapters highly available for outbound operations using the database mutex locking operation.	Enabling High Availability for Oracle DB_ File and FTP Adapters
Backing up the Oracle Service Bus Configuration	To back up the domain configuration for immediate restoration in case of failures in future procedures.	Backing Up the Oracle Service Bus Configuration

14.4 Prerequisites for Extending the Domain to Include Oracle Service Bus

Before extending the current domain, ensure that your existing deployment meets the necessary prerequisites.

- Back up the installation - If you have not yet backed up the existing Fusion Middleware Home and domain, Oracle recommends backing it up now.

  To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

- Verify that you have installed the Infrastructure and SOA software binaries in an Oracle home on shared storage and they are available from SOAHOST1 and SOAHOST2.

- If Oracle Service Bus is being configured in the same domain as SOA, then the appropriate SOAINFRA schema (used by the wlsbjmsrpDataSource) will be already available. If OSB is being configured in its own domain, then you must run RCU to install the SOAINFRA schema in a supported database, using a different schema prefix than the SOAINFRA schema used by the SOA domain.

- You have already configured Node Manager, Administration Server, (optionally SOA Servers) and WSM Servers as described in previous chapters to run a SOA system. Optionally, you may have already configured Server migration, transaction logs, coherence, and all other configuration steps for the SOA System.
- If you haven't done so already, verify that the system clocks on each host computer are synchronized. You can do this by running the date command as simultaneously as possible on the hosts in each cluster.

  Alternatively, there are third-party and open-source utilities you can use for this purpose.

14.5 Installing Oracle Service Bus Software

You can install Oracle Service Bus in an enterprise deployment by using the OSB Installer.

Starting the Oracle Service Bus Installer

Navigating the OSB Installation Screens

Installing the Software on the Other Host Computers

Validating the OSB Installation

14.5.1 Starting the Oracle Service Bus Installer

To start the installation program, perform the following steps.

1. Log in to the target system, SOAHOST1.
2. Go to the directory in which you downloaded the installation program.
3. Set the `path` for the java executable:

   ```
   export JAVA_HOME=JAVA_HOME
   export PATH=$JAVA_HOME/bin:$PATH
   ```

   In this example, replace JAVA_HOME with the value this variable listed in File System and Directory Variables Used in This Guide and entered in the *Enterprise Deployment Workbook*.
4. Launch the installation program by entering the following command:

   ```
   java -d64 -jar fmw_12.2.1.2_osb.jar
   ```

   When the installation program appears, you are ready to begin the installation.

14.5.2 Navigating the OSB Installation Screens

Table 14-2 provides description of each installation program screen.

Table 14-2 OSB Installation Screens

Screen	Description
Welcome	This screen introduces you to the product installer.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. If you plan to extend the existing SOA domain, then install the OSB software into the existing Oracle home, where the SOA software has already been installed. If you plan to configure OSB in a separate domain, then install the OSB software in the Infrastructure Oracle home.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. For this topology, select **Service Bus**.
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. If there are any warning or error messages, you can refer to one of the following documents in Roadmap for Verifying Your System Environment in *Oracle Fusion Middleware Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
Installation Progress	This screen allows you to see the progress of the installation.
Installation Complete	This screen appears when the installation is complete. Review the information on this screen, then click **Finish** to dismiss the installer.

14.5.3 Installing the Software on the Other Host Computers

If you have configured a separate shared storage volume or partition for SOAHOST2, then you must also install the software on SOAHOST2. For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

Note that the location where you install the Oracle home (which contains the software binaries) will vary, depending upon the host. To identify the proper location for you Oracle home directories, refer to the guidelines in File System and Directory Variables Used in This Guide.

14.5.4 Validating the OSB Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

- Reviewing the Installation Log Files
- Checking the Directory Structure
- Viewing the Contents of Your Oracle Home

14.5.4.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

14.5.4.2 Checking the Directory Structure

The contents of your installation vary based on the options you selected during the installation.

The addition of Oracle Service Bus adds the following directory and sub-directories:

```
ORACLE_HOME/osb/

bin
common
config
doc
financial
L10N
lib
osb
plugins
tools
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

14.5.4.3 Viewing the Contents of Your Oracle Home

You can also view the contents of your Oracle home using the `viewInventory` script. For more information, see Viewing the contents of an Oracle home in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

14.6 Extending the SOA or Infrastructure Domain to Include Oracle Service Bus

You can use the Configuration Wizard to extend the existing enterprise deployment SOA domain with the Oracle Service Bus. You have to perform a series of additional tasks to complete the extension.

Extending the domain involves the following tasks.

- Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Extend the Domain with Oracle Service Bus

14.6.1 Starting the Configuration Wizard

Note:

If you added any customizations directly to the start scripts in the domain, those will be overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the **`pack`** and **`unpack`** commands.

To begin domain configuration:

1. Shut down the Administration Server to prevent any configuration locks, saves, or activations from occurring during the configuration of the domain.
2. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

```
ORACLE_HOME/oracle_common/common/bin
./config.sh -log=/tmp/debug_osb.txt -log_priority=FINEST
```

14.6.2 Navigating the Configuration Wizard Screens to Extend the Domain with Oracle Service Bus

In this step, you extend the domain created in Extending the Domain with Oracle SOA Suite , and add the Oracle Service Bus software components and Managed Servers.

The steps reflected in this section would be very similar if Oracle Service Bus was extending a domain containing only an Administration Server and a WSM-PM Cluster, but some of the options, libraries and components shown in the screens could vary.

Follow the instructions in these sections to create and configure the domain for the topology, with staticclusters.

Extending the Domain with Static Clusters

14.6.2.1 Extending the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology, with static clusters.

Note:

You can use the same procedure described in this section to extend an existing domain with static clusters. If your needs do not match the instructions given in the procedure, be sure to make your selections accordingly, or refer to the supporting documentation for additional details.

Domain creation and configuration includes the following tasks.

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Database Configuration Type
- Task 4, Specifying JDBC Component Schema Information
- Task 5, Providing the GridLink Oracle RAC Database Connection Details
- Task 6, Testing the JDBC Connections
- Task 7, Selecting Advanced Configuration
- Task 8, Configuring Managed Servers
- Task 9, Configuring a Cluster
- Task 10, Assigning Server Templates
- Task 11, Configuring Dynamic Servers
- Task 12, Assigning Managed Servers to the Cluster
- Task 13, Configuring Coherence Clusters
- Task 14, Verifying the Existing Machines
- Task 15, Assigning Servers to Machines
- Task 16, Configuring Virtual Targets
- Task 17, Configuring Partitions
- Task 18, Configuring File Store
- Task 19, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 20, Writing Down Your Domain Home and Administration Server URL
- Task 21, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location
On the Configuration Type screen, select **Update an existing domain**.

In the **Domain Location** field, select the value of the *ASERVER_HOME* variable, which represents the complete path to the Administration Server domain home you created when you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

For more information about the other options on this screen, see Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following templates:

- **Oracle Service Bus - 12.2.1.2.0[osb]**

  The following additional templates should already be selected, because they were used to create the initial domain:

  - Oracle Enterprise Manager - 12.2.1.2.0[em]
  - Oracle WSM Policy Manager - 12.2.1.2.0[oracle_common]
  - Oracle JRF - 12.2.1.2.0[oracle_common]
  - WebLogic Coherence Cluster Extension - 12.2.1.2.0[wlserver]

For more information about the options on this screen, see Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Specifying the Database Configuration Type

On the Database Configuration Type screen, select **RCU Data**.

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain.

Verify and ensure that credentials in all the fields are the same that you have provided while configuring Oracle Fusion Middleware Infrastructure.

Click **Get RCU Configuration** after you finish verifying the database connection information. The following output in the Connection Result Log indicates that the operating succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK

Successfully Done.
```

> **Tip:**
> For more information about the **RCU Data** option, see Understanding the Service Table Schema in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.
>
> For more information about the other options on this screen, see Datasource Defaults in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 4 Specifying JDBC Component Schema Information

On the JDBC Component Schema screen, select **OSB JMS Reporting Provider** component schema.

When you select the schemas, the fields on the page are activated and the database connection fields are populated automatically.

Click **Convert to GridLink** and click **Next**.

Task 5 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in the following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

Task 6 Testing the JDBC Connections

Use the JDBC Component Schema Test screen to test the data source connections you have just configured.

A green check mark in the **Status** column indicates a successful test. If you encounter any issues, see the error message in the Connection Result Log section of the screen, fix the problem, then try to test the connection again.

For more information about the other options on this screen, see Test Component Schema in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 7 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Topology**

  Add, Delete, or Modify Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

- **File Store**

Task 8 Configuring Managed Servers

On the Managed Servers screen, a new Managed Server for Oracle SOA Suite appears in the list of servers. This server was created automatically by the Oracle SOA Suite configuration template you selected in Task 2, Selecting the Configuration Template.

Perform the following tasks to modify the default Oracle SOA Suite Managed Server and create a second Oracle SOA Suite Managed Server:

1. Rename the default Oracle SOA Suite Managed Server to `WLS_OSB1`.
2. Click **Add** to create a new Managed Server, and name it `WLS_OSB2`.

Tip:

The server names recommended here will be used throughout this document; if you choose different names, be sure to replace them as needed.

3. Use the information in Table 14-3 to fill in the rest of the columns for each Managed Server.
4. Select **OSB-MGD-SVRS-ONLY** as the server group for the OSB Servers. Deselect **OSB-MGD-SVRS-COMBINED** that is selected by default.
5. Click **Next**.

For more information about the options on the Managed Server screen, see Managed Servers in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Name	Listen Address	Listen Port	SSL Listen Port	SSL Enabled	Server Groups
WLS_SOA1	SOAHOST1	8001	n/a	No	SOA-MGD-SVRS-ONLY
WLS_SOA2	SOAHOST2	8001	n/a	No	SOA-MGD-SVRS-ONLY
WLS_WSM1	SOAHOST1	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_WSM2	SOAHOST2	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_OSB1	SOAHOST1	8011	n/a	No	OSB-MGD-SVRS-ONLY
WLS_OSB2	SOAHOST2	8011	n/a	No	OSB-MGD-SVRS-ONLY

The WLS_SOA Managed Servers will appear if you are extending an existing Oracle SOA Suite domain with Oracle Service Bus.

Task 9 Configuring a Cluster

In this task, you create a cluster of Managed Servers to which you can target the Oracle SOA Suite software.

You will also set the **Frontend Host** property for the cluster, which ensures that, when necessary, WebLogic Server will redirect Web services callbacks and other redirects to `soa.example.com` on the load balancer rather than the address in the HOST header of each request.

For more information about the `soa.example.com` virtual server address, see Configuring Virtual Hosts on the Hardware Load Balancer.

Use the Clusters screen to create a new cluster:

1. Click the **Add** button.
2. Specify `OSB_Cluster` in the **Cluster Name** field.
3. Specify `osb.example.com` in the **Frontend Host** field.
4. Specify `80` as the **Frontend HTTP Port** and `443` as the **Frontend HTTPS** port.
5. From the **Dynamic Server Groups** drop-down list, select `Unspecified`.

> **Note:**
> By default, server instances in a cluster communicate with one another using unicast. If you want to change your cluster communications to use multicast, refer to Considerations for Choosing Unicast or Multicast in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

For more information about the options on this screen, see Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 10 Assigning Server Templates
Click **Next** to continue.

Task 11 Configuring Dynamic Servers
Click **Next** to continue.

Task 12 Assigning Managed Servers to the Cluster
On the Assign Servers to Clusters screen, assign servers to clusters as follows:

Note that the WLS_SOA Managed Servers will appear only if you are extending an existing Oracle SOA Suite domain with Oracle Service Bus.

- SOA_Cluster - If you are extending a SOA domain.
  - WLS_SOA1
  - WLS_SOA2
- WSM-PM_Cluster:
  - WLS_WSM1
  - WLS_WSM2
- OSB_Cluster:
  - WLS_OSB1
  - WLS_OSB2

Click **Next**.

For more information about the options on this screen, see Assign Servers to Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 13 Configuring Coherence Clusters
Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain. Leave the port number value at `9991`, as it was defined during the initial Infrastructure domain creation.

For Coherence licensing information, see Oracle Coherence Products in *Oracle Fusion Middleware Licensing Information User Manual*.

Task 14 Verifying the Existing Machines

Confirm that the following entries appear:

Name	Node Manager Listen Address
SOAHOST1	SOAHOST1
SOAHOST2	SOAHOST2
ADMINHOST	ADMINVHN

Leave all other fields to their default values.

Click **Next**.

Task 15 Assigning Servers to Machines

On the Assign Servers to Machines screen, assign servers to machines as follows:

- ADMINHOST:
  - AdminServer
- SOAHOST1
  - WLS_SOA1 (if extending a SOA domain)
  - WLS_WSM1
  - WLS_OSB1
- SOAHOST2:
  - WLS_SOA2 (if extending a SOA domain)
  - WLS_WSM2
  - WLS_OSB2

For more information about the options on this screen, see Assign Servers to Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 16 Configuring Virtual Targets

Click **Next** to proceed to the next screen.

Task 17 Configuring Partitions

Click **Next** to proceed to the next screen.

Task 18 Configuring File Store

Configure the JMS File Stores that were just created during the configuration session (`Wsee FileStore`, `UMS JMS FileStore`, and `FileStore`).

On the JMS File Stores screen, assign the following directory for each of the OSB Persistence stores:

```
ORACLE_RUNTIME/domain_name/OSB_Cluster/jms
```

In this example, replace *ORACLE_RUNTIME* with the value of the variable for your environment. Replace *OSB_Cluster* with the name you assigned to the OSB cluster.

Ignore the JMS configuration warning that appears.

> **Note:**
> You do not need to customize the MDS file store locations. They are used only in development mode. In the production environments, MDS is persisted in the database.

Task 19 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Update**.

For more information about the options on this screen, see Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 20 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured, including:

- Domain Location
- Administration Server URL

Make a note of both these items, because you will need them later; you will need the domain location to access the scripts used to start the Administration Server, and you will need the Administration Server URL to access the WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control.

Click **Finish** to dismiss the Configuration Wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 21 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

14.7 Configuring a Default Persistence Store for Transaction Recovery

Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Each Managed Server uses a transaction log that stores information about committed transactions that are coordinated by the server and that may not have been completed.

Oracle WebLogic Server uses this transaction log for recovery from system crashes or network failures. To leverage the migration capability of the Transaction Recovery

Service for the Managed Servers within a cluster, store the transaction log in a location accessible to each Managed Server and its backup server.

Note:

To enable migration of the Transaction Recovery Service, specify a location on a persistent storage solution that is available to other servers in the cluster. All Managed Servers in the cluster must be able to access this directory. This directory must also exist before you restart the server.

The recommended location is a dual-ported SCSI disk or on a Storage Area Network (SAN). Note that it is important to set the appropriate replication and backup mechanisms at the storage level to guarantee protection in cases of a storage failure.

This information applies for file-based transaction logs. You can also configure a database-based persistent store for translation logs. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

For instructions to configure a default persistence store with static clusters, see Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster.

14.8 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the OSB instances, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

Note that there is no need to propagate the updated domain to the WEBHOST1 and WEBHOST2 machines, because there are no changes to the Oracle HTTP Server instances on those host computers.

Refer to the following sections for more information.

- Summary of the Tasks Required to Propagate the Changes to the Other Domain Directories and Machines
- Starting and Validating the WLS_OSB1 Managed Server
- Starting and Validating the WLS_OSB2 Managed Server
- Validating the Location and Creation of the Transaction Logs
- Verifying the Appropriate Targeting for OSB Singleton Services

14.8.1 Summary of the Tasks Required to Propagate the Changes to the Other Domain Directories and Machines

Table 14-4 summarizes the steps required to propagate the changes to all the domain directories and machines.

Table 14-4 Summary of Tasks Required to Propagate the Domain Chanegs to Domain Directories and Machines

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new OSB Servers configuration. When you pack up the domain, create a template jar file called `soadomaintemplateExtOSB.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers Directory on SOAHOST1	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

14.8.2 Starting and Validating the WLS_OSB1 Managed Server

After extending the domain, restarting the Administration Server, and propagating the domain to the other hosts, use the following procedure to start the WLS_OSB1 server and validate that it is configured successfully:

Starting the WLS_OSB1 Managed Server

Adding the MiddlewareAdministrators Role to the Enterprise Deployment Administration Group

Validating the Managed Server by Logging in to the SOA Infrastructure

14.8.2.1 Starting the WLS_OSB1 Managed Server

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

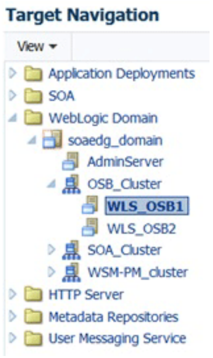
   ```
   http://ADMINVHN:7001/em
   ```

   Note:

   If you have already configured Web tier, use `http://admin.example.com/console`.

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the **Target Navigation** pane, expand the domain to view the Managed Servers in the domain.



4. Select only the **WLS_OSB1** Managed Server and click **Start Up** on the Oracle WebLogic Server toolbar.

   Note:

   OSB Servers depend on the policy access service to be functional. This implies that the WSM-PM Managed Servers in the domain need to be up and running and reachable before the OSB servers are started.

5. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_OSB1 Managed Server is up and running.

14.8.2.2 Adding the MiddlewareAdministrators Role to the Enterprise Deployment Administration Group

Before you validate the Oracle Service Bus configuration on the WLS_OSB1 Managed Server, add the Oracle Service Bus `MiddlewareAdministrators` administration role to the enterprise deployment administration group (`SOA Administrators`) and add the `IntegrationAdministrators` group in the external LDAP directory.

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

14.8.2.3 Validating the Managed Server by Logging in to the SOA Infrastructure

After you add the `MiddlewareAdministrator` role to the SOA Administrators group, you can then validate the configuration of the Oracle Service Bus software on the WLS_OSB1 Managed Server as follows.

1. Use your Web browser to navigate to the following URL:

   ```
   http://<OSB PORT NUMBER>/sbinspection.wsil
   ```

   Replace *SOAHOST1* with the value of this variable in the *Enterprise Deployment Workbook*. For more information, see Physical and Virtual IP Addresses Required by the Enterprise Topology.

2. Log in using the enterprise deployment administration user (SOA Administrators).

   With the default installation, this should result in the following HTTP response to the Web services call:

   ```
   <ins:inspection xmlns:ins="http://schemas.xmlsoap.org/ws/2001/10/inspection/"/>
   ```

14.8.3 Starting and Validating the WLS_OSB2 Managed Server

Follow similar steps as in the previous section for WLS_OSB2:

1. Log in to Fusion Middleware Control using the Administration Server credentials.

2. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.

3. Select only the WLS_OSB2 Managed Server and click **Start Up** on the Oracle WebLogic Server tool bar.

4. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_OSB2 Managed Server is up and running. Access the equivalent URLs for the WLS_OSB2:

   ```
   http://<OSB PORT NUMBER>/sbinspection.wsil
   ```

5. Verify the correct deployment of the Oracle Service Bus console to the Administration Server by accessing the following URL:

   ```
   http://ADMINVHN:7001/servicebus/
   ```

14.8.4 Validating the Location and Creation of the Transaction Logs

After the WLS_OSB1 and WLS_OSB2 Managed Servers are up and running, verify that the transaction log directory and transaction logs were created as expected, based on the steps you performed in Configuring a Default Persistence Store for Transaction Recovery:

```
ORACLE_RUNTIME/domain_name/OSB_Cluster/tlogs
```

- `_WLS_WLS_OSB1000000.DAT`
- `_WLS_WLS_OSB2000000.DAT`

14.8.5 Verifying the Appropriate Targeting for OSB Singleton Services

Oracle Service Bus uses some services that are singletons and that should run only in one of the WLS servers in the OSB_Cluster.

Verify that the appropriate targeting exists and that the following application is targeted only to WLS_OSB1:

- Service Bus Domain Singleton Marker Application

To do this follow these steps:

1. In a browser, go to the following URL:

   ```
   http://ADMINVHN:7001/console
   ```

   > **Note:**
   >
   > If you have already configured Web tier, use `http://admin.example.com/console`.

2. Log in as the administrator.

3. In the Domain Structure tree on the left, click **Deployments**.

4. Find the **Service Bus Domain Singleton Marker Application**. Verify that in the **Targets** column in the table only WLS_OSB1 appears as target.

14.9 Configuring the Web Tier for the Extended Domain

It is important to understand how to configure the Web server instances on the Web tier so that they route requests for both public and internal URLs to the proper clusters in the extended domain.

Note:

If you add custom endpoints in OSB, make sure that you add the appropriate URLs to the OHS or the OTD configuration. For example, if you add a proxy service such as RNOWOSB/, you must add the following URL to `osb_vh.conf` for the services to be available through OHS/OTD:

```
<Location /RNOWOSB>
     WLSRequest ON
    WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>
```

Alternatively, Oracle recommends creating a unique root context in the Web tier and use that as the base path for all proxy services. For example, if the root context is */endpoint*, the configured endpoint URL will be `osb.example.com/endpoint/RNOWOSB/`. This avoids the need to alter the Web tier config file with every new endpoint and also benefits from a single resource configuration for SSO, if OAM is used.

```
<Location /endpoint>
    WLSRequest ON
    WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>
```

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for the Oracle Service Bus
To configure the Oracle HTTP Server instances in the Web tier so they route requests correctly to the Oracle Service Bus cluster, use the following procedure to create an additional Oracle HTTP Server configuration file that creates and defines the parameters of the soa.example.com virtual server.

Configuring the WebLogic Proxy Plug-In
Set the WebLogic Plug-In Enabled parameter for the OSB cluster.

Validating the Oracle Service Bus URLs Through the Load Balancer
Verify the Oracle Service Bus URLs to ensure that appropriate routing and failover is working from the hardware load balancer to the HTTP Server instances to the Oracle Service Bus components.

14.9.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

14.9.2 Configuring Oracle HTTP Server for the Oracle Service Bus

To configure the Oracle HTTP Server instances in the Web tier so they route requests correctly to the Oracle Service Bus cluster, use the following procedure to create an additional Oracle HTTP Server configuration file that creates and defines the parameters of the soa.example.com virtual server.

This procedure assumes you have performed the Oracle HTTP Server configuration tasks described in Configuring Oracle HTTP Server for Administration and Oracle Web Services Manager.

To set the parameter:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Create a new configuration file, called `osb_vh.conf` file, and add the following `<VirtualHost>` directive to the file:

   ```
   <VirtualHost WEBHOST1:7777>
       ServerName https://osb.example.com:443
       ServerAdmin you@your.address
       RewriteEngine On
       RewriteOptions inherit
   </VirtualHost>
   ```

3. Add the following directives inside the `<VirtualHost>` tags:

   ```
   <Location /sbinspection.wsil>
     WLSRequest ON
     WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /sbresource>
     WLSRequest ON
     WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /osb>
     WLSRequest ON
   ```

```
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /alsb>
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /default>
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>
```

The `osb_vh.conf` file will appear as it does in Example 14-1.

4. Add the following entry to the `admin_vh.conf` file within the `<VirtualHost>` tags:

```
<Location /sbconsole >
  WLSRequest ON
  WebLogicHost ADMINVHN
  WeblogicPort 7001
</Location>

<Location /servicebus>
  WLSRequest ON
  WebLogicHost ADMINVHN
  WeblogicPort 7001
</Location>

<Location /lwpfconsole >
  WLSRequest ON
  WebLogicHost ADMINVHN
  WeblogicPort 7001
</Location>
```

The `admin_vh.conf` file will appear as it does in Example 14-2.

5. Copy the `osb_vh.conf` file and the `admin_vh.conf` file to the configuration directory for the second Oracle HTTP Server instance (ohs2) on WEBHOST2:

OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/**ohs2**/moduleconf

6. Edit the `osb_vh.conf` file and change any references to WEBHOST1 to WEBHOST2 in the `<VirtualHost>` directives.

7. Restart Oracle HTTP Servers on WEBHOST1 and WEBHOST2.

Example 14-1 osb_vh.conf file

```
<VirtualHost WEBHOST1:7777>
  ServerName https://osb.example.com:443
  ServerAdmin you@your.address
  RewriteEngine On
  RewriteOptions inherit

<Location /sbinspection.wsil >
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /sbresource >
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /osb >
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /alsb >
  WLSRequest ON
  WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /default>
 WLSRequest ON
 WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
 WLProxySSL ON
 WLProxySSLPassThrough ON
 </Location>
 </VirtualHost>
```

Example 14-2 admin_vh.conf file

```
# The admin URLs should only be accessible via the admin virtual host

<VirtualHost WEBHOST1:7777>
    ServerName admin.example.com:80
    ServerAdmin you@your.address
    RewriteEngine On
    RewriteOptions inherit

# Admin Server and EM
<Location /console>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /consolehelp>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>
```

```
<Location /em>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /sbconsole >
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
</Location>

<Location /servicebus>
    WLSRequest ON
    WebLogicHost ADMINVHN
    WeblogicPort 7001
   </Location>

<Location /lwpfconsole >
  WLSRequest ON
  WebLogicHost ADMINVHN
  WeblogicPort 7001
</Location>
</VirtualHost>
```

14.9.3 Configuring the WebLogic Proxy Plug-In

Set the WebLogic Plug-In Enabled parameter for the OSB cluster.

1. Log in to the Oracle WebLogic Server Administration Console.
2. In the Domain Structure pane, expand the **Environment** node.
3. Click on **Clusters**.
4. Select the OSB_Cluster cluster to which you want to proxy requests from Oracle HTTP Server.

   The **Configuration: General** tab is displayed.
5. Scroll down to the Advanced section and expand it.
6. Click **Lock and Edit**.
7. Set the WebLogic Plug-In Enabled to **yes**.
8. Click **Save and Activate the changes**.Restart the OSB servers for the changes to be effective.

14.9.4 Validating the Oracle Service Bus URLs Through the Load Balancer

Verify the Oracle Service Bus URLs to ensure that appropriate routing and failover is working from the hardware load balancer to the HTTP Server instances to the Oracle Service Bus components.

To verify the URLs:

1. While WLS_OSB1 is running, stop WLS_OSB2 using the Oracle WebLogic Server Administration Console.

2. Access the following URL and verify the HTTP response as indicated in Starting and Validating the WLS_OSB2 Managed Server:

   ```
   https://osb.example.com/
   ```

3. Start WLS_OSB2 from the Oracle WebLogic Server Administration Console.

4. Stop WLS_OSB1 from the Oracle WebLogic Server Administration Console.

5. Access the same URL and verify the HTTP response as indicated in section Starting and Validating the WLS_OSB2 Managed Server.

   > **Note:**
   >
   > Since a front end URL has been set for the OSB_Cluster, the requests to the urls result in a re-route to the LBR, but in all cases it should suffice to verify the appropriate mount points and correct failover in Oracle HTTP Server.

6. Verify this URL using your load balancer address:

   ```
   https://osb.example.com:443/sbinspection.wsil
   ```

   You can also verify `http://admin.example.com:80/servicebus`.

14.10 Post-Configuration Tasks for Oracle Service Bus

After you install and configure Oracle Service Bus in the domain, consider the following post-configuration tasks.

Enabling High Availability for Oracle DB, File and FTP Adapters

Considerations for Poller Transports

OSB provides native Poller transports that are not transactional in nature. These transports poll a source directory or email server for new messages and push the processing payloads to the required JMS destinations. Email, File, FTP, and SFTP fall in this category.

Configuring Specific Oracle Service Bus Services for an Enterprise Deployment

Enabling SSL Communication Between the Oracle Service Bus Servers and the Hardware Load Balancer

Backing Up the Oracle Service Bus Configuration

14.10.1 Enabling High Availability for Oracle DB, File and FTP Adapters

Oracle SOA Suite and Oracle Service Bus use the same database, File, and FTP JCA adapters.

You create the required database schemas for these adapters when you use the Oracle Repository Creation Utility before configuring Oracle SOA Suite. The database adapter does not require any configuration at the WebLogic Server resource level.

The required configuration for the other adapters is described in section Enabling High Availability for Oracle File and FTP Adapters.

If you are configuring Oracle Service Bus as an extension of a SOA domain, you do not need to add to the configuration already performed for the adapters.

If you are deploying Oracle Service Bus as an extension to an Oracle Fusion Middleware Infrastructure domain (without Oracle SOA Suite), then you must do the following:

- Run RCU to seed the Oracle Service Bus database with the required adapter schemas (Select the SOA Infrastructure schema in RCU).
- Perform the steps in Enabling High Availability for Oracle File and FTP Adapters.

14.10.2 Considerations for Poller Transports

OSB provides native Poller transports that are not transactional in nature. These transports poll a source directory or email server for new messages and push the processing payloads to the required JMS destinations. Email, File, FTP, and SFTP fall in this category.

Poll-based transports use a transport poller thread that is pinned to a Managed Server. All Managed Servers in a cluster can process the pertaining payload, but only one server can poll for the message. To protect the system from outages, the poller thread must be configured as an application-scoped singleton and the involved JMS destinations must be highly available.

To configure the transports as application-scoped singletons:

1. Log in to Oracle Fusion Middleware Enterprise Manager.
2. Navigate to **SOA > service-bus > Global Settings** and select **Automatic Singleton Service Migration**.

To protect the pertaining JMS destinations from failures, you can use different alternatives:

- When you use Weblogic static clusters, configure Automatic Service Migration (ASM) for the OSB migratable targets. In the case of a failure, the affected JMS and JTA services are migrated automatically to another member of the cluster.
- Alternatively, configure Whole Server Migration for the OSB cluster. In this case, the entire WLS server, including its JMS and JTA services, are restarted in another node.

14.10.3 Configuring Specific Oracle Service Bus Services for an Enterprise Deployment

To use IBM WebSphere MQ Connection resources and the MQ Transport in Oracle Service Bus, you must add the MQ client libraries to the classpath.

One option is to copy the required MQ libraries to the following location in the domain home directory:

```
DOMAIN_HOME/lib
```

This is also the case for custom assertions and JBoss integration services:

- When using JBoss initial context factory classes, make sure to include the class and any dependent classes in the *DOMAIN_HOME*/lib directory.

- Similarly, for custom assertions, create the required jar file with the assertion and add the jar to the `DOMAIN_HOME/lib` directory.

Further, to use these services in an enterprise deployment, you must add the required libraries to the Administration Server domain home (`ASERVER_HOME/lib`) and the Managed Server domain home (`MSERVER_HOME/lib`).

For more information about configuring and developing services for Oracle Service Bus, see Getting Started with the Oracle Service Bus Console in *Oracle Fusion Middleware Developing Services with Oracle Service Bus*.

14.10.4 Enabling SSL Communication Between the Oracle Service Bus Servers and the Hardware Load Balancer

After you extend the domain with Oracle Service Bus, you should also ensure that the Administration Server and Managed Servers can access the front-end, SSL URL of the hardware load balancer.

This will allow Oracle Service Bus Web services and other services to invoke callbacks and other communications with the front-end, secure URL.

For more information, see Enabling SSL Communication Between the Middle Tier and the Hardware Load Balancer.

14.10.5 Backing Up the Oracle Service Bus Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

14.11 Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle Service Bus

To ensure that Oracle Service Bus is configured for high availability, configure the Oracle Service Bus Managed Servers for automatic service migration for failover and zero data loss.

For more information on enabling server migration, see Configuring Automatic Service Migration in an Enterprise Deployment.

For additional high availability, you can also configure your transaction logs store and JMS store in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

15 Extending the Domain with Business Process Management

The procedures described in this chapter guide you through the process of extending the enterprise deployment topology to include Business Process Management (BPM).

Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Enabling SSL Communication Between Business Process Management Servers and the Hardware Load Balancer

After you extend the domain with Business Process Management, you must ensure that the Administration Server and Managed Servers can access the front-end, SSL URL of the hardware load balancer.

Validating Access to Business Process Management Through the Hardware Load Balancer

Because the cluster address for the SOA_Cluster has already been set in the previous chapter, the Business Process Management system can be verified only after the Oracle HTTP Server configuration files have been modified to route the Business Process Management context URLs to the WebLogic Servers.

Configuring BPMJMSModule for the Oracle BPM Cluster

The BPMJMSModule JMS Module is deployed automatically when you configure Oracle Business Process Management in a Oracle WebLogic Server domain.

Backing Up the Oracle BPM Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle Business Process Management

To ensure that Oracle Business Process Management is configured for high availability, configure the Managed Servers with automatic service migration for failover and zero data loss.

15.1 Variables Used When Configuring Business Process Management

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- OHS_DOMAIN_HOME
- JAVA_HOME

In addition, you will be referencing the following virtual IP (VIP) addresses defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2

15.2 Prerequisites for Extending the SOA Domain to Include Oracle BPM

Before extending the current domain, ensure that your existing deployment meets the necessary prerequisites.

- Back up the installation - If you have not yet backed up the existing Fusion Middleware Home and domain, Oracle recommends backing it up now.

  To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

- Existing WL_HOME and SOA ORACLE_HOME (binaries) are installed in previous chapters on a shared storage and are available from SOAHOST1 and SOAHOST2.

- Node Manager, Admin Server, SOA Servers and WSM Servers exist and have been configured as described in previous chapters to run a SOA system.

- You do not need to run RCU to load additional schemas for BPM. These are part of the SOA repository and are loaded into the DB in the SOA chapter

15.3 Installing Oracle Business Process Management for an Enterprise Deployment

The installation of Oracle SOA Foundation and Business Process Management software for an enterprise deployment is a three-step process.

Starting the Installation Program

Navigating the Oracle BPM Installation Screens

Verifying the Installation

15.3.1 Starting the Installation Program

To start the installation program, perform the following steps.

1. Log in to the target system.

2. Make sure certified JDK already exists on your system.

   For more information, see Installing a Supported JDK.

3. Go to the directory where you downloaded the installation program.

4. Launch the installation program by running the `java` executable from the JDK directory on your system, as shown in the examples below.

   ```
   JAVA_HOME/bin/java -d64 -jar fmw_12.2.1.2.0_soa.jar
   ```

Be sure to replace JDK location in these examples with the actual JDK location on your system.

When the installation program appears, you are ready to begin the installation.

15.3.2 Navigating the Oracle BPM Installation Screens

The installation program displays a series of screens, in the order listed in Table 15-1.

If you need additional help with any of the installation screens, click the screen name.

Table 15-1 Oracle Business Process Management Install Screens

Screen	Description
Installation Inventory Setup	On UNIX operating systems, this screen will appear if this is the first time you are installing any Oracle product on this host. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Understanding the Oracle Central Inventory in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. For the Oracle Home, specify `/u01/oracle/products/fmwnnnn`. For more information about Oracle Fusion Middleware directory structure, see Selecting Directories for Installation and Configuration in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. • Select **BPM** **NOTE**: The topology in this document does not include the examples, Oracle strongly recommends that you do not install the examples into a production environment.

Table 15-1 (Cont.) Oracle Business Process Management Install Screens

Screen	Description
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. If there are any warning or error messages, you can refer to one of the following documents in Roadmap for Verifying Your System Environment in *Oracle Fusion Middleware Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
Installation Summary	Use this screen to verify the installation options you selected. If you want to save these options to a response file, click **Save Response File** and provide the location and name of the response file. Response files can be used later in a silent installation situation. For more information about silent or command line installation, see Using the Oracle Universal Installer in Silent Mode in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*. Click **Install** to begin the installation.
Installation Progress	This screen allows you to see the progress of the installation. Click **Next** when the progress bar reaches 100% complete.
Installation Complete	Review the information on this screen, then click **Finish** to dismiss the installer.

15.3.3 Verifying the Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

Reviewing the Installation Log Files

Checking the Directory Structure

Viewing the Contents of Your Oracle Home

15.3.3.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Installing Software with the Oracle Universal Installer*.

15.3.3.2 Checking the Directory Structure

The contents of your installation vary based on the options you selected during the installation.

The addition of BPM will add the following directory and sub-directories to the `ORACLE_HOME/soa/bpm` directory:

```
composites
helpsets
lib
modules
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

15.3.3.3 Viewing the Contents of Your Oracle Home

You can also view the contents of your Oracle home using the `viewInventory` script. For more information, see Viewing the contents of an Oracle home in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

15.4 Running the Configuration Wizard on SOAHOST1 to Extend a SOA Domain to Include BPM

Run the Configuration Wizard from the ORACLE_COMMON_HOME directory to extend a domain containing an Administration Server, Oracle Web Services Manager and SOA to support BPM components.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Extend the Domain with BPM

15.4.1 Starting the Configuration Wizard

Note:

If you have added any customizations directly to the start scripts in the domain, those are overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

To start the Configuration Wizard:

1. From the WebLogic Server Console, stop any managed servers that will be modified by this domain extension. Managed Servers that are not effected can remain on-line.

   Note: This specific domain extension for Oracle Business Process Management component modifies the WLS_SOAn managed servers. Be sure to shut down these Managed Servers.

   ---

2. Verify the status of the managed servers, and then stop the Administration Server.

3. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

```
cd ORACLE_HOME/oracle_common/common/bin
./config.sh -log=bpm.log -log_priority=debug
```

15.4.2 Navigating the Configuration Wizard Screens to Extend the Domain with BPM

In this step, you extend the domain created in Extending the Domain with Oracle SOA Suite , and add the BPM components and Managed Servers.

Follow the instructions in these sections to create and configure the domain for the topology, with static clusters.

Extending the Domain with Static Clusters

15.4.2.1 Extending the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology with static clusters.

> **Note:**
>
> This procedure assumes you are extending an existing domain. If your needs do not match the instructions given in the procedure, be sure to make your selections accordingly, or refer to the supporting documentation for additional details.

Domain creation and configuration includes the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Datasource Configuration Type
- Task 4, Selecting Advanced Configuration
- Task 5, Reviewing your Configuration Specifications and Configuring the Domain
- Task 6, Writing Down Your Domain Home and Administration Server URL
- Task 7, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select Update an existing domain.

In the Domain Location field, select the value of the `ASERVER_HOME` variable, which represents the complete path to the Administration Server domain home you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

> **Tip:**
>
> More information about the other options on this screen can be found in Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure Update Domain Using Product Templates is selected, then select the following templates:

- **Oracle BPM Suite - 12.2.1.2.0[soa]**

In addition, the following additional templates should already be selected, because they were used to create the initial domain and extend it to SOA:

- Basic Weblogic Server Domain - 12.2.1.2[wlserver]
- Oracle SOA Suite 12.2.1.2[soa]
- Oracle Enterprise Manager - 12.2.1.2[em]
- Oracle WSM Policy Manager - 12.2.1.2[oracle_common]
- Oracle JRF - 12.2.1.2[oracle_common]
- WebLogic Coherence Cluster Extension - 12.2.1.2[wlserver]

The ODSI XQuery 2004 Components - 12.1.3.0 [oracle_common] template will also be selected if you had extended the domain previously with Oracle Service Bus.

Note:

There is no 12.2.1.1.0 template for ODSI. The 12.1.3 template will work for your 12.2.1.1.0 configuration.

Tip:

More information about the options on this screen can be found in Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Specifying the Datasource Configuration Type

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain. BPM uses the existing Datasources for SOA and no new Datasources need to be added to the domain.

Note:

Any custom datasources that were created before the extension (like LEASING datasources) will show up before this screen. Check the Datasources row and click **Next**. The test datasource screen will verify its validity. Click **Next**.

Task 4 Selecting Advanced Configuration

To complete domain configuration for the topology, do not select any additional options on the Advanced Configuration screen. Click **Next**. BPM applications and required artifacts will be targeted automatically to the existing SOA servers.

Task 5 Reviewing your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the Back button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Update**.

> **Tip:**
>
> More information about the options on this screen can be found in Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 6 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location
- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start Administration Server, and the URL is needed to access the Administration Server.

Click **Finish** to dismiss the configuration wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 7 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

15.5 Propagating the Extended Domain to the Domain Directories and Machines

Oracle BPM Suite requires some updates to the WebLogic Server start scripts. Propagate these changes using the pack and unpack commands.

Table 15-2 summarizes the steps required to propagate the changes to all the domain directories and machines.

Note that there is no need to propagate the updated domain to the WEBHOST1 and WEBHOST2 machines, because there are no changes to the Oracle HTTP Server instances on those host computers.

Table 15-2 Summary of Tasks Required to Propagate the Domain Changes to Domain Directories and Machines

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new Oracle BPM Suite Managed Servers configuration. When you pack up the domain, create a template jar file called `soadomaintemplateExtSOABPM.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers Directory on SOAHOST1	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

15.6 Updating SOA BPM Servers for Web Forms

Oracle BPM Web Forms define the interface that enables users to interact with your application. For business applications created with Oracle BPM, these forms are displayed in Oracle Business Process Management Workspace.

For web form to work properly in a highly available environment, perform the following steps:

1. Edit the `MSERVER_HOME/bin/startWebLogic.sh` file.

   Note:

   If you perform a domain extension, the script is overwritten by the unpack command. Therefore, you have to apply the changes again in the `startWebLogic.sh` file. You can also copy the changes from the backup file that the unpack command creates before you overwrite the script.

2. Insert the following code in the `startWebLogic.sh` file. Use a different port than the server listen port:

```
 if [ "${SERVER_NAME} = "WLS_SOA1" ]; then
    export cache_port=7801
    export host_bind=SOAHOST1
 fi
 if [ "${SERVER_NAME}"  = "WLS_SOA2" ]; then
    export cache_port=7801
    export host_bind=SOAHOST2
 fi
JAVA_OPTIONS="${JAVA_OPTIONS} -Djgroups.tcpping.bind_port=${cache_port}
  -Djgroups.tcpping.initial_hosts=SOAHOST1[7801],SOAHOST2[7801]
  -Dfrevvo.metadata.cache-config=/WEB-INF/cache-clustered.xml
    -Dfrevvo.cache.config.file=cache-tcp.xml
    -Dfrevvo.cluster=SOA_Cluster
```

```
-Djgroups.tcpping.num_members=2
-Djgroups.bind_addr=${host_bind}
-Djava.net.preferIP4Stack=true
```

Note: Servers, hosts, and ports are updated in scale scenarios.

15.7 Restarting the WLS_SOA Managed Servers with Business Process Management

For configuration changes and start scripts to be effective, you must restart the WLS_SOAn server to which BPM has been added.

Because BPM extends an already existing SOA system, the Administration Server and respective Node Managers are already running in SOAHOST1 and SOAHOST2.

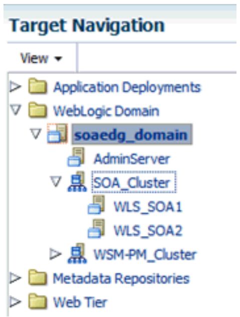
To restart the WLS_SOA1 Managed Server:

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

   `http://ADMINVHN:7001/em`

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the **Target Navigation** pane, expand the domain to view the Managed Servers in the domain.



4. Select the **WLS_SOA1** Managed Server and click **Shut Down** on the Oracle WebLogic Server toolbar.

Note:

SOA Servers depend on the policy access service to be functional, so the WSM-PM Managed Servers in the domain need to be up and running and reachable before the SOA servers are started.

5. When the shutdown operation is complete, make sure the server is still selected, and then click **Start Up** in the toolbar.

6. Repeat steps 4 and 5 for the WLS_SOA2 Managed Server.

7. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_SOA1 and WLS_SOA2 Managed Servers are up and running.

15.8 Adding the Enterprise Deployment Administration User to the Oracle BPM Administrators Group

Before you validate the Oracle Business Process Management configuration on the Managed Server, add the enterprise deployment administration user (`weblogic_soa`) to the Business Process Management `Administrators` group in the LDAP directory.

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

Note that the first time you log in to the Business Process Management Composer or Business Process Management Worklist applications, you must log in as a user that is a member of the Administrators group. After the initial login, any user can be an administration user, as long as they are granted the following roles:

```
OracleBPMComposerRolesApp/BPMComposerAdmin
```

Also, after the first login, any authenticated user should be able to access the Business Process Management applications.

15.9 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

15.9.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

15.9.2 Configuring Oracle HTTP Server for Oracle Business Process Management

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle Business Process Management requests correctly to the Oracle Business Process Management software.

To enable Oracle HTTP Server to route requests to the BPM Composer and BPM Workspace console:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   ```
   # BPM
   <Location /bpm/composer>
     WLSRequest ON
     WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   # BPM
   <Location /bpm/workspace>
     WLSRequest ON
     WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /frevvo>
       WLSRequest ON
       WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
       WLProxySSL ON
       WLProxySSLPassThrough ON
   </Location>
   </VirtualHost>
   ```

3. Change directory to the following location so you can update the configuration file for the second Oracle HTTP Server instance (ohs2):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

4. Open the `soa_vh.conf` file and add the Oracle Business Process Management directives to the `<VirualHost>` tag.

5. Restart Oracle HTTP Servers on WEBHOST1 and WEBHOST2.

15.10 Enabling SSL Communication Between Business Process Management Servers and the Hardware Load Balancer

After you extend the domain with Business Process Management, you must ensure that the Administration Server and Managed Servers can access the front-end, SSL URL of the hardware load balancer.

This will allow Business Process Management to use Web services to invoke callbacks and other communications with the front-end, secure URL.

If you already configured this communication for the Oracle SOA Suite (WLS_SOA) Managed Servers, then you should be able to validate this configuration using the validation procedures in Validating Access to Business Process Management Through the Hardware Load Balancer.

If you have not yet configured SSL communication with the hardware load balancer, then see Enabling SSL Communication Between the Middle Tier and the Hardware Load Balancer before you proceed to the validation steps.

15.11 Validating Access to Business Process Management Through the Hardware Load Balancer

Because the cluster address for the SOA_Cluster has already been set in the previous chapter, the Business Process Management system can be verified only after the Oracle HTTP Server configuration files have been modified to route the Business Process Management context URLs to the WebLogic Servers.

Use the following procedure to verify the Business Process Management URLs to ensure that appropriate routing and failover is working from the hardware load balancer to the Oracle HTTP Server instances to the Business Process Management Managed Servers:

1. While the WLS_SOA2 Managed Server is running, stop the WLS_SOA1 Managed Server using the Oracle WebLogic Server Administration Console.

2. Use your Web browser to access the following URLs:

   ```
   https://soa.example.com/bpm/composer/
   https://soa.example.com/bpm/workspace/
   ```

3. Log in using the `weblogic_soa` administration credentials.

   You should see the BPM Composer and BPM Workspace applications (Figure 15-1 and Figure 15-2)

4. Start WLS_SOA1 from the Oracle WebLogic ServerAdministration Console.

5. Stop WLS_SOA2 from the Oracle WebLogic Server Administration Console.

6. Access the same URLs to verify that the load balancer and Oracle HTTP Server instances can route the requests to the other Managed Server.

Figure 15-1 Oracle BPM Composer

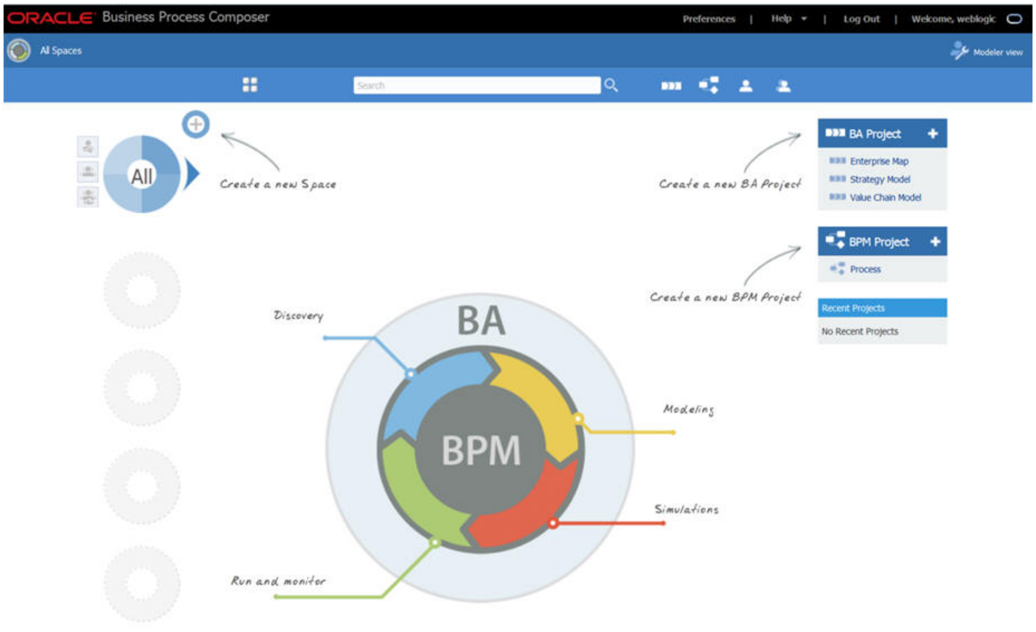
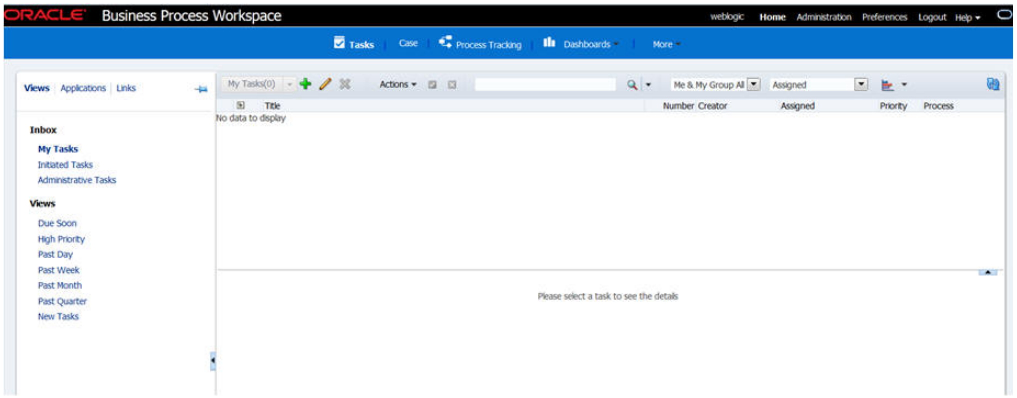


Figure 15-2 Oracle BPM Workspace



15.12 Configuring BPMJMSModule for the Oracle BPM Cluster

The BPMJMSModule JMS Module is deployed automatically when you configure Oracle Business Process Management in a Oracle WebLogic Server domain.

However, when you deploy Oracle Business Process Management Server as part of a Oracle WebLogic Server cluster, you must modify the default values for the quota and redelivery limits for specific JMS resources within the BPMJMSModule JMS module.

Specifically, you must modify the JMS topic resources listed in the following table.

JMS Resource	Property	Description	Recommended Setting
Measurement distributed topic in a cluster configuration: `dist_MeasurementTopic_auto`	Quota	This setting causes issues if a large number of messages are published to the measurement JMS topic and the message consumption is relatively slow. When the JMS default threshold of maximum message size is reached, then additional messages cannot be published and any attempt at publishing fails with the following exception: `ResourceAllocationException`	Set Quota to **MeasurementQuota**
Measurement distributed topic in a cluster configuration: `dist_MeasurementTopic_auto`	Redelivery Limit	In a cluster configuration, this property is set to -1 by default. This setting causes JMS to retry sending the message until it is successfully acknowledged. If the measurement topic consumers cannot process messages due to a system error that causes the transaction to rollback, then the system can experience performance issues and the filling up of logs with repeated exceptions.	Set the redelivery limit to three (3).

JMS Resource	Property	Description	Recommended Setting
Measurement distributed topic in a cluster configuration: `dist_MeasurementTopic_auto`	Forwarding Policy	A distributed measurement topic in a cluster installation is configured by default with the **Forwarding Policy** set to **Replicated**, even though this is not the best performance option for BPM analytics. For more information, see Tuning Oracle Business Process Management in *Oracle Fusion Middleware Tuning Performance*. For more information on partitioned and replicated forwarding policies, see Configuring Partitioned Distributed Topics in *Oracle Fusion Middleware Administering JMS Resources for Oracle WebLogic Server*.	Change the Forwarding Policy to **Partitioned**.

To modify the BPMJMSModule Resource settings:

1. Log in to the Oracle WebLogic Server Administration Console.
2. Select **Services > Messaging > JMS Modules** in the left navigation pane.
3. Click **BPMJMSModule** in the list of JMS Modules.
4. Select **dist_MeasurementTopic_auto** in the Summary of Resources table.
5. Click the **Thresholds and Quotas** tab.
6. Click **Lock and Edit**.
7. From the **Quota** drop-down menu, select **MeasurementQuota** and click **Save**.
8. Click the **Delivery Failure** tab.
9. Verify that the following fields are set to 3:
   - **Redelivery Delay Override**
   - **Redelivery Limit**
10. Click the **General** tab.
11. From the **Forwarding Policy** menu, select **Partitioned**.
12. Click **Save**.

13. Restart all SOA BPM cluster nodes for the changes to take effect.

15.13 Backing Up the Oracle BPM Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

15.14 Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle Business Process Management

To ensure that Oracle Business Process Management is configured for high availability, configure the Managed Servers with automatic service migration for failover and zero data loss.

For more information on enabling server migration, see Configuring Automatic Service Migration in an Enterprise Deployment.

Note that if you have already configured automatic service migration for the WLS_SOA Managed Servers, then this step is not necessary.

For additional high availability, you can also configure your transaction logs store and JMS store in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

16

Extending the Domain with Oracle Enterprise Scheduler

The procedures explained in this chapter guide you through the process of extending the enterprise deployment domain with the Oracle Enterprise Scheduler software.

Starting and Validating the WLS_ESS2 Managed Server

After you start the WLS_ESS2 managed server, you must verify that the server status is reported as 'Running' in the Admin Console and access the URLs to verify the status of servers.

Validating the Location and Creation of the Transaction Logs

After WLS_ESS1 and WLS_ESS2 are up and running, verify that the transaction log directory and transaction logs were created as expected.

Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Validating Access to Oracle Enterprise Scheduler Through the Hardware Load Balancer

Verify the URLs to ensure that appropriate routing and failover is working from the HTTP Server to the Oracle ESS components.

Backing Up the Oracle Enterprise Scheduler Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

16.1 About Adding Oracle Enterprise Scheduler

Before you add Oracle Enterprise Scheduler to a SOA domain, familiarize yourself with the high-level steps that you have to perform to complete the extension process.

Table 16-1 lists and describes to high-level steps for extending a SOA domain with Oracle Enterprise Scheduler.

Table 16-1 Steps for Extending a SOA Domain to Include Oracle Enterprise Scheduler

Step	Description	More Information
Create Database Schemas for ESS	Navigate the RCU screens to create the database schemas.	Creating the Database Schemas for ESS
Run the Configuration Wizard to Extend the Domain	Extend the SOA/OSB domain to contain Oracle Enterprise Scheduler components	Extending the SOA Domain to Include Oracle Enterprise Scheduler
Configure a Default Persistence Store for Transaction Recovery	To leverage the migration capability of the Transaction Recovery Service for the servers within a cluster, store the transaction log in a location accessible to a server and its backup servers.	Configuring a Default Persistence Store for Transaction Recovery
Propagate the Domain Configuration to the Managed Server Directory in SOAHOST1 and to SOAHOST2	Oracle Enterprise Scheduler requires some updates to the WebLogic Server start scripts. Propagate these changes using the pack and unpack commands.	Propagating the Extended Domain to the Domain Directories and Machines

Table 16-1 (Cont.) Steps for Extending a SOA Domain to Include Oracle Enterprise Scheduler

Step	Description	More Information
Start the Oracle Enterprise Scheduler Servers	Oracle Enterprise Scheduler servers extend an already existing domain. As a result, the Administration Server and respective Node Managers are already running in SOAHOST1 and SOAHOST2.	Starting WLS_ESS1 Managed Server
Validate the WLS_ESS Managed Servers	Verify that the server status is reported as Running in the Admin Console and access URLs to verify status of servers.	Starting and Validating the WLS_ESS2 Managed Server
Configuring Oracle HTTP Server for the WLS_ESSn Managed Servers	To enable Oracle HTTP Server to route to Oracle Enterprise Scheduler console and service, set the WebLogicCluster parameter to the list of nodes in the cluster.	Configuring Oracle HTTP Server for the WLS_ESS Managed Servers
Validating Access Through Oracle HTTP Server	Verify that the server status is reported as Running.	Validating Access to Oracle Enterprise Scheduler Through the Hardware Load Balancer
Backing up the Oracle Enterprise Scheduler	To back up the domain configuration for immediate restoration in case of failures in future procedures.	Backing Up the Oracle Enterprise Scheduler Configuration

16.2 Variables Used When Configuring Oracle Enterprise Scheduler

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- OHS_DOMAIN_HOME

In addition, you willl be referencing the following virtual IP (VIP) addresses defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2

- WEBHOST1
- WEBHOST2

16.3 Creating the Database Schemas for ESS

Before you can configure an Oracle ESS server, you must install the required schemas on a certified database for use with this release of Oracle Fusion Middleware.

Follow the instructions in these sections to install the schemas.

Starting the Repository Creation Utility (RCU)

Navigating the RCU Screens to Create the Enterprise Scheduler Schemas

16.3.1 Starting the Repository Creation Utility (RCU)

To start the Repository Creation Utility (RCU):

1. Navigate to the *`ORACLE_HOME`*`/oracle_common/bin` directory on your system.
2. Make sure the *`JAVA_HOME`* environment variable is set to the location of a certified JDK on your system. The location should be up to but not including the `bin` directory. For example, if your JDK is located in `/u01/oracle/products/jdk`:

   On UNIX operating systems:

   ```
   export JAVA_HOME=/u01/oracle/products/jdk
   ```

3. Start RCU:

   On UNIX operating systems:

   ```
   ./rcu
   ```

> **Note:**
>
> If your database has Transparent Data Encryption (TDE) enabled, and you want to encrypt your tablespaces created by the RCU, provide the `-encryptTablespace true` option when you start the RCU.
>
> This will default the appropriate RCU GUI Encrypt Tablespace checkbox selection on the Map Tablespaces screen without further effort during the RCU execution. For more information, see olink:RCUUG-GUID-D4AE68B4-11DF-459B-A5F1-D4DAAA3B7233 in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

16.3.2 Navigating the RCU Screens to Create the Enterprise Scheduler Schemas

Schema creation involves the following tasks:

- Task 1, Introducing RCU
- Task 2, Selecting a Method of Schema Creation
- Task 3, Providing Database Connection Details
- Task 4, Specifying a Custom Prefix and Selecting Schemas
- Task 5, Specifying Schema Passwords

- Task 6, Specifying Custom Variables
- Task 7, Completing Schema Creation

Task 1 Introducing RCU

Click **Next**.

Task 2 Selecting a Method of Schema Creation

If you have the necessary permission and privileges to perform DBA activities on your database, select **System Load and Product Load Concurrently.** This procedure assumes that you have the necessary privileges.

If you do not have the necessary permission or privileges to perform DBA activities in the database, you must select **Prepare Scripts for System Load** on this screen. This option will generate a SQL script, which can be provided to your database administrator. See Understanding System Load and Product Load in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

Task 3 Providing Database Connection Details

Provide the database connection details for RCU to connect to your database. In the host name enter the scan address of your RAC DB.

Click **Next** to proceed, then click OK on the dialog window confirming that connection to the database was successful.

Task 4 Specifying a Custom Prefix and Selecting Schemas

Select **Select existing prefix** and specify the prefix you used for the original domain creation schemas.

Expand the **Oracle AS Common Schemas** and then select the **Oracle Enterprise Scheduler** in the component list.

The custom prefix is used to logically group these schemas together for use in this domain only; you must create a unique set of schemas for each domain as schema sharing across domains is not supported.

> **Tip:**
>
> For more information about custom prefixes, see Understanding Custom Prefixes in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.
>
> For more information about how to organize your schemas in a multi-domain environment, see Planning Your Schema Creation in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

> **Tip:**
>
> You must make a note of the custom prefix you choose to enter here; you will need this later on during the domain creation process.

Click **Next** to proceed, then click **OK** on the dialog window confirming that prerequisite checking for schema creation was successful.

Task 5 Specifying Schema Passwords

Specify how you want to set the schema passwords on your database, then specify and confirm your passwords.

> **Tip:**
>
> You must make a note of the passwords you set on this screen; you will need them later on during the domain creation process.

Task 6 Specifying Custom Variables

Click **Next** in the Default and temporary tablespaces selection (accept defaults) and click in the Confirmation Pop up window warning about tablespaces being created.

Task 7 Completing Schema Creation

Navigate through the remainder of the RCU screens to complete schema creation. When you reach the Completion Summary screen, click **Close** to dismiss RCU.

16.4 Extending the SOA Domain to Include Oracle Enterprise Scheduler

You can use the Configuration Wizard to configure and extend the existing enterprise deployment SOA domain with Oracle Enterprise Scheduler. You also need to perform additional tasks to complete the extension.

Extending the domain involves the following tasks.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens to Extend the Domain with Oracle Enterprise Scheduler

16.4.1 Starting the Configuration Wizard

> **Note:**
>
> If you added any customizations directly to the start scripts in the domain, those will be overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the **`pack`** and **`unpack`** commands.

To begin domain configuration:

1. Shut down the Administration Server to prevent any configuration locks, saves, or activations from occurring during the configuration of the domain.

2. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

   ```
   ORACLE_HOME/oracle_common/common/bin
   ./config.sh
   ```

16.4.2 Navigating the Configuration Wizard Screens to Extend the Domain with Oracle Enterprise Scheduler

Follow the instructions in the following sections to create and configure the domain for the topology, with static clusters.

16.4.2.1 Extending the Domain with Static Clusters

In this step, you extend the domain created in Extending the Domain with Oracle SOA Suite to contain Oracle Enterprise Scheduler components.

The steps reflected in this section are very similar to the steps required to extend an Oracle Fusion Middleware Infrastructure domain directly, but some of the options, libraries, and components shown in the screens will vary.

Domain creation and configuration includes the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Datasource Configuration Type
- Task 4, Specifying JDBC Component Schema Information
- Task 5, Providing the GridLink Oracle RAC Database Connection Details
- Task 6, Selecting Advanced Configuration
- Task 7, Configuring Managed Servers
- Task 8, Configuring a Cluster
- Task 9, Assigning Server Templates
- Task 10, Configuring Dynamic Servers
- Task 11, Assigning Managed Servers to the Cluster
- Task 12, Configuring Coherence Clusters
- Task 13, Verifying the Existing Machines
- Task 14, Assigning Servers to Machines
- Task 15, Configuring Virtual Targets
- Task 16, Configuring Partitions
- Task 17, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 18, Writing Down Your Domain Home and Administration Server URL
- Task 19, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the **Domain Location** field, select the value of the ASERVER_HOME variable, which represents the complete path to the Administration Server domain home you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

> **Tip:**
> More information about the other options on this screen can be found in Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following templates:

Oracle Enterprise Scheduler Service Basic - 12.2.1.2.0[oracle_common]

Oracle Enterprise Manager Plugin for ESS - 12.2.1.2.0[em]

Click **Next**.

Task 3 Specifying the Datasource Configuration Type

> **Note:**
> Any custom datasources that were created before the extension (like LEASING datasources) will show up before this screen. Check the Datasources row and click **Next**. The test datasource screen will verify its validity. Click **Next**.

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain. Verify and ensure that credentials in all the fields are the same that you have provided while configuring Oracle Fusion Middleware Infrastructure.

Click **Get RCU Configuration** after you finish verifying the database connection information. The following output in the Connection Result Log indicates that the operation succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK
Successfully Done.
```

> **Tip:**
> More information about the RCU Data option can be found in Understanding the Service Table Schema in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.
>
> More information about the other options on this screen can be found in Datasource Defaults in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 4 Specifying JDBC Component Schema Information

Select the **ESS Schema** and **ESS MDS Schema**.

When you select the schemas, the fields on the page are activated and the database connection fields are populated automatically.

Click **Convert to GridLink** and click **Next**.

Task 5 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in the following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

Task 6 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Topology**

  Add, Delete, or Modify Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

Task 7 Configuring Managed Servers

On the Managed Servers screen, add the required managed servers for Enterprise Scheduler.

- Select the automatically created server and click **Rename** to change the name to WLS_ESS1.
- Click **Add** to add another new server and enter WLS_ESS2 as the server name.
- Give servers WLS_ESS1 and WLS_ESS2 the attributes listed in Table 16-2.

Click **Next**.

Name	Listen Address	Listen Port	SSL Listen Port	SSL Enabled	Server Groups
WLS_SOA1	SOAHOST1	8001	n/a	No	SOA-MGD-SVRS-ONLY

Name	Listen Address	Listen Port	SSL Listen Port	SSL Enabled	Server Groups
WLS_SOA2	SOAHOST2	8001	n/a	No	SOA-MGD-SVRS-ONLY
WLS_WSM1	SOAHOST1	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_WSM2	SOAHOST2	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_OSB1	SOAHOST1	8011	n/a	No	OSB-MGD-SVRS-ONLY
WLS_OSB2	SOAHOST2	8011	n/a	No	OSB-MGD-SVRS-ONLY
WLS_ESS1	SOAHOST1	8021	n/a	No	ESS-MGD-SVRS
WLS_ESS2	SOAHOST2	8021	n/a	No	ESS-MGD-SVRS

Note:

- The WLS_SOA Managed Servers appear only if you are extending a domain where Oracle SOA Suite has been configured.
- The WLS_OSB Managed Servers appear only if you are extending a domain where Oracle Service Bus has been configured.

Task 8 Configuring a Cluster

On the Configure Clusters screen, add the **ESS_Cluster** cluster, using the values for each property shown in the following table.

Name	Cluster Address	Frontend Host	Frontend HTTP Port	Frontend HTTPs
SOA_Cluster	Leave it empty.	soa.example.com	80	443
WSM-PM_Cluster	Leave it empty	Leave it empty	Leave it empty	Leave it empty
OSB_Cluster	Leave it empty	osb.example.com	80	443
ESS_Cluster	Leave it empty	soa.example.com	80	443

From the **Dynamic Server Groups** drop-down list, select `Unspecified`.

Click **Next**.

Note:

- The SOA_Cluster cluster appears only if you are extending a domain where Oracle SOA Suite has been configured.
- The OSB_Cluster cluster appears only if you are extending a domain where Oracle Service Bus has been configured.

Task 9 Assigning Server Templates
Click **Next** to continue.

Task 10 Configuring Dynamic Servers
Click **Next** to continue.

Task 11 Assigning Managed Servers to the Cluster
On the Assign Servers to Clusters screen, assign servers to clusters as follows:

- SOA_Cluster - If you are extending a SOA domain.
  - WLS_SOA1
  - WLS_SOA2
- WSM-PM_Cluster:
  - WLS_WSM1
  - WLS_WSM2
- OSB_Cluster - If you are extending an OSB domain:
  - WLS_OSB1
  - WLS_OSB2
- ESS_Cluster:
  - WLS_ESS1
  - WLS_ESS2

Click **Next**.

Task 12 Configuring Coherence Clusters
Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain. Leave the port number value at 9991, as it was defined during the initial Infrastructure domain creation.

Task 13 Verifying the Existing Machines
On the Unix Machines tab, confirm that the following entries appear:

Name	Node Manager Listen Address
SOAHOST1	SOAHOST1
SOAHOST2	SOAHOST2
ADMINHOST	ADMINVHN

Leave all other fields to their default values.

Click **Next**.

Task 14 Assigning Servers to Machines

On the Assign Servers to Machines screen, assign servers to machines as follows:

- ADMINHOST:
  - AdminServer
- SOAHOST1
  - WLS_SOA1 (if extending a SOA domain)
  - WLS_WSM1
  - WLS_OSB1 (if extending an OSB domain)
  - WLS_ESS1
- SOAHOST2
  - WLS_SOA2 (if extending a SOA domain)
  - WLS_WSM2
  - WLS_OSB2 (if extending an OSB domain)
  - WLS_ESS2

Click **Next**.

Task 15 Configuring Virtual Targets

Click **Next** to continue.

Task 16 Configuring Partitions

Click **Next** to continue.

Task 17 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

Click **Update**.

In the Extending Domain screen, click **Done**.

Task 18 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured, including:

- Domain Location
- Administration Server URL

Make a note of both these items, because you will need them later; you will need the domain location to access the scripts used to start the Administration Server, and you will need the Administration Server URL to access the WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control.

Click **Finish** to dismiss the Configuration Wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 19 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

16.5 Configuring a Default Persistence Store for Transaction Recovery

Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Each Managed Server uses a transaction log that stores information about committed transactions that are coordinated by the server and that may not have been completed.

Oracle WebLogic Server uses this transaction log for recovery from system crashes or network failures. To leverage the migration capability of the Transaction Recovery Service for the Managed Servers within a cluster, store the transaction log in a location accessible to each Managed Server and its backup server.

Note:

To enable migration of the Transaction Recovery Service, specify a location on a persistent storage solution that is available to other servers in the cluster. All Managed Servers in the cluster must be able to access this directory. This directory must also exist before you restart the server.

The recommended location is a dual-ported SCSI disk or on a Storage Area Network (SAN). Note that it is important to set the appropriate replication and backup mechanisms at the storage level to guarantee protection in cases of a storage failure.

This information applies for file-based transaction logs. You can also configure a database-based persistent store for translation logs. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

For instructions to configure a default persistence store with static clusters, see Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster.

16.6 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the ESS instances, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

The following table summarizes the steps required to propagate the changes to all the domain directories and machines.

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new ESS Servers configuration. When you pack up the domain, create a template jar file called `soadomaintemplateExtESS.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers Directory on SOAHOST1	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

16.7 Adding the ESSAdmin Role to the SOA Administrators Group

Before you validate the Oracle Enterprise Scheduler configuration on the WLS_ESS1 Managed Server, add the `ESSAdmin` role to the enterprise deployment administration group (`SOA Administrators`).

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

16.8 Starting WLS_ESS1 Managed Server

Now that you have extended the domain, restarted the Administration Server, and propagated the domain to the other hosts, you can start the newly configured ESS servers.

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

   ```
   http://ADMINVHN:7001/em
   ```

   In this example:

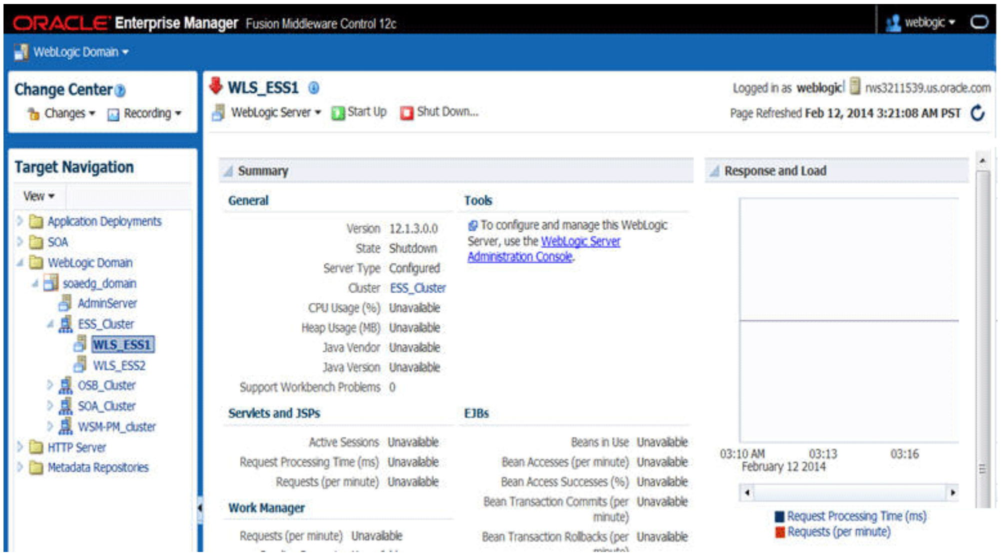
   - Replace ADMINVHN with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Downloads for an Enterprise Deployment.
   - Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that

was displayed at the end of the Configuration Wizard session when you created the domain.

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.

Figure 16-1 WLS_ESS1 Managed Server



Logged in as **weblogic** rws3211539.us.oracle.com

Page Refreshed **Feb 12, 2014 3:21:08 AM PST**

General

Version 12.1.3.0.0
State Shutdown
Server Type Configured
Cluster ESS_Cluster
CPU Usage (%) Unavailable
Heap Usage (MB) Unavailable
Java Vendor Unavailable
Java Version Unavailable
Support Workbench Problems 0

Tools

To configure and manage this WebLogic Server, use the WebLogic Server Administration Console.

Servlets and JSPs

Active Sessions Unavailable
Request Processing Time (ms) Unavailable
Requests (per minute) Unavailable

EJBs

Beans in Use Unavailable
Bean Accesses (per minute) Unavailable
Bean Access Successes (%) Unavailable
Bean Transaction Commits (per minute) Unavailable
Bean Transaction Rollbacks (per minute) Unavailable

Work Manager

Requests (per minute) Unavailable

4. Select only the WLS_ESS1 Managed Server and click **Start Up** on the Oracle WebLogic Server tool bar.

Note:

SOA Servers depend on the policy access service to be functional. This implies that the WSM-PM servers in the domain need to be reachable before the SOA ones are started

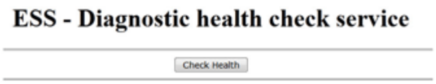
---

5. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_ESS1 Managed Server is up and running.

6. To verify the ESS software is configured, enter the following URL in the browser:

   ```
   http://SOAHOST1:8021/EssHealthCheck/
   ```

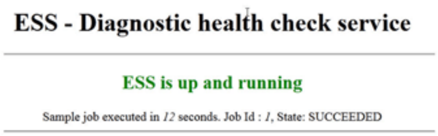
   With the default installation, this should be the HTTP response, as shown in the following image.



ESS - Diagnostic health check service

Click on the **Check Health** button, and then log in using the `welogic_soa` administration credentials.

The reply should report that Oracle Enterprise Schedule (ESS) is up and running, as shown in the following image.



ESS - Diagnostic health check service

ESS is up and running

Sample job executed in *12* seconds. Job Id : *1*, State: SUCCEEDED

16.9 Starting and Validating the WLS_ESS2 Managed Server

After you start the WLS_ESS2 managed server, you must verify that the server status is reported as 'Running' in the Admin Console and access the URLs to verify the status of servers.

Perform the same steps that you used to start WLS_ESS1, to start WLS_ESS2.

1. Log in to Fusion Middleware Control using the Administration Server credentials.
2. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.
3. Select only the WLS_ESS2 Managed Server and click **Start Up** on the Oracle WebLogic Server tool bar.
4. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_ESS2 Managed Server is up and running, access the equivalent URLs for the WLS_ESS2:

   ```
   http://SOAHOST2:8021/EssHealthCheck/
   ```

   Click the **Check Health** button, and then log in using the `welogic_soa` administration credentials.

   The reply reports that Oracle Enterprise Scheduler is up and running.

16.10 Validating the Location and Creation of the Transaction Logs

After WLS_ESS1 and WLS_ESS2 are up and running, verify that the transaction log directory and transaction logs were created as expected.

Run the following command to verify, based on the steps you performed in Configuring a Default Persistence Store for Transaction Recovery:

```
ORACLE_RUNTIME/domain_name/ESS_Cluster/tlogs
```

- `_WLS_WLS_ESS1000000.DAT`
- `_WLS_WLS_ESS2000000.DAT`

16.11 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for the WLS_ESS Managed Servers
Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle Enterprise Scheduler requests correctly to the WLS_ESS Managed Servers on SOHOST1 and SOAHOST2.

Configuring the WebLogic Proxy Plug-In
Set the WebLogic Plug-In Enabled parameter for the ESS cluster.

16.11.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

16.11.2 Configuring Oracle HTTP Server for the WLS_ESS Managed Servers

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle Enterprise Scheduler requests correctly to the WLS_ESS Managed Servers on SOHOST1 and SOAHOST2.

To enable Oracle HTTP Server to route Oracle Enterprise Scheduler requests to the application tier:

1. Log in to SOAHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   ```
   <Location /ess >
     WLSRequest ON
     WebLogicCluster SOAHOST1:8021,SOAHOST2:8021
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /EssHealthCheck >
     WLSRequest ON
     WebLogicCluster SOAHOST1:8021,SOAHOST2:8021
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /ess-async >
       WLSRequest ON
       WebLogicCluster SOAHOST1:8021,SOAHOST2:8021
       WLProxySSL ON
       WLProxySSLPassThrough ON
   ```

```
</Location>

<Location /ess-wsjob >
    WLSRequest ON
    WebLogicCluster SOAHOST1:8021,SOAHOST2:8021
    WLProxySSL ON
    WLProxySSLPassThrough ON
</Location>
```

3. Change directory to the following location so you can update the configuration file for the second Oracle HTTP Server instance (ohs2):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

4. Open the `soa_vh.conf` file and add the Oracle Business Process Management directives to the `<VirualHost>` tag.

5. Restart Oracle HTTP Servers on WEBHOST1 and WEBHOST2.

16.11.3 Configuring the WebLogic Proxy Plug-In

Set the WebLogic Plug-In Enabled parameter for the ESS cluster.

1. Log in to the Oracle WebLogic Server Administration console.

2. In the Domain Structure pane, expand the **Environment** node.

3. Click on **Clusters**.

4. Select the ESS_Cluster cluster to which you want to proxy requests from Oracle HTTP Server.

   The Configuration: General tab is displayed.

5. Scroll down to the Advanced section, expand it.

6. Click **Lock and Edit**.

7. Set the WebLogic Plug-In Enabled to **yes**.

8. Click **Save and Activate the Changes**.

9. Restart the ESS servers for the changes to be effective.

16.12 Validating Access to Oracle Enterprise Scheduler Through the Hardware Load Balancer

Verify the URLs to ensure that appropriate routing and failover is working from the HTTP Server to the Oracle ESS components.

To verify the URLs:

1. While WLS_ESS1 is running, stop WLS_ESS2 using the Oracle WebLogic Server Administration Console.

2. Access the following URL from your Web browser, and verify the HTTP response as indicated in Starting and Validating the WLS_ESS2 Managed Server:

   ```
   https://soa.example.com/EssHealthCheck
   ```

3. Start WLS_ESS2 from the Oracle WebLogic Server Administration Console.

4. Stop WLS_ESS1 from the Oracle WebLogic Server Administration Console.

5. Verify these URLs using your load balancer address:

   ```
   https://soa.example.com:443/EssHealthCheck
   https://soa.example.com/ess
   ```

16.13 Backing Up the Oracle Enterprise Scheduler Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

17

Extending the Domain with Business Activity Monitoring

The procedures explained in this chapter guide you through the process of extending the enterprise deployment domain to include Oracle Business Activity Monitoring.

Variables Used When Configuring Business Activity Monitor
As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

Prerequisites When Adding Oracle BAM to the Domain
Before you add Oracle BAM to your existing Oracle SOA Suite domain, consider the following information and prerequisites.

Special Instructions When Configuring Oracle BAM on Separate Hosts
If you choose to configure Oracle BAM on its own hardware, then you can use the instructions in this chapter, as long as you also consider the information in the following sections.

Roadmap for Adding Oracle BAM to the Domain
The table in this section lists the high-level steps for extending a SOA domain for Oracle Business Activity Monitoring.

Extending the SOA Domain to Include Oracle Business Activity Monitoring
You can use the Configuration Wizard to extend the existing enterprise deployment SOA domain with the Oracle Business Activity Monitoring.

Configuring a Default Persistence Store for Transaction Recovery
Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Propagating the Extended Domain to the Domain Directories and Machines
After you have extended the domain with the BAM instances, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

Adding the Enterprise Deployment Administration User to the Oracle BAM Administration Group
Before you validate the Oracle BAM configuration on the Managed Server, add the enterprise deployment administration user (weblogic_soa) to the `BAMAdministrators` group.

Starting WLS_BAM1 Managed Server
After extending the domain, restarting the Administration Server, and propagating the domain to the other hosts, start the newly configured BAM servers.

Starting and Validating the WLS_BAM2 Managed Server
After you start the WLS_BAM2 managed server, you must verify that the server status is reported as 'Running' in the Admin Console and access the URLs to verify the status of the servers.

Configuring the Web Tier for the Extended Domain
Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Validating Access to Oracle BAM Through the Hardware Load Balancer
Verify that Oracle BAM URLs are successfully routing requests from the hardware load balancer to the Oracle HTTP Server instances to the Oracle BAM software in the middle tier.

Enabling Automatic Service Migration and JDBC Persistent Stores for the Oracle BAM Servers
To ensure that your software is configured for high availability, configure the Oracle Business Activity Monitoring Managed Servers for automatic service migration.

Backing Up the Oracle BAM Configuration
It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

17.1 Variables Used When Configuring Business Activity Monitor

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- ORACLE_RUNTIME
- OHS_DOMAIN_HOME

In addition, you will be referencing the following virtual IP (VIP) address defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2

- BAMHOST1
- BAMHOST2

17.2 Prerequisites When Adding Oracle BAM to the Domain

Before you add Oracle BAM to your existing Oracle SOA Suite domain, consider the following information and prerequisites.

> **Note:**
>
> If you choose to install Oracle BAM on a separate set of host computers, then in addition to the prerequisites listed here, see Special Instructions When Configuring Oracle BAM on Separate Hosts.

17.2.1 Understanding the Installation Requirements for Adding Oracle BAM to the Domain

This chapter assumes you are configuring Oracle Business Activity Monitoring on the same host computers as Oracle SOA Suite, as shown in Figure 3-2.

In the default Oracle SOA Suite and Oracle Business Activity Monitoring topology, you target Oracle BAM to its own Managed Servers and its own cluster, but it shares system resources with the other Oracle SOA Suite products on SOAHOST1 and SOAHOST2. Those system resources include a shared storage device where the Oracle SOA Suite software has been installed in an existing Oracle home directory.

In the default topology, there is no need to install Oracle BAM, because Oracle BAM is included in the Oracle SOA Suite and Oracle Business Process Management distribution and is installed into the Oracle home directories when you install Oracle SOA Suite in Understanding the SOA Enterprise Deployment Topology .

17.2.2 Understanding the Database Schema Requirements for Oracle BAM

The schemas required for Oracle BAM are created in the database when you run the Repository Creation Utility (RCU) to create the required Oracle SOA Suite schemas.

As a result, there is no need to run RCU specifically for Oracle BAM.

If the BAM system is being created without the other Oracle SOA Suite products and the SOA schemas creation has not been performed yet, you must use the RCU installation steps provided in Extending the Domain with Oracle SOA Suite .

17.2.3 Backing Up the Existing Installation

If you have not yet backed up the existing Fusion Middleware Home and domain, back it up now.

To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

17.3 Special Instructions When Configuring Oracle BAM on Separate Hosts

If you choose to configure Oracle BAM on its own hardware, then you can use the instructions in this chapter, as long as you also consider the information in the following sections.

For some organizations, it might make sense to install and configure Oracle BAM on separate host computers so the Oracle BAM software can use dedicated hardware resources and can be further isolated from the other Oracle SOA Suite products.

Procuring Additional Host Computers for Oracle BAM

Installation Requirements When Configuring Oracle BAM on Separate Hosts

Configuration Wizard Instructions When Configuring Oracle BAM on Separate Hosts

Propagating the Domain Configuration When Configuring Oracle BAM on Separate Hosts

17.3.1 Procuring Additional Host Computers for Oracle BAM

If you are configuring Oracle BAM on its own set of host computers, you must procure the additional hardware and be sure it meets the system requirements described in Host Computer Hardware Requirements and Operating System Requirements for the Enterprise Deployment Topology.

You should also add the required entries to the Enterprise Deployment Workbook, as described in Using the Enterprise Deployment Workbook . For the purposes of this guide, you can refer to these host computers as BAMHOST1 and BAMHOST2.

17.3.2 Installation Requirements When Configuring Oracle BAM on Separate Hosts

If you are configuring Oracle BAM on its own set of host computers, then you should follow the same shared storage strategy you are following for the host computers where the other Oracle SOA Suite products are installed.

Note:

The Oracle home used by BAMHOST1 and BAMHOST2 must contain the exact set of software binaries used by the SOAHOST1 and SOAHOST2 hosts in the domain; otherwise, unpredictable behavior in the execution of the binaries may occur.

Depending on your shared storage strategy, one of the following sections apply if you are using separate host hardware for the Oracle BAM software:

Installation Requirements When Using a Separate Volume or Partition

Installation Requirements When Using a Shared Oracle Home

17.3.2.1 Installation Requirements When Using a Separate Volume or Partition

If BAMHOST1 and BAMHOST2 are using separate shared storage volumes or partitions, then you must install the Infrastructure and optionally Oracle SOA Suite on those hosts. For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

Note that the location where you install the Oracle home (which contains the software binaries) will vary, depending upon the host. To identify the proper location for you Oracle home directories, refer to the guidelines in File System and Directory Variables Used in This Guide.

To install the software on BAMHOST1 and BAMHOST2, log in to each host, and perform the following tasks:

- Use the instructions in Installing the Oracle Fusion Middleware Infrastructure in Preparation for an Enterprise Deployment to create the Oracle home on the appropriate storage device and install Oracle Fusion Middleware Infrastructure.
- Optionally use the instructions in Installing Oracle SOA Suite for an Enterprise Deployment to install the Oracle SOA Suite software.

17.3.2.2 Installation Requirements When Using a Shared Oracle Home

If BAMHOST1 and BAMHOST2 are using an existing volume or partition where the Oracle Fusion Middleware Infrastructure or Oracle SOA Suite are already installed, then you must mount the volumes appropriately to BAMHOST1 and BAMHOST2. For more information, see Mounting the Required Shared File Systems on Each Host. Ensure that BAMHOST1 and BAMHOST2 have access to this Oracle home, just like the rest of the hosts in the domain.

This is the preferred method of using shared storage for the enterprise deployment. For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

After you have mounted an existing volume or partition that contains an existing Oracle home, then you should attach the Oracle home to the local Oracle Inventory on BAMHOST1 or BAMHOST2.

To attach an Oracle home in shared storage to the local Oracle Inventory, use the following command on the BAMHOSTs:

```
cd ORACLE_HOME/oui/bin/attachHome.sh

./attachHome.sh -jreLoc JAVA_HOME
```

The `pack` and `unpack` utilities is used to bootstrap the domain configuration for the WLS_BAM1 and WLS_BAM2 servers. As a result, if you have mounted an existing Oracle home with the required software already installed, then you do not need to install any software in these two hosts.

17.3.3 Configuration Wizard Instructions When Configuring Oracle BAM on Separate Hosts

If you are configuring Oracle BAM on separate host computers, then the instructions in this chapter for configuring the domain with the Configuration Wizard are slightly different.

Specifically, be sure to create additional Oracle WebLogic Server machines for BAMHOST1 and BAMHOST2, and then target the WLS_BAM1 and WLS_BAM2 Managed Servers to those machines, rather than to SOAHOST1 and SOAHOST2.

For more information, see Task 14, Verifying the Existing Machines and Task 15, Assigning Servers to Machines.

17.3.4 Propagating the Domain Configuration When Configuring Oracle BAM on Separate Hosts

If you are configuring Oracle BAM on separate host computers, then the instructions in this chapter for propagating the domain to the other domain directories must be modified.

Specifically, in addition to propagating the domain to the Managed Server domain directories on SOAHOST1 and SOAHOST2, you must also unpack the domain in the local Managed Server directories for BAMHOST1 and BAMHOST2.

Note that this means you must start the Node Manager software on each BAMHOST computer before you can remotely start the WLS_BAM Managed Servers on these hosts.

17.4 Roadmap for Adding Oracle BAM to the Domain

The table in this section lists the high-level steps for extending a SOA domain for Oracle Business Activity Monitoring.

Step	Description	More Information
Run the Configuration Wizard to Extend the Domain in the Administration Server domain home	Extend the SOA domain to contain Oracle BAM components	Extending the SOA Domain to Include Oracle Business Activity Monitoring
Configure a Default Persistence Store for Transaction Recovery	To leverage the migration capability of the Transaction Recovery Service for the servers within a cluster, store the transaction log in a location accessible to a server and its backup servers.	Configuring a Default Persistence Store for Transaction Recovery
Propagate the Domain Configuration to the Managed Server domain directories	Oracle BAM requires some updates to the WebLogic Server start scripts. Propagate these changes using the pack and unpack commands.	Propagating the Extended Domain to the Domain Directories and Machines
Add the SOA Administrator role to the Oracle BAM Administration Group	This step allows you to use one set of credentials to access the various product-specific management utlities.	Adding the Enterprise Deployment Administration User to the Oracle BAM Administration Group
Start the Oracle BAM Servers	Oracle BAM servers extend an already existing domain. As a result, the Administration Server and respective Node Managers are already running in SOAHOST1 and SOAHOST2.	Starting WLS_BAM1 Managed Server
Validate the WLS_BAM Managed Servers	Verify that the server status is reported as Running in the Admin Console and access URLs to verify status of servers.	Starting and Validating the WLS_BAM2 Managed Server

Step	Description	More Information
Configuring Oracle HTTP Server for the WLS_BAMn Managed Servers	To enable Oracle HTTP Server to route to Oracle BAM, add the required directives to the Oracle HTTP Server configuration files, and set the WebLogicCluster parameter to the list of nodes in the cluster.	Configuring Oracle HTTP Server for the WLS_BAM Managed Servers
Configure the WebLogic Server Proxy Plugin	Enable the WebLogic Server Proxy Plugin for Oracle BAM.	Configuring the WebLogic Proxy Plug-In
Validating Access Through Oracle HTTP Server	Verify that the server status is reported as Running.	Validating Access to Oracle BAM Through the Hardware Load Balancer
Configure Automatic Service Migration for the Oracle BAM Servers	Service migration ensures that key pinned services can be migrated automatically to another Managed Server in the cluster if one of the Managed Servers or host computers fails. For more information about service migration, see Using Whole Server Migration and Service Migration in an Enterprise Deployment.	Configuring Automatic Service Migration for the Oracle BAM Servers
Backing up the Oracle BAM Configuration	To back up the domain configuration for immediate restoration in case of failures in future procedures.	Backing Up the Oracle BAM Configuration

17.5 Extending the SOA Domain to Include Oracle Business Activity Monitoring

You can use the Configuration Wizard to extend the existing enterprise deployment SOA domain with the Oracle Business Activity Monitoring.

Extending the domain involves the following tasks.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens for Oracle BAM

17.5.1 Starting the Configuration Wizard

Note:

If you added any customizations directly to the start scripts in the domain, those will be overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the **`pack`** and **`unpack`** commands.

To begin domain configuration:

1. Shut down the Administration Server to prevent any configuration locks, saves, or activations from occurring during the configuration of the domain.

2. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

```
ORACLE_HOME/oracle_common/common/bin
./config.sh
```

17.5.2 Navigating the Configuration Wizard Screens for Oracle BAM

In this step, you extend the domain created in Extending the Domain with Oracle SOA Suite , to contain Oracle Business Activity Monitoring components.

The steps reflected in this section would be very similar if Oracle Business Activity Monitoring was extending a domain containing only an Administration Server and a WSM-PM Cluster, but some of the options, libraries and components shown in the screens could vary.

Domain creation and configuration includes the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Datasource Configuration Type
- Task 4, Specifying JDBC Component Schema Information
- Task 5, Providing the GridLink Oracle RAC Database Connection Details
- Task 6, Testing the JDBC Connections
- Task 7, Selecting Advanced Configuration
- Task 8, Configuring Managed Servers
- Task 9, Configuring a Cluster
- Task 10, Assigning Server Templates

- Task 11, Configuring Dynamic Servers
- Task 12, Assigning Managed Servers to the Cluster
- Task 13, Configuring Coherence Clusters
- Task 14, Verifying the Existing Machines
- Task 15, Assigning Servers to Machines
- Task 16, Configuring Virtual Targets
- Task 17, Configuring Partitions
- Task 18, Configuring the JMS File Store
- Task 19, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 20, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the **Domain Location** field, select the value of the ASERVER_HOME variable, which represents the complete path to the Administration Server domain home you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

> **Tip:**
> More information about the other options on this screen can be found in Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following template:

Oracle Business Activity Monitoring- 12.2.1.2.0[soa]

Click **Next**.

Task 3 Specifying the Datasource Configuration Type

> **Note:**
> Any custom data sources that were created before the extension (like LEASING datasources) will show up before this screen. Check the Datasources row and click **Next**. The test data source screen will verify its validity. Click **Next**.

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain.

Verify and ensure that credentials in all the fields are the same that you have provided while configuring Oracle Fusion Middleware Infrastructure.

Click **Get RCU Configuration** after you finish verifying the database connection information. The following output in the Connection Result Log indicates that the operation succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK
Successfully Done.
```

Task 4 Specifying JDBC Component Schema Information

On the JDBC Component Schema page, select the following schemas:

- **BAM Schema**
- **BAM Job Sched Schema**
- **BAM Leasing Schema**
- **BAM Non JTA Schema**
- **BAM MDS Schema**

Select **Convert to Gridlink**, and then click **Next**.

Task 5 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in the following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

Task 6 Testing the JDBC Connections

On the Test JDBC Data Sources screen, confirm that all connections were successful.

The connections are tested automatically. The Status column displays the results. If all connections are not successful, click Previous to return to the previous screen and correct your entries.

Click **Next** when all the connections are successful.

Task 7 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Topology**

  Add, Delete, or Modify Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

- **File Store**

Click **Next**.

Task 8 Configuring Managed Servers

On the Managed Servers screen, add the required managed servers for Oracle BAM:

- Select the automatically created server and rename it to WLS_BAM1.
- Click **Add** to add another new server and enter WLS_BAM2 as the server name.
- Select **BAM12-MGD-SVRS-ONLY** as the server group for the BAM Servers. Deselect **BAM12-MGD-SVRS** from the list.

The configuration for the added servers should match those shown in the following table.

Name	Listen Address	Listen Port	SSL Listen Port	SSL Enabled	Server Groups
WLS_SOA1*	SOAHOST1	8001	n/a	No	SOA-MGD-SVRS-ONLY
WLS_SOA2*	SOAHOST2	8001	n/a	No	SOA-MGD-SVRS-ONLY
WLS_WSM1	SOAHOST1	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_WSM2	SOAHOST2	7010	n/a	No	JRF-MAN-SVR WSMPM-MAN-SVR
WLS_BAM1	SOAHOST1	9001	n/a	No	BAM12-MGD-SVRS-ONLY
WLS_BAM2	SOAHOST2	9001	n/a	No	BAM12-MGD-SVRS-ONLY

*The WLS_SOA1 and WLS_SOA2 Managed Servers are shown if you are extending a domain where Oracle SOA Suite has already been configured.

*When specifying the listen address for WLS_BAM1 and WLS_BAM2, enter the IP address for SOAHOST1 and SOAHOST2, respectively, unless you are configuring Oracle BAM on separate host computers (BAMHOST1 and BAMHOST2). If you are configuring Oracle BAM on separate hosts enter the listen addresses for BAMHOST1 and BAMHOST2.

Task 9 Configuring a Cluster

On the Configure Clusters screen, click **Add** to add the **BAM_Cluster** (leave the present cluster as they are):

Name	Cluster Address	Frontend Host	Frontend HTTP Port	Frontend HTTPS Port
SOA_Cluster*	Leave it empty	soa.example.com	80	443
WSM-PM_Cluster	Leave it empty	Leave it empty	Leave it empty	Leave it empty
BAM_Cluster	Leave it empty	soa.example.com	80	443

*The SOA cluster appears only if you have already configured Oracle SOA Suite in the domain.

Click **Next**.

Task 10 Assigning Server Templates

Click **Next** to continue.

Task 11 Configuring Dynamic Servers

Click **Next** to continue.

Task 12 Assigning Managed Servers to the Cluster

On the Assign Servers to Clusters screen, assign servers to clusters as follows:

- BAM_Cluster:
  - WLS_BAM1
  - WLS_BAM2

Click **Next**.

Task 13 Configuring Coherence Clusters

Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain. Leave the port number value at 9991, as it was defined during the initial Infrastructure domain creation.

Task 14 Verifying the Existing Machines

Verify the machines that have already been created in the domain. By default, you will be targeting the new Oracle BAM Managed Servers to the SOAHOST1 and SOAHOST2 machines, respectively.

However, if you are configuring Oracle BAM on separate host computers, then you must create two new machines for the corresponding BAMHOST1 and BAMHOST2 host computers:

1. Select the **Unix Machine** tab.

2. Use the **Add** button to create two new Unix machines for BAMHOST1 and BAMHOST2.

   Node Manager Listen Address to the physical IP address for BAMHOST1 and BAMHOST2.

3. Verify the port in the Node Manager Listen Port field.

   The port number 5556, shown in this example, may be referenced by other examples in the documentation. Replace this port number with your own port number as needed.

Leave all other fields to their default values.

Click **Next**.

Task 15 Assigning Servers to Machines

On the Assign Servers to Machines screen, assign the new WLS_BAM1 and WLS_BAM2 servers to the SOAHOST1 and SOAHOST2 machines, respectively.

However, if you are configuring Oracle BAM on separate host computers, assign the new Oracle BAM servers to the newly created BAMHOST1 and BAMHOST2 machines, respectively.

Click **Next**.

Task 16 Configuring Virtual Targets

Do not specify any values. Click **Next**.

Task 17 Configuring Partitions

Do not specify any values. Click **Next**.

Task 18 Configuring the JMS File Store

On the JMS File Stores screen, assign the following directory for each of the Oracle BAM persistent stores, including the 2 UMS JMS file stores created in this session:

```
ORACLE_RUNTIME/domain_name/BAM_Cluster/jms
```

Do not change the values assigned to the existing JMS file stores, which correspond to the clusters you created for previously configured products.

Task 19 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

Click **Update**.

In the Extending Domain screen, click **Done**.

Task 20 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

17.6 Configuring a Default Persistence Store for Transaction Recovery

Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Each Managed Server uses a transaction log that stores information about committed transactions that are coordinated by the server and that may not have been completed.

Oracle WebLogic Server uses this transaction log for recovery from system crashes or network failures. To leverage the migration capability of the Transaction Recovery Service for the Managed Servers within a cluster, store the transaction log in a location accessible to each Managed Server and its backup server.

Note:

To enable migration of the Transaction Recovery Service, specify a location on a persistent storage solution that is available to other servers in the cluster. All Managed Servers in the cluster must be able to access this directory. This directory must also exist before you restart the server.

The recommended location is a dual-ported SCSI disk or on a Storage Area Network (SAN). Note that it is important to set the appropriate replication and backup mechanisms at the storage level to guarantee protection in cases of a storage failure.

This information applies for file-based transaction logs. You can also configure a database-based persistent store for translation logs. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

For instructions to configure a default persistence store with static clusters, see Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster.

17.7 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the BAM instances, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

The following table summarizes the steps required to propagate the changes to all the domain directories and machines.

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new BAM Servers configuration. When you pack up the domain, create a template jar file called soadomaintemplateExtBAM.jar.	Packing Up the Extended Domain on SOAHOST1

Task	Description	More Information
Unpack the Domain in the Managed Servers Directory on SOAHOST1*	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

*If you are configuring Oracle BAM on separate hosts, then you would unpack the domain on BAMHOST1 and BAMHOST2, rather than on SOAHOST1 and SOAHOST2.

17.8 Adding the Enterprise Deployment Administration User to the Oracle BAM Administration Group

Before you validate the Oracle BAM configuration on the Managed Server, add the enterprise deployment administration user (weblogic_soa) to the `BAMAdministrators` group.

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

17.9 Starting WLS_BAM1 Managed Server

After extending the domain, restarting the Administration Server, and propagating the domain to the other hosts, start the newly configured BAM servers.

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

   ```
   http://ADMINVHN:7001/em
   ```

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.

4. Select only the WLS_BAM1 Managed Server and click **Start Up** on the Oracle WebLogic Server toolbar.

   Note:

   BAM Servers depend on the policy access service to be functional, so the WSM-PM Managed Servers in the domain need to be up and running and reachable before the BAM servers are started.

5. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_BAM1 Managed Server is up and running.

6. To verify that the BAM software is configured properly:

   a. Enter the following URL in the browser:

      ```
      http://SOAHOST1:9001/bam/composer
      ```

The login screen for BAM's composer appears.

If you configured Oracle BAM on separate host computers, enter BAMHOST1 in the URL, rather than SOAHOST1.

b. Enter the `weblogic_soa` login credentials.

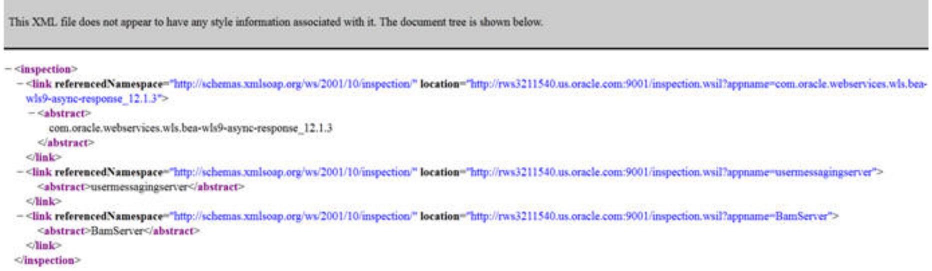
   The BAM Composer screen appears.

7. Enter the following URL:

```
http://SOAHOST1:9001/inspection.wsil/
```

If you configured Oracle BAM on separate host computers, enter BAMHOST1 in the URL, rather than SOAHOST1.

You should see a response with the following list of links.



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
- <inspection>
  - <link referencedNamespace="http://schemas.xmlsoap.org/ws/2001/10/inspection/" location="http://rws3211540.us.oracle.com:9001/inspection.wsil?appname=com.oracle.webservices.wls.bea-
    wls9-async-response_12.1.3">
    - <abstract>
        com.oracle.webservices.wls.bea-wls9-async-response_12.1.3
      </abstract>
    </link>
  - <link referencedNamespace="http://schemas.xmlsoap.org/ws/2001/10/inspection/" location="http://rws3211540.us.oracle.com:9001/inspection.wsil?appname=usermessagingserver">
      <abstract>usermessagingserver</abstract>
    </link>
  - <link referencedNamespace="http://schemas.xmlsoap.org/ws/2001/10/inspection/" location="http://rws3211540.us.oracle.com:9001/inspection.wsil?appname=BamServer">
      <abstract>BamServer</abstract>
    </link>
  </inspection>
```

8. Enter the following URL in the browser:

```
http://SOAHOST1:9001/bam/cqservice/
```

If you configured Oracle BAM on separate host computers, enter BAMHOST1 in the URL, rather than SOAHOST1.

You should get a message in the browser indicating " BAM CQService is running."

17.10 Starting and Validating the WLS_BAM2 Managed Server

After you start the WLS_BAM2 managed server, you must verify that the server status is reported as ‘Running’ in the Admin Console and access the URLs to verify the status of the servers.

1. Log in to Fusion Middleware Control using the Administration Server credentials.

2. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.

3. Select only the WLS_BAM2 Managed Server and click **Start Up** on the Oracle WebLogic Server tool bar.

4. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_BAM2 Managed Server is up and running. Access the equivalent URLs for the WLS_BAM2:

```
http://SOAHOST2:9001/bam/composer
```

The login screen for BAM's composer appears. Enter the login credentials. The BAM composer's menu is displayed.

5. Enter the following URL:

   ```
   http://SOAHOST2:9001/inspection.wsil/
   ```

   You should see a response with a list of links.

6. Enter the following URL in the browser:

   ```
   http://SOAHOST2:9001/bam/cqservice/
   ```

   You should get a message in the browser indicating "BAM Service is running."

> **Note:**
>
> If you configured Oracle BAM on separate host computers, enter *BAMHOST2* in the URL, rather than *SOAHOST2*.

17.11 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for the WLS_BAM Managed Servers
Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle BAM requests correctly to the Oracle BAM software on the Oracle SOA Suite cluster.

Configuring the WebLogic Proxy Plug-In
Set the WebLogic Plug-In Enabled parameter for the BAM cluster.

17.11.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

17.11.2 Configuring Oracle HTTP Server for the WLS_BAM Managed Servers

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle BAM requests correctly to the Oracle BAM software on the Oracle SOA Suite cluster.

Note that these instructions assume you configuring Oracle BAM on the same host as Oracle SOA Suite. If you are using separate hosts for Oracle BAM, you must modify the WebLogicCluster parameter in the Oracle HTTP Server configuration files to reference the BAMHOST computers, rather than the SOAHOST computers.

To enable Oracle HTTP Server to route requests to Oracle BAM:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   ```
   <Location /bam/composer >
     WLSRequest ON
     WebLogicCluster SOAHOST1:9001,SOAHOST2:9001
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /OracleBAMWS>
     WLSRequest ON
     WebLogicCluster SOAHOST1:9001,SOAHOST2:9001
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>

   <Location /oracle/bam/>
     WLSRequest ON
     WebLogicCluster SOAHOST1:9001,SOAHOST2:9001
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>
   ```

3. Change directory to the following location so you can update the configuration file for the second Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

4. Open the `soa_vh.conf` file and add the B2B directives to the `<VirualHost>` tag.

5. Restart the Oracle HTTP Server instances on WEBHOST1 and WEBHOST2.

17.11.3 Configuring the WebLogic Proxy Plug-In

Set the WebLogic Plug-In Enabled parameter for the BAM cluster.

1. Log in to the Oracle WebLogic Server Administration Console.
2. In the Domain Structure pane, expand the **Environment** node.
3. Click on **Clusters**.
4. Select the BAM_Cluster cluster to which you want to proxy requests from Oracle HTTP Server.

   The **Configuration: General** tab is displayed.

5. Scroll down to the Advanced section and expand it.
6. Click **Lock and Edit.**
7. Set the WebLogic Plug-In Enabled to **yes**.

8. Click **Save and Activate the changes**. Restart the BAM servers for the changes to be effective.

17.12 Validating Access to Oracle BAM Through the Hardware Load Balancer

Verify that Oracle BAM URLs are successfully routing requests from the hardware load balancer to the Oracle HTTP Server instances to the Oracle BAM software in the middle tier.

You can also use this procedure test the failover of the Managed Servers where Oracle BAM is configured.

To verify the URLs:

1. While the WLS_BAM1 Managed Server is running, stop the WLS_BAM2 Managed Server, using the Oracle WebLogic Server Administration Console.

2. Access the following URL and verify the HTTP response as indicated in Starting WLS_BAM1 Managed Server:

   ```
   https://soa.example.com/bam/composer
   ```

3. Access the following URL to be sure the software is running as expected:

   ```
   https://soa.example.com/oracle/bam/server
   ```

4. Start WLS_BAM2 from the Oracle WebLogic Server Administration Console.

5. Stop WLS_BAM1 from the Oracle WebLogic Server Administration Console.

6. Access the URL again, and verify the HTTP response is still valid, as indicated in Starting and Validating the WLS_BAM2 Managed Server.

17.13 Enabling Automatic Service Migration and JDBC Persistent Stores for the Oracle BAM Servers

To ensure that your software is configured for high availability, configure the Oracle Business Activity Monitoring Managed Servers for automatic service migration.

For more information on enabling automatic service migration, see Configuring Automatic Service Migration in an Enterprise Deployment.

Note:

If you are configuring Oracle BAM in its own domain, then you can use the default leasing data source (BamLeasingDatasource) when you are configuring automatic service migration for Oracle BAM.

However, in a more typical environment, where you are configuring both Oracle BAM with Oracle SOA Suite or Oracle Service Bus, then Oracle recommends you use a central automatic service migration data source, such as the LeasingDS, which is described in Configuring Automatic Service Migration in an Enterprise Deployment.

For additional high availability, you can also configure your transaction logs store and JMS store in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

17.14 Backing Up the Oracle BAM Configuration

It is an Oracle best practices recommendation to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

18

Extending the Domain with Oracle B2B

The procedures explained in this chapter guide you through the process of extending the enterprise deployment domain to include Oracle B2B.

The Oracle B2B and Healthcare distribution includes the software required to configure Oracle B2B or Oracle SOA for Healthcare.

Note:

For X12 HIPAA use cases, you can use the Oracle B2B domain extension steps described in this chapter. However, if you are a healthcare provider using HL7 documents, refer to Extending the Domain with Oracle SOA Suite for Healthcare Integration, and extend the domain with the Oracle SOA Suite for Healthcare Integration software.

Configuring the Web Tier for the Extended Domain
: Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Adding the B2BAdmin Role to the SOA Administrators Group
: Before you validate the Oracle B2B configuration on the Managed Servers, add the `B2BAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

Validating Access to Oracle B2B Through the Load Balancer
: Use the following steps to verify that the appropriate routing and failover is working from the load balancer to the HTTP Server instances to the B2B Suite Components on the Oracle SOA Suite Managed Server.

Backing Up the Configuration
: It is an Oracle best practices recommendation to create a backup after successfully configuring a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle B2B
: In the enterprise topology, Oracle B2B is configured on the existing Oracle SOA Suite Managed Servers. If you have already configured automatic service migration for the `SOA_Cluster`, then the Oracle B2B software is already protected by automatic service migration.

18.1 Variables Used When Configuring Oracle B2B

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- OHS_DOMAIN_HOME
- JAVA_HOME

In addition, you will be referencing the following virtual IP (VIP) addresses defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2

18.2 Prerequisites for Extending the SOA Domain to Include Oracle B2B

Before extending the current domain, ensure that your existing deployment meets the prerequisites specified in this section.

- Back up the installation - If you have not yet backed up the existing Fusion Middleware Home and domain, Oracle recommends backing it up now.

  To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

- There is an existing WL_HOME and SOA ORACLE_HOME (binaries) installed in previous chapters on a shared storage and available from SOAHOST1 and SOAHOST2.

- Node Manager, Admin Server, SOA Servers and WSM Servers exist and have been configured as described in previous chapters to run a SOA system.

- You do not need to run RCU to load additional schemas for B2B, these are part of the SOA repository and were loaded into the DB in the SOA chapter.

- You do not need to create an additional cluster because B2B components are added to the previously created SOA_cluster.

18.3 Installing Oracle B2B for an Enterprise Deployment

Use the following sections to install the Oracle Fusion Middleware Infrastructure software in preparation for configuring a new domain for an enterprise deployment.

Starting the Oracle B2B and Healthcare Installer on SOAHOST1

Navigating the Oracle B2B Installation Screens

Verifying the B2B or Healthcare Installation

18.3.1 Starting the Oracle B2B and Healthcare Installer on SOAHOST1

To start the installation program, perform the following steps.

1. Log in to SOAHOST1.
2. Go to the directory where you downloaded the installation program.
3. Launch the installation program by invoking the `java` executable from the JDK directory on your system, as shown in the example below.

   ```
   JAVA_HOME/bin/java -d64 -jar distribution_file_name.jar
   ```

   In this example:

   - Replace *JAVA_HOME* with the environment variable or actual JDK location on your system.
   - Replace *distribution_file_name* with the actual name of the distribution jar file.

     Note that if you download the distribution from the Oracle Technology Network (OTN), then the jar file is typically packaged inside a downloadable ZIP file.

To install the software required for the initial Infrastructure domain, the distribution you want to install is **fmw_12.2.1.2_b2bhealthcare.jar**.

For more information about the actual file names of each distribution, see Identifying and Obtaining Software Downloads for an Enterprise Deployment.

When the installation program appears, you are ready to begin the installation. See Navigating the Installation Screens for a description of each installation program screen.

18.3.2 Navigating the Oracle B2B Installation Screens

Table 18-1 provides description of each installation program screen.

Table 18-1 Oracle B2B Install Screens

Screen	Description
Installation Inventory Setup	On UNIX operating systems, this screen will appear if this is the first time you are installing any Oracle product on this host. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Understanding the Oracle Central Inventory in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Welcome	This screen introduces you to the product installer.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. For more information about Oracle Fusion Middleware directory structure, see Selecting Directories for Installation and Configuration in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. • Select **B2B** **NOTE**: The topology in this document does not include the examples, Oracle strongly recommends that you do not install the examples into a production environment.

Table 18-1 (Cont.) Oracle B2B Install Screens

Screen	Description
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. If there are any warning or error messages, you can refer to one of the following documents in Roadmap for Verifying Your System Environment in *Oracle Fusion Middleware Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
Installation Summary	Use this screen to verify the installation options you selected. If you want to save these options to a response file, click **Save Response File** and provide the location and name of the response file. Response files can be used later in a silent installation situation. For more information about silent or command line installation, see Using the Oracle Universal Installer in Silent Mode in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*. Click **Install** to begin the installation.
Installation Progress	This screen allows you to see the progress of the installation. Click **Next** when the progress bar reaches 100% complete.
Installation Complete	Review the information on this screen, then click **Finish** to dismiss the installer.

18.3.3 Verifying the B2B or Healthcare Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

Reviewing the Installation Log Files

Checking the Directory Structure

Viewing the Contents of Your Oracle Home

18.3.3.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

18.3.3.2 Checking the Directory Structure

The contents of your installation vary based on the options that you select during the installation process.

The addition of Oracle B2B adds the following directory and sub-directories:

```
ls  /u01/oracle/products/fmw/soa/soa/thirdparty/edifecs/
```

```
Common
XEngine
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

18.3.3.3 Viewing the Contents of Your Oracle Home

You can also view the contents of your Oracle home using the `viewInventory` script. For more information, see Viewing the contents of an Oracle home in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

18.4 Running the Configuration Wizard to Extend for Oracle B2B

To extend the domain to include Oracle B2B, refer to the following sections.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens for Oracle B2B

18.4.1 Starting the Configuration Wizard

Note:

If you added any customizations directly to the start scripts in the domain, those will be overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional JAVA command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

To start the Configuration Wizard:

1. From the WebLogic Server Console, stop any managed servers that will be modified by this domain extension. Managed Servers that are not effected can remain on-line.

Note: This specific domain extension for Oracle B2B component modifies the WLS_SOA*n* managed servers. Be sure to shut down these Managed Servers.

---

2. Verify the status of the managed servers, and then stop the Administration Server.

3. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

```
cd ORACLE_HOME/oracle_common/common/bin
./config.sh
```

18.4.2 Navigating the Configuration Wizard Screens for Oracle B2B

Follow the instructions in these sections to create and configure the domain for the topology, with static clusters.

Extending the Domain with Static Clusters

18.4.2.1 Extending the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology, with static clusters.

> **Note:**
>
> You can use the same procedure described in this section to extend an existing domain. If your needs do not match the instructions given in the procedure, be sure to make your selections accordingly, or refer to the supporting documentation for additional details.

Domain creation and configuration includes the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Datasource Configuration Type
- Task 4, Selecting Advanced Configuration
- Task 5, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 6, Writing Down Your Domain Home and Administration Server URL
- Task 7, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the Domain Location field, select the value of the *`ASERVER_HOME`* variable, which represents the complete path to the Administration Server domain home you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

> **Tip:**
>
> More information about the other options on this screen can be found in Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following templates:

- **Oracle B2B - 12.2.1.2.0[soa]**

In addition, the following additional templates should already be selected, because they were used to create the initial domain and extend it to SOA:

- Basic Weblogic Server Domain - 12.2.1.2.0[wlserver]
- Oracle SOA Suite 12.2.1.2.0[soa]
- Oracle Enterprise Manager - 12.2.1.2.0[em]
- Oracle WSM Policy Manager - 12.2.1.2.0[oracle_common]
- Oracle JRF - 12.2.1.2.0[oracle_common]
- WebLogic Coherence Cluster Extension - 12.2.1.2.0[wlserver]

> **Tip:**
> More information about the options on this screen can be found in Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*Creating WebLogic Domains Using the Configuration Wizard.

Task 3 Specifying the Datasource Configuration Type

All fields are pre-populated because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain. B2B uses the existing Data Sources for SOA and no new Datasources need to be added to the domain.

> **Note:**
> Any custom data sources that were created before the extension (like LEASING data sources) will show up before this screen. Check the Datasources row and click **Next**. The test data source screen will verify its validity. Click **Next**.

Task 4 Selecting Advanced Configuration

To complete domain configuration for the topology, do not select any additional options on the Advanced Configuration screen and Click **Next**. B2B applications and required artifacts will be targeted automatically to the existing SOA servers

Task 5 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Domain Update**.

> **Tip:**
> More information about the options on this screen can be found in Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 6 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location
- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start the Administration Server, and the URL is needed to access the Administration Server.

Click **Finish** to dismiss the configuration wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 7 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

18.5 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the B2B instances, and have restarted the Administration Server on SOAHOST1, you must propagate the domain changes to the domain directories and machines.

The following table summarizes the steps required to propagate the changes to all the domain directories and machines.

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new BAM Servers configuration. When you pack up the domain, create a template jar file called `soadomaintemplateExtB2B.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers Directory on SOAHOST1*	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

18.6 Starting the B2B Suite Components

For configuration changes and start scripts to be effective, you must start the WLS_SOA server to which B2B has been added. Since B2B extends an already existing SOA system, the Administration Server and the respective Node Managers are already running in SOAHOST1 and SOAHOST2.

To start the added B2B components, restart the Managed Servers:

1. Log into the Oracle WebLogic Server Administration Console at:

   ```
   http://ADMINVHN:7001/em
   ```

   In this example:

   Replace *ADMINVHN* with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Downloads for an Enterprise Deployment.

   Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that was displayed at the end of the Configuration Wizard session when you created the domain.

2. In the Domain Structure window, expand the **Environment** node, then select **Servers**.

   The Summary of Servers page appears.

3. Click the **Control** tab.

4. Select **WLS_SOA1** from the Servers column of the table.

5. Click **Shutdown**. Wait for the shutdown to complete (refresh the WebLogic Server Console page to verify shutdown status).

6. Click **Start**.

7. Repeat steps 2 through 6 for WLS_SOA2.

18.7 Updating the B2B Instance Identifier for Transports

To set up File, FTP, or Email transports in a high availability environment, set the b2b.HAInstance property to true.

To do this follow these steps:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control with the user name and password specified for the domain administration.

2. Display the Target Navigation pane, by clicking the target navigation icon near the left top corner of the screen.

3. In the navigation treet, expand **SOA**, and then right click the soa-infra(*server_name*), and select the **SOA Administration**, and then **B2B Server Properties** from the context menu.

   If there are multiple soa-infra (*server_name*), add the property only once.

4. Click **More B2B Configuration Properties** .

   B2BConfig b2b should already be selected.

5. Click the **Operations** tab.

6. Click **addProperty** in the list on the right.

7. In the Key field enter **b2b.HAInstance**.

8. In the value field enter **true**.

   This property is stored in MDS and needs to be created only once for the cluster.

9. Click **Invoke**.

After you define high availability properties, you can view them on the Attributes tab. To view the properties, click the **Attributes** tab and then click **Properties**. Expand the Element nodes in the Value table to verify the property names and values.

18.8 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for Oracle B2B

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle B2B requests correctly to the Oracle B2B software on the Oracle SOA Suite cluster.

18.8.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

18.8.2 Configuring Oracle HTTP Server for Oracle B2B

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle B2B requests correctly to the Oracle B2B software on the Oracle SOA Suite cluster.

To enable Oracle HTTP Server to route requests to Oracle B2B Console and to Oracle B2B services:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   ```
   # B2B
   <Location /b2bconsole>
     WLSRequest ON
   ```

```
  WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

# B2B
<Location /b2b>
  WLSRequest ON
  WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>
```

3. Restart the ohs1 instance:

   a. Change directory to the following location:

   ```
   cd OHS_DOMAIN_HOME/bin
   ```

   b. Enter the following commands to stop and start the instance:

   ```
   ./stopComponent.sh ohs1
   ./startComponent.sh ohs1
   ```

4. Log in to WEBHOST2 and copy the `soa_vh.conf` file to the configuration directory for the second Oracle HTTP Server instance (ohs_2):

   ```
   OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

5. Edit the `soa_vh.conf` file to change any references to WEBHOST1 to WEBHOST2.

6. Restart the `ohs2` instance:

   a. Change directory to the following location:

   ```
   cd OHS_DOMAIN_HOME/bin
   ```

   b. Enter the following commands to stop and start the instance:

   ```
   ./stopComponent.sh ohs2
   ./startComponent.sh ohs2
   ```

18.9 Adding the B2BAdmin Role to the SOA Administrators Group

Before you validate the Oracle B2B configuration on the Managed Servers, add the `B2BAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

18.10 Validating Access to Oracle B2B Through the Load Balancer

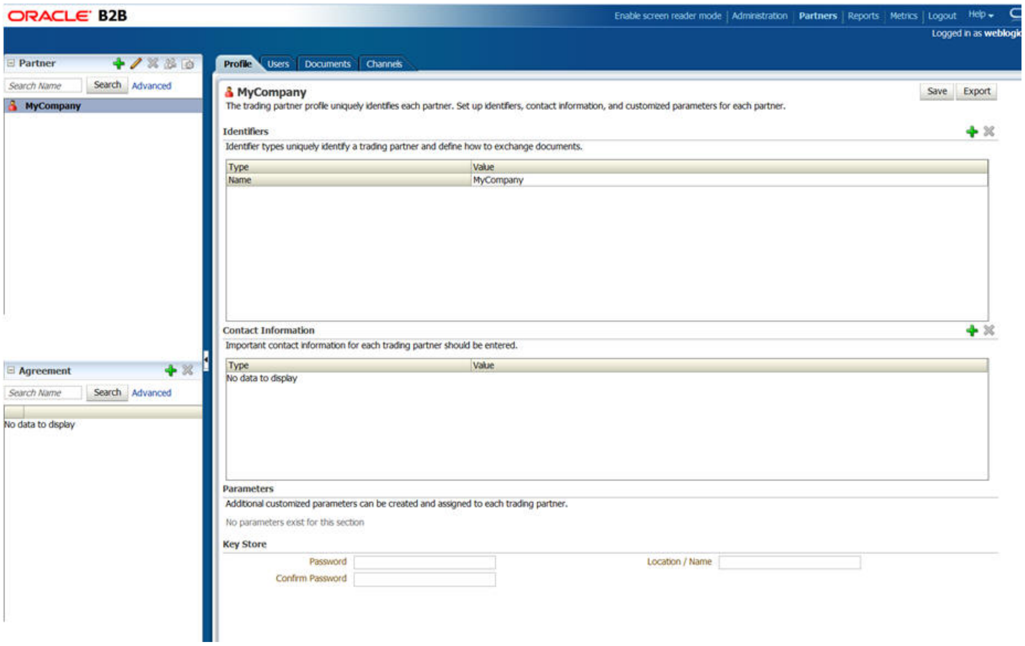
Use the following steps to verify that the appropriate routing and failover is working from the load balancer to the HTTP Server instances to the B2B Suite Components on the Oracle SOA Suite Managed Server.

1. Enter the following URL to access the Oracle B2B Console through the load balancer:

   ```
   https://soa.example.com/b2bconsole
   ```

2. Log in using `weblogic_soa` user. You should see the Oracle B2B Partner, Agreement, and Profile screen, as shown in Figure 18-1.

   Figure 18-1 Oracle B2B Partner, Agreement, and Profile Screen

   MyCompany

   The trading partner profile uniquely identifies each partner. Set up identifiers, contact information, and customized parameters for each partner.

   Identifiers

   Identifier types uniquely identify a trading partner and define how to exchange documents.

Type	Value
Name	MyCompany

   Contact Information

   Important contact information for each trading partner should be entered.

Type	Value
No data to display	

   Parameters

   Additional customized parameters can be created and assigned to each trading partner.

   No parameters exist for this section

   Key Store

   Password

   Confirm Password

   Location / Name

   No data to display

3. Enter the following URL to access the Oracle B2B Web services endpoint:

   ```
   https://soa.example.com/b2b/services
   ```

   You will see the links to the different B2B endpoints test.

18.11 Backing Up the Configuration

It is an Oracle best practices recommendation to create a backup after successfully configuring a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries for an Enterprise Deployment.

18.12 Enabling Automatic Service Migration and JDBC Persistent Stores for Oracle B2B

In the enterprise topology, Oracle B2B is configured on the existing Oracle SOA Suite Managed Servers. If you have already configured automatic service migration for the `SOA_Cluster`, then the Oracle B2B software is already protected by automatic service migration.

If you have not configured automatic service migration for the Managed Servers where Oracle B2B is configured, then see Configuring Automatic Service Migration in an Enterprise Deployment.

In addition, you can optionally configure database-based persistent stores for Oracle B2B. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

19

Extending the Domain with Oracle SOA Suite for Healthcare Integration

The procedures explained in this chapter guide you through the process of extending the domain to include Oracle SOA Suite for healthcare integration (Oracle Healthcare).

Configuring the Web Tier for the Extended Domain
: Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Adding the B2BAdmin Role to the SOA Administrators Group
: Before you validate the Oracle B2B configuration on the Managed Servers, add the `B2BAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

Validating Access to Oracle Healthcare Through the Load Balancer
: Use the following steps to verify that the appropriate routing and failover is working from the load balancer to the HTTP Server instances to the Oracle Healthcare Components on the Oracle SOA Suite Managed Server.

Backing Up the Configuration
: It is an Oracle best practices recommendation to create a backup after successfully configuring a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

Enabling Automatic Service Migration for Oracle Healthcare
: In the enterprise topology, Oracle Healthcare is configured on the existing Oracle SOA Suite Managed Servers. If you have already configured automatic service migration for the `SOA_Cluster`, then the Oracle Healthcare software is already protected by automatic service migration.

19.1 About Oracle SOA Suite for Healthcare Integration in an Enterprise Deployment

Oracle SOA Suite for healthcare integration uses several features of Oracle SOA Suite to help you design, create, and manage applications that process healthcare data.

For more information about Oracle SOA Suite for Healthcare Integration, see Introduction to Oracle SOA Suite for Healthcare Integration in *Oracle Fusion Middleware Healthcare Integration User's Guide for Oracle SOA Suite*.

When you configure Oracle SOA Suite for Healthcare Integration in an enterprise deployment, Oracle recommends that you configure Healthcare in its own domain. For more information about this recommendation, see B2B and Healthcare Domain Topology Best Practices in *Oracle Fusion Middleware Healthcare Integration User's Guide for Oracle SOA Suite*.

Typically, you configure a single domain for Oracle SOA Suite for Healthcare Integration, and a separate domain for Oracle B2B. Both these domain topologies are described and supported in this enterprise deployment guide. For more information, see the following:

- Flow Charts and Road Maps for Implementing the Primary Oracle SOA Suite Enterprise Topologies
- Building Your Own Oracle SOA Suite Enterprise Topology

19.2 Variables Used When Configuring Oracle Healthcare

As you perform the tasks in this chapter, you will be referencing the directory variables listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- OHS_DOMAIN_HOME
- JAVA_HOME

In addition, you will be referencing the following virtual IP (VIP) addresses defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2

19.3 Prerequisites for Extending the Domain to Include Oracle Healthcare

Before extending the domain with Oracle Healthcare, note the following important prerequisites that are specific Oracle Healthcare.

- You can extend an existing domain with the Oracle Healthcare software only if the domain was configured using the Oracle SOA Suite domain configuration template. You cannot extend an Oracle BPM, Oracle BAM, or Oracle OSB domain with Oracle Healthcare.

  This chapter assumes you have performed the steps in Extending the Domain with Oracle SOA Suite .

- When you installed the Oracle SOA Infrastructure schema, as part of the Oracle SOA Suite installation and configuration, you should have set the **Healthcare Integration** RCU custom variable to YES. When you enter YES as the value for the Healthcare Integration custom variable, RCU creates additional materialized views in the database, which are required by the Healthcare Integration User Interface.

  If you entered NO, you can perform these additional schema configuration tasks later by running the following SQL script on the database. This script is installed in the Oracle Fusion Middleware Oracle home when you select the Healthcare with B2B installation type:

  ```
  ORACLE_HOME/soa/common/sql/soainfra/sql/oracle/b2b_mv.sql
  ```

In addition, ensure that your existing deployment meets the following general prerequisites for extending the domain

- Back up the installation - If you have not yet backed up the existing Fusion Middleware Home and domain, Oracle recommends backing it up now.

  To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

- Verify that you have installed the Infrastructure and SOA software binaries in an Oracle home on shared storage and they are available from SOAHOST1 and SOAHOST2.

- You have already configured Node Manager, Administration Server, SOA Servers, and WSM Servers as described in previous chapters to run a SOA system. Optionally, you may have already configured Server migration, transaction logs, coherence, and all other configuration steps for the SOA System.

- If you haven't done so already, verify that the system clocks on each host computer are synchronized. You can do this by running the date command as simultaneously as possible on the hosts in each cluster.

  Alternatively, there are third-party and open-source utilities you can use for this purpose.

19.4 Installing Oracle Healthcare for an Enterprise Deployment

Use the following sections to install the Oracle Fusion Middleware Infrastructure software in preparation for configuring a new domain for an enterprise deployment.

Starting the Oracle B2B and Healthcare Installer on SOAHOST1

Navigating the Installation Screens for Oracle Healthcare Installation

Verifying the B2B or Healthcare Installation

19.4.1 Starting the Oracle B2B and Healthcare Installer on SOAHOST1

To start the installation program, perform the following steps.

1. Log in to SOAHOST1.

2. Go to the directory where you downloaded the installation program.

3. Launch the installation program by invoking the `java` executable from the JDK directory on your system, as shown in the example below.

   ```
   JAVA_HOME/bin/java -d64 -jar distribution_file_name.jar
   ```

   In this example:

   - Replace *JAVA_HOME* with the environment variable or actual JDK location on your system.

   - Replace *distribution_file_name* with the actual name of the distribution jar file.

     Note that if you download the distribution from the Oracle Technology Network (OTN), then the jar file is typically packaged inside a downloadable ZIP file.

To install the software required for the initial Infrastructure domain, the distribution you want to install is **fmw_12.2.1.2_b2bhealthcare.jar**.

For more information about the actual file names of each distribution, see Identifying and Obtaining Software Downloads for an Enterprise Deployment.

When the installation program appears, you are ready to begin the installation. See Navigating the Installation Screens for a description of each installation program screen.

19.4.2 Navigating the Installation Screens for Oracle Healthcare Installation

Table 18-1 provides description of each installation program screen.

Table 19-1 Oracle B2B and Healthcare Install Screens

Screen	Description
Installation Inventory Setup	On UNIX operating systems, this screen will appear if this is the first time you are installing any Oracle product on this host. Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location. For more information about the central inventory, see Understanding the Oracle Central Inventory in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you’ve already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. For more information about Oracle Fusion Middleware directory structure, see Selecting Directories for Installation and Configuration in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.
Installation Type	Use this screen to select the type of installation and consequently, the products and feature sets you want to install. • Select **Healthcare** **NOTE**: The topology in this document does not include the examples, Oracle strongly recommends that you do not install the examples into a production environment.
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements.

Table 19-1 (Cont.) Oracle B2B and Healthcare Install Screens

Screen	Description
Installation Summary	Use this screen to verify the installation options you selected. If you want to save these options to a response file, click **Save Response File** and provide the location and name of the response file. Response files can be used later in a silent installation situation. For more information about silent or command line installation, see Using the Oracle Universal Installer in Silent Mode in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*. Click **Install** to begin the installation.
Installation Progress	This screen allows you to see the progress of the installation. Click **Next** when the progress bar reaches 100% complete.
Installation Complete	Review the information on this screen, then click **Finish** to dismiss the installer.

19.4.3 Verifying the B2B or Healthcare Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

Reviewing the Installation Log Files

Checking the Directory Structure

Viewing the Contents of Your Oracle Home

19.4.3.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

19.4.3.2 Checking the Directory Structure

The contents of your installation vary based on the options that you select during the installation process.

The addition of Oracle B2B adds the following directory and sub-directories:

```
ls  /u01/oracle/products/fmw/soa/soa/thirdparty/edifecs/

Common
XEngine
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

19.4.3.3 Viewing the Contents of Your Oracle Home

You can also view the contents of your Oracle home using the `viewInventory` script. For more information, see Viewing the contents of an Oracle home in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

19.5 Running the Configuration Wizard for Oracle Healthcare

To extend the domain to include Oracle Healthcare, refer to the following sections.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens for Oracle Healthcare

19.5.1 Starting the Configuration Wizard

Note:

If you added any customizations directly to the start scripts in the domain, those will be overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, you can create a file called `setUserOverrides.sh` and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

To start the Configuration Wizard:

1. From the WebLogic Server Console, stop any managed servers that will be modified by this domain extension. Managed Servers that are not effected can remain on-line.

2. Verify the status of the managed servers, and then stop the Administration Server.

   For more information, see the instructions for shutting down the Administration Server with Node Manager in Starting the Configuration Wizard on SOAHOST1.

3. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

   ```
   cd ORACLE_HOME/oracle_common/common/bin
   ./config.sh
   ```

19.5.2 Navigating the Configuration Wizard Screens for Oracle Healthcare

Follow the instructions in these sections to create and configure the domain for the topology, with static clusters.

Extending the Domain with Static Cluster

19.5.2.1 Extending the Domain with Static Cluster

Follow the instructions in this section to extend the domain for Oracle Healthcare.

Note:

You can use the same procedure described in this section to extend an existing domain. If your needs do not match the instructions given in the procedure, be sure to make your selections accordingly, or refer to the supporting documentation for additional details.

Domain creation and configuration includes the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Specifying the Datasource Configuration Type
- Task 4, Selecting Advanced Configuration
- Task 5, Configuring Virtual Targets
- Task 6, Configuring Partitions
- Task 7, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 8, Writing Down Your Domain Home and Administration Server URL
- Task 9, Start the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the Domain Location field, select the value of the *ASERVER_HOME* variable, which represents the complete path to the Administration Server domain home you created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide

Tip:
More information about the other options on this screen can be found in Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure **Update Domain Using Product Templates** is selected, then select the following templates:

- **Oracle SOA Suite for healthcare integration - 12.2.1.2.0[soa]**

  Selecting this template automatically selects the following as a dependency:

  Oracle B2B - 12.2.1.2.0[soa]

In addition, the following additional templates should already be selected, because they were used to create the initial domain and extend it to SOA:

- Basic Weblogic Server Domain - 12.2.1.2.0[wlserver]
- Oracle SOA Suite 12.2.1.2.0[soa]
- Oracle Enterprise Manager - 12.2.1.2.0[em]
- Oracle WSM Policy Manager - 12.2.1.2.0[oracle_common]
- Oracle JRF - 12.2.1.2.0[oracle_common]
- WebLogic Coherence Cluster Extension - 12.2.1.2.0[wlserver]

> **Tip:**
> More information about the options on this screen can be found in Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Specifying the Datasource Configuration Type

All fields are pre-populated, because you already configured the domain to reference the Fusion Middleware schemas that are required for the Infrastructure domain. Oracle Healthcare uses the existing Datasources for SOA and no new Datasources need to be added to the domain.

> **Note:**
> Any custom data sources that were created before the extension (like LEASING data sources) will show up before this screen. Check the Datasources row and click **Next**. The test data source screen will verify its validity. Click **Next**.

Task 4 Selecting Advanced Configuration

To complete domain configuration for the topology, do not select any additional options on the Advanced Configuration screen and Click **Next**. Oracle Healthcare applications and required artifacts will be targeted automatically to the existing SOA servers

Task 5 Configuring Virtual Targets

Do not specify any values. Click **Next** to continue.

Task 6 Configuring Partitions

Do not specify any values. Click **Next** to continue.

Task 7 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Domain Update**.

Tip:

More information about the options on this screen can be found in Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 8 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location
- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start the Administration Server, and the URL is needed to access the Administration Server.

Click **Finish** to dismiss the configuration wizard.

If the Admin Server was running during the domain extension process, restart the server before you continue.

Task 9 Start the Administration Server

Start the Administration Server to ensure the changes you have made to the domain have been applied.

19.6 Starting the Healthcare Components

This topic explains how to start the Oracle Healthcare components you have configured in the domain. The procedure requires you to restart the Managed Server where Oracle Healthcare has been configured. This ensures that the configuration changes and startup scripts are updated and validated correctly. Because you are extending an existing domain, the Administration Server and respective Node Managers are already running in on both application server hosts.

To start the Healthcare components, restart the Managed Servers:

1. Log into the Oracle WebLogic Server Administration Console at:

   http://*ADMINVHN*:7001/em

   In this example:

   - Replace ADMINVHN with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Downloads for an Enterprise Deployment.
   - Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that was displayed at the end of the Configuration Wizard session when you created the domain.

2. In the Domain Structure window, expand the **Environment** node, then select **Servers**.

   The Summary of Servers page appears.

3. Click the **Control** tab.

4. Select **WLS_SOA1** from the **Servers** column of the table.

5. Click **Shutdown**.

   Wait for the shutdown to complete. Refresh the Console page to verify shutdown status.

6. Select **WLS_SOA1** from the Servers column of the table.

7. Click **Start**.

8. Repeat steps 4 through 7 for the WLS_SOA2 Managed Server.

19.7 Updating the B2B Instance Identifier and MLLP High Availability Mode

To set up File, FTP, or Email transports in a high availability environment, set the `b2b.HAInstance` property to `true`.

1. Log in to Oracle Enterprise Manager Fusion Middleware Control with the user name and password specified for the domain administration.

2. If not already displayed, click the Target Navigation icon ≣ in the top left corner of the page to display the **Target Navigation** pane.

3. Expand SOA, and then right click on the **soa-infra(*server_name*)**, and select the SOA Administration, and then B2B Server Properties.

   If there are multiple soa-infra instances, then add the property only once.

4. Click **More B2B Configuration Properties...** .

   When you click this link, Fusion Middleware Control displays the MBean browser, so you can make modifications to specific B2B MBean properties.

5. Click the **b2b** MBean.

   `B2BConfig b2b` should already be selected.

6. Click the **Operations** tab.

7. Click **addProperty** in the list of operations.

8. In the **Key** field enter `b2b.HAInstance`.

9. In the **Value** field enter true.

   This property is stored in the MDS repository and must be created only once for the cluster.

10. Click **Invoke**.

    A message should display, confirming that the property has been added.

11. Click **Return** to return to the B2B Properties list.

12. Click the **Operations** tab.

13. Click **addProperty** to add another property.
14. In the **Key** field enter `b2b.MLLP_HA_Mode`.
15. In the **Value** field enter `true`.
16. Click **Invoke**.

After you define high availability properties, you can view them on the Attributes tab. To view the properties, click the **Attributes** tab and then click **Properties**. Expand the Element nodes in the Value table to verify the property names and values.

19.8 Disabling Connection Factory Affinity for Optimum Load Balancing

To avoid the possibility of all the load affecting one Oracle Healthcare server, Oracle recommends that you perform the following steps.

1. Log in to the WebLogic Administration Console Control with the user name and password specified for the domain administration.
2. In the left navigation tree, expand **Services**, and then **Messaging**.
3. Click **JMS Modules**.
4. Click **SOAJMSModule** on the table.
5. Click **B2BEventQueueConnectionFactory**.
6. Click the **Load Balance** tab.
7. Click **Lock and Edit** on the Change Center Menu.
8. Clear the **Server Affinity Enabled** check box.
9. Click **Save and Activate the changes**.

19.9 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for Oracle Healthcare
Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle Healthcare requests correctly to the Oracle SOA Suite cluster.

19.9.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

19.9.2 Configuring Oracle HTTP Server for Oracle Healthcare

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier can route Oracle Healthcare requests correctly to the Oracle SOA Suite cluster.

To enable Oracle HTTP Server to route requests to Oracle Healthcare:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   ```
   <Location /healthcare>
       SetHandler weblogic-handler
       WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
       WLProxySSL ON
       WLProxySSLPassThrough ON
   </Location>
   ```

3. Update the `soainternal_vh.conf` file with the following directive:

   ```
   <Location /healthcare>
       SetHandler weblogic-handler
       WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
       WLProxySSL ON
       WLProxySSLPassThrough ON
   </Location>
   ```

4. Restart the ohs1 instance:

   a. Change directory to the following location:

      ```
      cd OHS_DOMAIN_HOME/bin
      ```

   b. Enter the following commands to stop and start the instance:

      ```
      ./stopComponent.sh ohs1
      ./startComponent.sh ohs1
      ```

5. Log in to WEBHOST2 and copy the soa_vh.conf file and soainternal_vh.conf file to the configuration directory for the second Oracle HTTP Server instance (ohs_2):

   ```
   OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

6. Edit the `soa_vh.conf` and `soainternal_vh.conf` files to change any references to WEBHOST1 to WEBHOST2.

7. Restart the `ohs2` instance:

   a. Change directory to the following location:

      ```
      cd OHS_DOMAIN_HOME/bin
      ```

   b. Enter the following commands to stop and start the instance:

```
./stopComponent.sh ohs2
./startComponent.sh ohs2
```

19.10 Adding the B2BAdmin Role to the SOA Administrators Group

Before you validate the Oracle B2B configuration on the Managed Servers, add the `B2BAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

19.11 Validating Access to Oracle Healthcare Through the Load Balancer

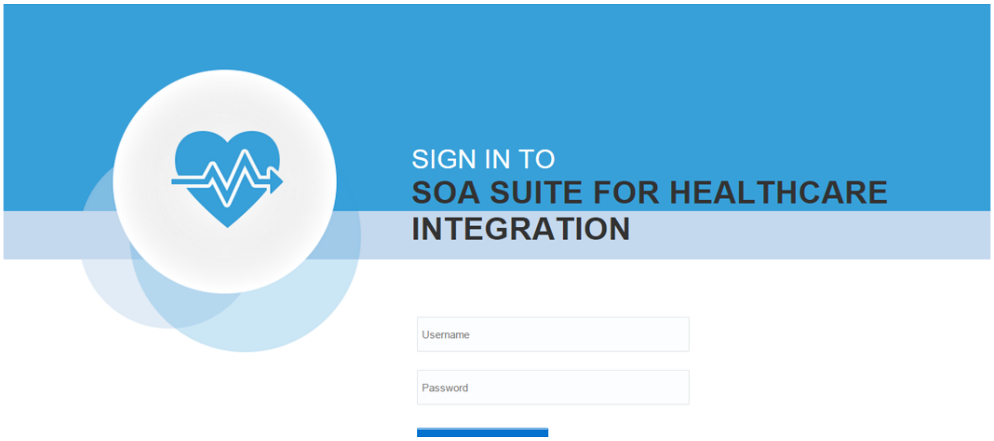
Use the following steps to verify that the appropriate routing and failover is working from the load balancer to the HTTP Server instances to the Oracle Healthcare Components on the Oracle SOA Suite Managed Server.

> **Note:**
>
> When you previously configured the Oracle SOA Suite Managed Servers, you should have enabled the WebLogic Plug-in. If have not performed this task, then see Configuring the WebLogic Proxy Plug-In.

1. Enter the following URL to access the Oracle Healthcare User Interface through the load balancer:

   ```
   https://soa.example.com/healthcare
   ```

   You should see the Oracle Healthcare User Interface screen.

   SIGN IN TO
   SOA SUITE FOR HEALTHCARE INTEGRATION

2. Log in using `weblogic_soa` user.

   For more information, see Using the Oracle SOA Suite for Healthcare Integration User Interface in *Oracle Fusion Middleware Healthcare Integration User's Guide for Oracle SOA Suite*.

19.12 Backing Up the Configuration

It is an Oracle best practices recommendation to create a backup after successfully configuring a domain or at another logical point. Create a backup after verifying that the installation so far is successful. This is a quick backup for the express purpose of immediate restoration in case of problems in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries for an Enterprise Deployment.

19.13 Enabling Automatic Service Migration for Oracle Healthcare

In the enterprise topology, Oracle Healthcare is configured on the existing Oracle SOA Suite Managed Servers. If you have already configured automatic service migration for the `SOA_Cluster`, then the Oracle Healthcare software is already protected by automatic service migration.

If you have not configured automatic service migration for the Managed Servers where Oracle Healthcare is configured, then see Configuring Automatic Service Migration in an Enterprise Deployment.

For additional high availability, you can also configure your transaction logs store and JMS store in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

20

Configuring Oracle Managed File Transfer in an Enterprise Deployment

The procedures explained in this chapter guide you through the process of adding Oracle Managed File Transfer to your enterprise deployment.

The credentials you enter in this file are encrypted when you start the Administration Server.

Starting the Node Manager on MFTHOST1

After you manually set up the Node Manager to use a per-host Node Manager configuration, you can start the Node Manager on *MFTHOST1*, using the `startNodeManager.sh` script.

Configuring the Node Manager Credentials and Type

By default, a per-host Node Manager configuration does not use Secure Socket Layer (SSL) for Node Manager-to-server communications. As a result, you must configure each machine in the domain to use a communication type of “plain,” rather than SSL. In addition, you should set the Node Manager credentials so you can connect to the Administration Server and Managed Servers in the domain.

Configuring the Domain Directories and Starting the Servers on MFTHOST1

After the domain is created and the node manager is configured, you can then configure the additional domain directories and start the Administration Server and the Managed Servers on *MFTHOST1*.

Propagating the Domain and Starting the Servers on MFTHOST2

After you start and validate the Administration Server and WLS_MFT1 Managed Server on *MFTHOST1*, you can then perform the following tasks on *MFTHOST2*.

Modifying the Upload and Stage Directories to an Absolute Path

After configuring the domain and unpacking it to the Managed Server domain directories on all the hosts, verify and update the upload and stage directories for Managed Servers in the new clusters.

Configuring and Enabling the SSH-FTP Service for Managed File Transfer

The Oracle Managed File Transfer enterprise deployment topology is based on the Secure File Transfer Protocol (SFTP) for file transfer. SFTP is a separate protocol, packaged with SSH and designed to work like FTP, but over a secure connection.

Configuring Oracle Traffic Director for Managed File Transfer

Oracle Traffic Director can be used as an alternative to Oracle HTTP Server on the Web tier. Like Oracle HTTP Server, it can route HTTP requests from the front-end load balancer to the application-tier WebLogic Managed Servers. However, only Oracle Traffic Director provides TCP load balancing and failover. As a result, Oracle Traffic Director is required by Oracle Managed File Transfer, which requires TCP for the routing of secure FTP requests.

Creating a New LDAP Authenticator and Provisioning Users for Managed File Transfer

When you configure an Oracle Fusion Middleware domain, the domain is configured by default to use the WebLogic Server authentication provider (DefaultAuthenticator). However, for an enterprise deployment, Oracle recommends that you use a dedicated, centralized LDAP-compliant authentication provider.

Enabling Automatic Service Migration and JDBC Persistent Stores for Managed File Transfer

To ensure that your software is configured for high availability, configure the Oracle Managed File Transfer Managed Servers for automatic service migration.

20.1 About Oracle Managed File Transfer

Oracle Managed File Transfer (MFT) provides a standards-based file gateway. It features design, deployment, and monitoring of file transfers using a web-based design-time console that includes transfer prioritization, file encryption, scheduling, and embedded FTP and sFTP servers.

For more information about Oracle MFT, see Understanding Oracle Managed File Transfer in *Oracle Fusion Middleware Using Oracle Managed File Transfer*.

About Managed File Transfer in an Enterprise Deployment

Characteristics of the Managed File Transfer Domain

20.1.1 About Managed File Transfer in an Enterprise Deployment

Managed File Transfer runs in its own domain, separate from other components, such as Oracle SOA Suite, Oracle Service Bus, and Business Activity Monitoring. Typically, you create the domain and configure the Managed Servers for Managed File Transfer in a single configuration wizard session.

Managed File Transfer uses Oracle Web Services Manager (OWSM), and runs the OWSM services on the same servers as the Managed File Transfer applications.

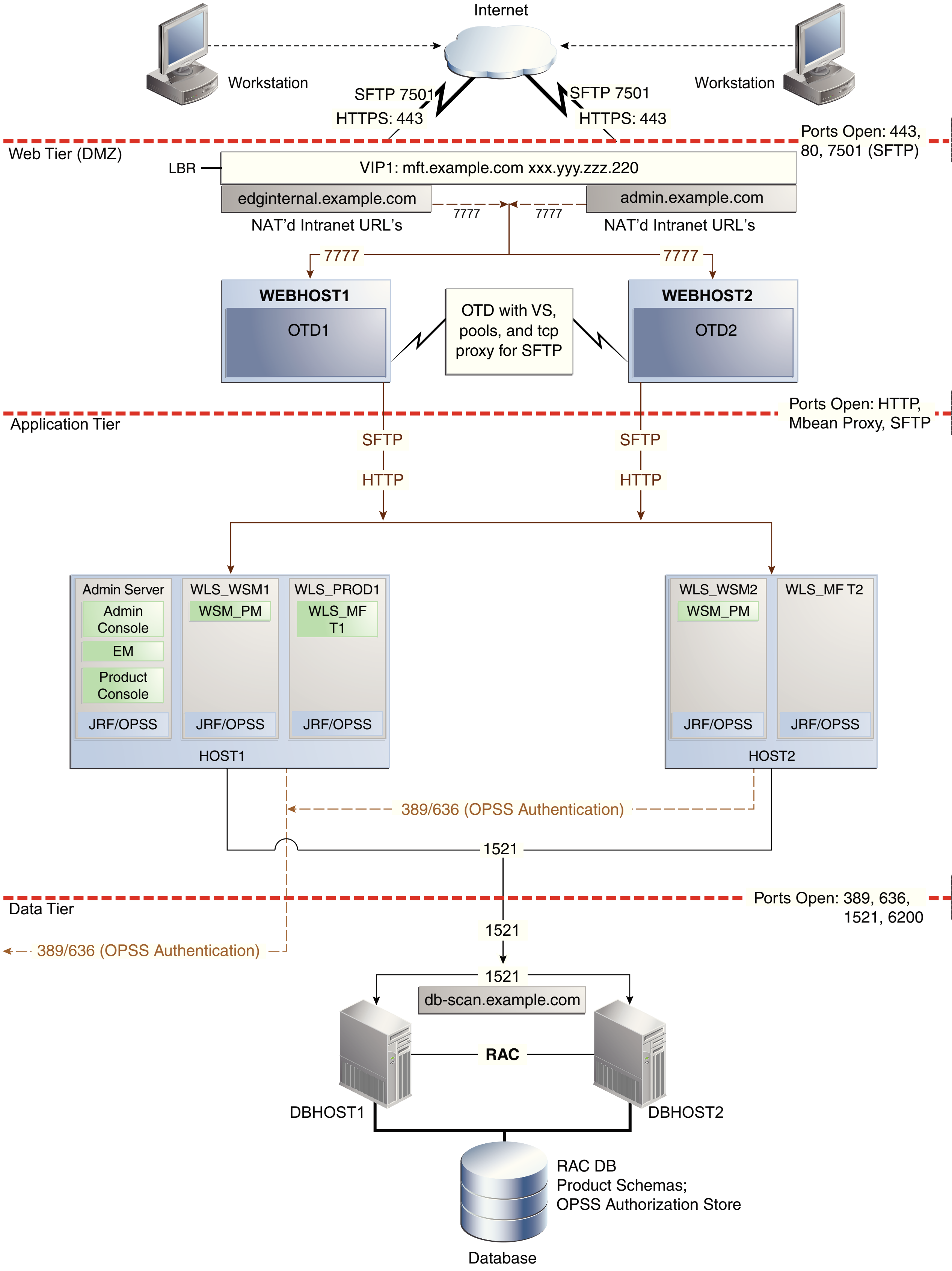
If you are configuring a Web tier, then Managed File Transfer requires Oracle Traffic Director, which provide TCP communication load balancing for the Managed File Transfer SFTP requests.

Figure 20-1 illustrates the Managed File Transfer deployment topology.

For a description of the standard elements shown in the diagram, see Understanding the Typical Enterprise Deployment Topology Diagram.

For a description of the elements shown in the diagram, see Understanding the Primary Oracle SOA Suite Topology Diagrams.

Figure 20-1 Managed File Transfer Topology



The Managed File Transfer domain can be configured on the same host as other FMW components. For this reason, Oracle recommends that you use a per host Node Manager configuration. In this configuration, a single Node Manager can control different domains on the same machine. For more information, see Configuring a Per Host Node Manager for an Enterprise Deployment.

20.1.2 Characteristics of the Managed File Transfer Domain

The following table lists some of the key characteristics of the domain you are about to create. By reviewing and understanding these characteristics, you can better understand the purpose and context of the procedures used to configure the domain.

Many of these characteristics are described in more detail in Understanding a Typical Enterprise Deployment.

Characteristic of the Domain	More Information
Uses a separate virtual IP (VIP) address for the Administration Server.	Configuration of the Administration Server and Managed Servers Domain Directories
Uses separate domain directories for the Administration Server and the Managed Servers in the domain.	Configuration of the Administration Server and Managed Servers Domain Directories
Uses Oracle Web Services Manager, which is deployed to the same servers as Managed File Transfer	Using Oracle Web Services Manager in the Application Tier
Requires Oracle Traffic Director for routing SFTP requests from the Web tier.	About Oracle Traffic Director in an Enterprise Deployment
Uses a single Configuration Wizard session to configure the Infrastructure and Managed File Transfer software on the Managed File Transfer Managed Servers. The domain is later extended to include Oracle Traffic Director.	Creating the Managed File Transfer Domain for an Enterprise Deployment
Uses a per host Node Manager configuration.	About the Node Manager Configuration in a Typical Enterprise Deployment
Requires a separately installed LDAP-based authentication provider.	Understanding OPSS and Requests to the Authentication and Authorization Stores

20.2 Variables Used When Configuring Managed File Transfer

The procedures for installing and configuring Managed File Transfer reference use a series of variables that you can replace with the actual values used in your environment.

The following directory location variables are used in these procedures:

- WEB_ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- WEB_DOMAIN_HOME
- JAVA_HOME

- NM_HOME

For more information, see File System and Directory Variables Used in This Guide.

In addition, you'll be referencing the following virtual IP (VIP) address defined in Reserving the Required IP Addresses for an Enterprise Deployment:

- ADMINVHN

Actions in this chapter will be performed on the following host computers:

- APPHOST1
- APPHOST2
- WEBHOST1
- WEBHOST2

Note:

Note that for this chapter, APPHOST1 and APPHOST2 provide a more generic variable for the application tier hosts. This is because, depending upon the domain you are creating, the host name variable will vary.

For example, if you are configuring Oracle Traffic Director for an Oracle SOA Suite domain, APPHOST1 is the same as SOAHOST1. However, if you are configuring Oracle Traffic Director for an Oracle Managed File Transfer domain, which is typically configured in its own domain, then APPHOST1 is the same as MFTHOST1.

20.3 Synchronizing the System Clocks

Before you extend the domain to include Oracle SOA Suite, verify that the system clocks on each host computer are synchronized. You can do this by running the `date` command simultaneously on all the hosts in each cluster.

Alternatively, there are third-party and open-source utilities you can use for this purpose.

20.4 Prerequisites for Creating the Managed File Transfer Domain

Before creating the Managed File Transfer domain, ensure that your existing deployment meets the following prerequisites.

- Verify that you have installed a supported JDK.
- You must have an existing Oracle home where you have installed the Oracle Fusion Middleware Infrastructure software binaries. This must be a dedicated Oracle home for the Managed File Transfer domain. The Oracle home is typically on shared storage and is available from MFTHOST1 and MFTHOST2. For more information, see Shared Storage Recommendations When Installing and Configuring an Enterprise Deployment.

  Note that you should not configure the Infrastructure domain, only install the Oracle Fusion Middleware Infrastructure software.

  To create the Infrastructure Oracle home, see Installing the Oracle Fusion Middleware Infrastructure on SOAHOST1.

- Back up the installation - If you have not yet backed up the existing Fusion Middleware Home, Oracle recommends backing it up now.

  To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

- If you haven't done so already, verify that the system clocks on each host computer are synchronized. You can do this by running the date command as simultaneously as possible on the hosts in each cluster.

  Alternatively, there are third-party and open-source utilities you can use for this purpose.

20.5 Installing the Software for an Enterprise Deployment

The procedure for installing the software for an enterprise deployment is explained in this section.

20.5.1 Starting the Managed File Transfer Installer on MFTHOST1

To start the installation program:

1. Log in to MFTHOST1.
2. Go to the directory where you downloaded the installation program.
3. Launch the installation program by invoking the `java` executable from the JDK directory on your system, as shown in the example below.

   ```
   JAVA_HOME/bin/java -d64 -jar Installer File Name
   ```

   Be sure to replace the JDK location in these examples with the actual JDK location on your system.

   Replace *`Installer File Name`* with the name of the actual installer file for your product listed in Identifying and Obtaining Software Distributions for an Enterprise Deployment.

When the installation program appears, you are ready to begin the installation.

20.5.2 Navigating the Installation Screens When Installing Managed File Transfer

The installation program displays a series of screens, in the order listed in the following table.

If you need additional help with any of the installation screens, click the screen name.

Screen	Description
Welcome	This screen introduces you to the product installer.

Screen	Description
Auto Updates	Use this screen to automatically search My Oracle Support for available patches or automatically search a local directory for patches that you've already downloaded for your organization.
Installation Location	Use this screen to specify the location of your Oracle home directory. This Oracle home should already contain Oracle Fusion Middleware Infrastructure. For more information about Oracle Fusion Middleware directory structure, see Selecting Directories for Installation and Configuration in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.
Prerequisite Checks	This screen verifies that your system meets the minimum necessary requirements. If there are any warning or error messages, you can refer to one of the documents in the Roadmap for Verifying Your System Environment section in *Oracle Fusion Middleware Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
Installation Summary	Use this screen to verify the installation options you selected. Click **Install** to begin the installation.
Installation Progress	This screen allows you to see the progress of the installation. Click **Next** when the progress bar reaches 100% complete.
Installation Complete	Review the information on this screen, then click **Finish** to dismiss the installer.

20.5.3 Verifying the Installation

After you complete the installation, you can verify it by successfully completing the following tasks.

Reviewing the Installation Log Files

Checking the Directory Structure for Managed File Transfer

20.5.3.1 Reviewing the Installation Log Files

Review the contents of the installation log files to make sure that no problems were encountered. For a description of the log files and where to find them, see Understanding Installation Log Files in *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*.

20.5.3.2 Checking the Directory Structure for Managed File Transfer

The contents of your installation vary based on the options you selected during the installation.

The addition of Managed File Transfer adds the following directory and sub-directories:

```
/u01/oracle/products/fmw
```

```
cfgtoollogs
coherence
em
install
inventory
mft
OPatch
oracle_common
oraInst.loc
osb
oui
soa
wlserver
```

For more information about the directory structure you should see after installation, see What are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

20.6 Creating the Managed File Transfer Database Schemas

Before you can configure an Managed File Transfer domain, you must install the required schemas in a certified database for use with this release of Oracle Fusion Middleware.

Starting the Repository Creation Utility (RCU)

Navigating the RCU Screens to Create the Managed File Transfer Schemas

20.6.1 Starting the Repository Creation Utility (RCU)

To start the Repository Creation Utility (RCU):

1. Navigate to the `ORACLE_HOME/oracle_common/bin` directory on your system.
2. Make sure the `JAVA_HOME` environment variable is set to the location of a certified JDK on your system. The location should be up to but not including the `bin` directory. For example, if your JDK is located in `/u01/oracle/products/jdk`:

   On UNIX operating systems:

   ```
   export JAVA_HOME=/u01/oracle/products/jdk
   ```

3. Start RCU:

   On UNIX operating systems:

   ```
   ./rcu
   ```

> **Note:**
>
> If your database has Transparent Data Encryption (TDE) enabled, and you want to encrypt your tablespaces created by the RCU, provide the `-encryptTablespace true` option when you start the RCU.
>
> This will default the appropriate RCU GUI Encrypt Tablespace checkbox selection on the Map Tablespaces screen without further effort during the RCU execution. For more information, see olink:RCUUG-GUID-D4AE68B4-11DF-459B-A5F1-D4DAAA3B7233 in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

20.6.2 Navigating the RCU Screens to Create the Managed File Transfer Schemas

Schema creation involves the following tasks:

- Task 1, Introducing RCU
- Task 2, Selecting a Method of Schema Creation
- Task 3, Providing Database Connection Details
- Task 4, Specifying a Custom Prefix and Selecting Schemas
- Task 5, Specifying Schema Passwords
- Task 6, Verifying the Tablespaces for the Required Schemas
- Task 7, Completing Schema Creation
- Task 8, Verifying the Schema Creation

Task 1 Introducing RCU

Click **Next**.

Task 2 Selecting a Method of Schema Creation

If you have the necessary permission and privileges to perform DBA activities on your database, select **System Load and Product Load**. This procedure assumes that you have the necessary privileges.

If you do not have the necessary permission or privileges to perform DBA activities in the database, you must select **Prepare Scripts for System Load** on this screen. This option will generate a SQL script, which can be provided to your database administrator to create the required schema. See Understanding System Load and Product Load in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

Task 3 Providing Database Connection Details

Provide the database connection details for RCU to connect to your database.

In the **Host Name** field, enter the SCAN address of the Oracle RAC Database.

Enter the **DBMS/Service** details.

Enter the **Schema Owner** and **Schema Password** details.

Click **Next** to proceed, then click **OK** on the dialog window confirming that connection to the database was successful.

Task 4 Specifying a Custom Prefix and Selecting Schemas

On this page, do the following:

1. Choose **Create new prefix**, and then enter the prefix you want to use for the Managed File Transfer schemas. A unique schema prefix is required because you are creating a new domain for Managed File Transfer.

2. From the list of schemas, select the **Managed File Transfer** schema.

   The following dependent schemas are selected automatically:

   - **User Messaging Service**
   - **Metadata Services**
   - **Oracle Platform Security Services**
   - **Audit Services**
   - **Audit Services Append**
   - **Audit Services Viewer**
   - **Oracle Enterprise Scheduler**
   - **Common Infrastructure Services**
   - **Weblogic Services**

3. Select **WebLogic Services**.

   Note: The WebLogic Services schema is not selected automatically, ensure that you select it manually.

The custom prefix is used to logically group these schemas together for use in this domain only; you must create a unique set of schemas for each domain as schema sharing across domains is not supported.

Tip:

For more information about custom prefixes, see Understanding Custom Prefixes in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

For more information about how to organize your schemas in a multi-domain environment, see Planning Your Schema Creation in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

Click **Next** to proceed, then click **OK** on the dialog window confirming that prerequisite checking for schema creation was successful.

Task 5 Specifying Schema Passwords

Specify how you want to set the schema passwords on your database, then specify and confirm your passwords.

Tip:

You must make a note of the passwords you set on this screen; you will need them later on during the domain creation process.

Task 6 Verifying the Tablespaces for the Required Schemas

On the Map Tablespaces screen, review the information, and then click **Next** to accept the default values.

Click **OK** in the confirmation dialog box.

Task 7 Completing Schema Creation

Navigate through the remainder of the RCU screens to complete schema creation. When you reach the Completion Summary screen, click **Close** to dismiss RCU.

Task 8 Verifying the Schema Creation

To verify that the schemas were created successfully, and to verify the database connection details, use SQL*Plus or another utility to connect to the database, using the Managed File Transfer schema name and the password you provided.

For example:

```
./sqlplus

SQL*Plus: Release 11.2.0.4.0 Production on Fri Nov 1 08:44:18 2013

Copyright (c) 1982, 2013, Oracle.  All rights reserved.

Enter user-name: FMW12211_MFT
Enter password: mft_schema_password

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

20.7 Creating the Managed File Transfer Domain for an Enterprise Deployment

You create a separate Managed File Transfer domain, using the Fusion Middleware Configuration Wizard.

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens for MFT

20.7.1 Starting the Configuration Wizard

To start the Configuration Wizard:

1. From the WebLogic Server Console, stop any managed servers that will be modified by this domain extension. Managed Servers that are not effected can remain on-line.

2. For any managed servers to be modified, verify the managed server shutdown has completed.

3. Stop the Administration Server once all managed servers are in a steady state.

4. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

   ```
   cd ORACLE_HOME/oracle_common/common/bin
   ./config.sh -log=debug_soa.log -log_priority=FINEST
   ```

20.7.2 Navigating the Configuration Wizard Screens for MFT

Follow the instructions in these sections to create and configure the domain for the topology, with static clusters.

Configuring the Domain with Static Clusters

20.7.2.1 Configuring the Domain with Static Clusters

Follow the instructions in this section to create and configure the domain for the topology.

Domain creation and configuration includes the following tasks.

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Templates
- Task 3, Selecting the Application Home Location
- Task 4, Configuring the Administrator Account
- Task 5, Specifying the Domain Mode and JDK
- Task 6, Specifying the Database Configuration Type
- Task 7, Specifying JDBC Component Schema Information
- Task 8, Providing the GridLink Oracle RAC Database Connection Details
- Task 9, Testing the JDBC Connections
- Task 10, Specifying the Keystore
- Task 11, Selecting Advanced Configuration
- Task 12, Configuring the Administration Server Listen Address
- Task 13, Setting the Node Manager Type (Per Host)
- Task 14, Configuring Managed Servers
- Task 15, Configuring a Cluster
- Task 16, Assigning Server Templates
- Task 15, Configuring a Cluster
- Task 18, Assigning Managed Servers to the Cluster
- Task 19, Configuring Coherence Clusters
- Task 20, Creating Machines
- Task 21, Assigning Servers to Machines
- Task 22, Creating Virtual Targets
- Task 23, Creating Partitions
- Task 24, Configuring the JMS File Store

- Task 25, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 26, Writing Down Your Domain Home and Administration Server URL

Task 1 Selecting the Domain Type and Domain Home Location

You must select a Domain home directory location, optimally outside the Oracle home directory.

Oracle recommends that you locate your Domain home in accordance with the directory structure in What Are the Key Oracle Fusion Middleware Directories? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*, where the Domain home is located outside the Oracle home directory. This directory structure helps avoid issues when you need to upgrade or reinstall software.

To specify the Domain type and Domain home directory:

1. On the Configuration Type screen, select **Create a new domain**.
2. In the **Domain Location** field, specify your Domain home directory.

For more information about this screen, see Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*

Task 2 Selecting the Configuration Templates

On the Templates screen, make sure **Create Domain Using Product Templates** is selected, then select the following templates:

- Oracle Managed File Transfer - 12.2.1.2.0 [mft]

  Selecting this template automatically selects the following dependencies:

  – Oracle B2B Client

  – Oracle Enterprise Manager

  – Oracle WSM Policy Manager

  – Oracle JRF

  – WebLogic Coherence Cluster Extension

For more information about the options on this screen, see Templates in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 3 Selecting the Application Home Location

On the Application Location screen, specify the value of the *APPLICATION_HOME* variable, as defined in File System and Directory Variables Used in This Guide.

For more information about the options on this screen, see Application Location in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 4 Configuring the Administrator Account

On the Administrator Account screen, specify the user name and password for the default WebLogic Administrator account for the domain.

Make a note of the user name and password specified on this screen; you will need these credentials later to boot and connect to the domain's Administration Server.

Task 5 Specifying the Domain Mode and JDK

On the Domain Mode and JDK screen:

- Select **Production** in the Domain Mode field.
- Select the **Oracle Hotspot** JDK in the JDK field.

Selecting **Production Mode** on this screen gives your environment a higher degree of security, requiring a user name and password to deploy applications and to start the Administration Server.

For more information about the options on this screen, including the differences between development mode and production mode, see Domain Mode and JDK in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

In the production mode, a boot identity file can be created to bypass the need to provide a user name and password when starting the Administration Server. For more information, see Creating the boot.properties File.

Task 6 Specifying the Database Configuration Type

Select **RCU Data** to activate the fields on this screen.

The **RCU Data** option instructs the Configuration Wizard to connect to the database and Service Table (STB) schema to automatically retrieve schema information for the schemas needed to configure the domain.

> **Note:**
> If you select **Manual Configuration** on this screen, you must manually fill in the parameters for your schema on the JDBC Component Schema screen.

After selecting **RCU Data**, fill in the fields as shown in the following table.

Field	Description
DBMS/Service	Enter the service name for the Oracle RAC database where you will install the product schemas. For example: `orcl.example.com` Be sure this is the common service name that is used to identify all the instances in the Oracle RAC database; do not use the host-specific service name.
Host Name	Enter the Single Client Access Name (SCAN) Address for the Oracle RAC database, which you entered in the *Enterprise Deployment Workbook*.
Port	Enter the port number on which the database listens. For example, `1521`.

Field	Description
Schema Owner Schema Password	Enter the user name and password for connecting to the database's Service Table schema. This is the schema user name and password that was specified for the Service Table component on the Schema Passwords screen in RCU. For more information, see Creating the Database Schemas. The default user name is `prefix_STB`, where `prefix` is the custom prefix that you have defined in RCU.

Click **Get RCU Configuration** when you are finished specifying the database connection information. The following output in the Connection Result Log indicates that the operating succeeded:

```
Connecting to the database server...OK
Retrieving schema data from database server...OK
Binding local schema components with retrieved data...OK

Successfully Done.
```

Click **Next** if the connection to the database is successful.

For more information about the **RCU Data** option, see Understanding the Service Table Schema in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

For more information about the other options on this screen, see Datasource Defaults in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 7 Specifying JDBC Component Schema Information

Verify that the values on the JDBC Component Schema screen are correct for all schemas.

The schema table should be populated, because you selected **Get RCU Data** on the previous screen. As a result, the Configuration Wizard locates the database connection values for all the schemas required for this domain.

At this point, the values are configured to connect to a single-instance database. However, for an enterprise deployment, you should use a highly available Real Application Clusters (RAC) database, as described in Preparing the Database for an Enterprise Deployment.

In addition, Oracle recommends that you use an Active GridLink datasource for each of the component schemas. For more information about the advantages of using GridLink data sources to connect to a RAC database, see Database Considerations in the *Oracle Fusion Middleware High Availability Guide*.

To convert the data sources to GridLink:

1. Select all the schemas by selecting the checkbox at in the first header row of the schema table.

2. Click **Convert to GridLink** and click **Next**.

Task 8 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

For more information about specifying the information on this screen, as well as information about how to identify the correct SCAN address, see Configuring Active GridLink Data Sources with Oracle RAC in the *Oracle Fusion Middleware High Availability Guide*.

You can also click **Help** to display a brief description of each field on the screen.

Task 9 Testing the JDBC Connections

A green check mark in the Status column indicates a successful test. If you encounter any issues, see the error message in the Connection Result Log section of the screen, fix the problem, then try to test the connection again.

By default, the schema password for each schema component is the password you specified while creating your schemas. If you want different passwords for different schema components, manually edit them in the previous screen (JDBC Component Schema) by entering the password you want in the **Schema Password** column, against each row. After specifying the passwords, select the check box corresponding to the schemas that you changed the password in and test the connection again.

For more information about the other options on this screen, see Test Component Schema in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 10 Specifying the Keystore

Use the Keystore screen in the Configuration Wizard to specify details about the keystore to be used in the domain.

For a typical enterprise deployment, you can leave the default values.

For more information, see Keystore in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 11 Selecting Advanced Configuration

To complete domain configuration for the topology, select the following options on the Advanced Configuration screen:

- **Administration Server**

  This is required to properly configure the listen address of the Administration Server.

- **Node Manager**

  This is required to configure Node Manager.

- **Topology**

  This is required to add, delete, or modify the Settings for Server Templates, Managed Servers, Clusters, Virtual Targets, and Coherence.

- **File Store**

  This is required to configure the appropriate shared storage for JMS persistent stores.

Note:
When using the Advanced Configuration screen in the Configuration Wizard, if any of the above options are not available on the screen, then return to the Templates screen and ensure that you have selected the required templates for this topology.

Task 12 Configuring the Administration Server Listen Address
On the Administration Server screen:

1. In the **Server Name** field, retain the default value - AdminServer.
2. In the **Listen Address** field, enter the virtual host name that corresponds to the VIP of the ADMINVHN that you had procured in Procuring Resources for an Enterprise Deployment and had enabled in Preparing the Host Computers for an Enterprise Deployment.

   For more information on the reasons for using the ADMINVHN virtual host, see Reserving the Required IP Addresses for an Enterprise Deployment.
3. Leave the other fields at their default values.

   In particular, be sure that no server groups are assigned to the Administration Server.

Task 13 Setting the Node Manager Type (Per Host)
Select **Manual Node Manager Setup** as the Node Manager type.

Note:

- For more information about the options on this screen, see Node Manager in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.
- For more information about per domain and per host Node Manager implementations, see About the Node Manager Configuration in a Typical Enterprise Deployment.
- For additional information, see Configuring Node Manager on Multiple Machines in *Oracle Fusion Middleware Administering Node Manager for Oracle WebLogic Server*.

Task 14 Configuring Managed Servers

Use the Managed Servers screen to create the Managed Servers required in the Managed File Transfer domain.

1. Change the default server name to `WLS_MFT1` in the **Server name** column.
2. In the **Listen Address** column, enter *MFTHOST1*.

   Be sure to enter the host name that corresponds to *MFTHOST1*; do not use the IP address.
3. In the **Listen Port** column, enter `7500`.
4. In the **Server Groups** drop-down list, select **MFT-MGD-SVRS**.

   The selected server group ensures that the Managed File Transfer and Oracle Web Services Manager (OWSM) software is targeted to the Managed Server.

   There is another server group called **MFT-MGD-SVRS-ONLY** that targets only MFT but not Oracle Web Services Manager (OWSM) to the server. This is typically used if you want to have Oracle Web Services Manager (OWSM) in a different server rather than with the MFT server.

   The server groups target Fusion Middleware applications and services to one or more servers by mapping defined groups of application services to each defined server group. Any application services that are mapped to a given server group are automatically targeted to all servers that are assigned to that group. For more information, see Application Service Groups, Server Groups, and Application Service Mappings in *Oracle Fusion Middleware Domain Template Reference*.
5. Click **Add** and repeat this process to create a second Managed Server named `WLS_MFT2`.

   For the **Listen Address**, enter *MFTHOST2*. For the **Listen Port**, enter 7500. Associate the same server group that you associated with the first managed server, to WLS_MFT2 also.

The Managed Server names suggested in this procedure (WLS_MFT1 and WLS_MFT2) will be referenced throughout this document; if you choose different names then be sure to replace them as needed,

For more information about the options on this screen, see Managed Servers in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 15 Configuring a Cluster

Use the Clusters screen to create a new cluster:

1. Click the **Add** button.
2. Specify `MFT_Cluster` in the **Cluster Name** field.
3. Leave the Address field blank.
4. Specify `mft.example.com` in the **Frontend Host** field.
5. Specify `80` as the **Frontend HTTP** port and `443` as the **Frontend HTTPS** port.
6. From the **Dynamic Server Groups** drop-down list, select `Unspecified`.

For more information about the options on this screen, see Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 16 Assigning Server Templates

Click **Next** to continue.

Task 17 Configuring Dynamic Servers

Verify that all dynamic server options are disabled for clusters that are to remain as static clusters.

1. Confirm that the **Dynamic Cluster**, **Calculated Listen Port**, and **Calculated Machine Names** checkboxes on this screen are unchecked.
2. Confirm the **Server Template** selection is **Unspecified**.
3. Click **Next**.

Task 18 Assigning Managed Servers to the Cluster

Use the Assign Servers to Clusters screen to assign Managed Servers to the new cluster.

1. In the **Clusters** pane, select the cluster to which you want to assign the servers; in this case, `MFT_Cluster`.
2. In the **Servers** pane, assign `WLS_MFT1` to `MFT_Cluster` by doing one of the following:
   - Click once on `WLS_MFT1` to select it, then click on the right arrow to move it beneath the selected cluster (`MFT_Cluster)`) in the Clusters pane.

     OR
   - Double-click on `WLS_MFT1` to move it beneath the selected cluster (`MFT_Cluster`) in the clusters pane.
3. Repeat these steps to assign the WLS_MFT2 Managed Server to MFT_Cluster.

For more information about the options on this screen, see Assign Servers to Clusters in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 19 Configuring Coherence Clusters

Use the Coherence Clusters screen to configure the Coherence cluster that is automatically added to the domain.

In the **Cluster Listen Port**, enter `9991`.

For Coherence licensing information, Oracle Coherence Products in *Oracle Fusion Middleware Licensing Information User Manual*.

Task 20 Creating Machines

Use the Machines screen to create five new machines in the domain. A machine is required in order for the Node Manager to be able to start and stop the servers.

1. Select the **Unix Machine** tab.

2. Click the **Add** button to create five new UNIX machines.

   Use the values in Table 20-1 to define the Name and Node Manager Listen Address of each machine.

3. Verify the port in the **Node Manager Listen Port** field.

   The port number `5556`, shown in this example, may be referenced by other examples in the documentation. Replace this port number with your own port number as needed.

   > **Note:**
   >
   > If you are installing on a host where additional domains were already configured, and you have already configured a per host Node Manager, then the address and port configured in this screen must be for the existing per host Node Manager.

Name	Node Manager Listen Address	Node Manager Listen Port
MFTHOST1	The value of the MFTHOST1 host name variable. For example, `*MFTHOST1*.example.com`.	5556
MFTHOST2	The value of the MFTHOST2 host name variable. For example, `*MFTHOST2*.example.com`.	5556
ADMINHOST	Enter the value of the ADMINVHN variable.	5556

For more information about the options on this screen, see Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 21 Assigning Servers to Machines

Use the Assign Servers to Machines screen to assign the Administration Server and the two Managed Servers to the appropriate machine.

The Assign Servers to Machines screen is similar to the Assign Managed Servers to Clusters screen. Select the target machine in the Machines column, select the Managed Server in the left column, and click the right arrow to assign the server to the appropriate machine.

Assign the servers as follows:

- Assign the AdminServer to the ADMINHOST machine.
- Assign the WLS-MFT1 Managed Server to the *MFTHOST1* machine.
- Assign the WLS-MFT2 Managed Server to the *MFTHOST2* machine.

For more information about the options on this screen, see Assign Servers to Machines in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 22 Creating Virtual Targets

Click **Next** to continue.

Task 23 Creating Partitions

Click **Next** to continue.

Task 24 Configuring the JMS File Store

When you configure a domain using the Oracle WSM Policy Manager configuration template, you should select the proper location of the Metadata Services (MDS) JMS File Store, especially when you are configuring an enterprise deployment.

Enter the following location in the Directory column of the JMS File Store screen:

```
ORACLE_RUNTIME/domain_name/cluster_name
```

Replace *ORACLE_RUNTIME* with the actual value of the variable, as defined in File System and Directory Variables Used in This Guide.

Replace *domain_name* with the name of the domain you are creating.

Replace *cluster_name* with the name of the cluster you have configured for this domain.

Task 25 Reviewing Your Configuration Specifications and Configuring the Domain

The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

You can go back to any previous screen if you need to make any changes, either by using the **Back** button or by selecting the screen in the navigation pane.

Domain creation will not begin until you click **Create**.

For more information about the options on this screen, see Configuration Summary in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 26 Writing Down Your Domain Home and Administration Server URL

The Configuration Success screen will show the following items about the domain you just configured:

- Domain Location
- Administration Server URL

You must make a note of both items as you will need them later; the domain location is needed to access the scripts used to start the Administration Server.

Click **Finish** to dismiss the Configuration Wizard.

20.8 Configuring Node Manager for the Managed File Transfer Domain

The Managed File Transfer domain uses a per host Node Manager, which allows the Node Manager to control multiple domains on the same host.

If you are configuring Node Manager for the first time on MFTHOST1, then follow the steps described in Configuring a Per Host Node Manager for an Enterprise Deployment. Note that the domain name and directories must match the values for the Managed File Transfer domain.

If you have already configured a per host Node Manager on MFTHOST1, then you can add the new domain to the existing Node Manager configuration:

1. Change directory to the per host Node Manager home directory on MFTHOST1:

   ```
   cd NM_HOME
   ```

2. Open the `nodemanager.domains` file with a text editor.

3. Add the path to the both the Administration Server domain home and the Managed Server domain home to the `nodemanager.domains` file.

   Separate the domain paths with a semicolon. For example:

   ```
   mftedg_domain=/u02/oracle/config/domains/mftedg_domain;/u01/oracle/
   config/domains/mftedg_domain
   ```

4. Perform steps 1 to 2 on *MFTHOST2* and add the following domain home paths in the `nodemanager.domains` file:

   ```
   mftedg_domain=/u02/oracle/config/domains/mftedg_domain
   ```

20.9 Creating the boot.properties File

You must create a `boot.properties` if you want to start the Administrator Server without being prompted for the Administrator Server credentials. This step is required in an enterprise deployment. The credentials you enter in this file are encrypted when you start the Administration Server.

To create a `boot.properties` file for the Administration Server:

1. Create the following directory structure:

   ```
   mkdir -p ASERVER_HOME/servers/AdminServer/security
   ```

2. In a text editor, create a file called `boot.properties` in the `security` directory created in the previous step, and enter the Administration Server credentials that you defined when you ran the Configuration Wizard to create the domain:

   ```
   username=adminuser
   password=password
   ```

Note:

When you start the Administration Server, the `username` and `password` entries in the file get encrypted.

For security reasons, minimize the amount of time the entries in the file are left unencrypted; after you edit the file, you should start the server as soon as possible so that the entries get encrypted.

3. Save the file and close the editor.

20.10 Starting the Node Manager on MFTHOST1

After you manually set up the Node Manager to use a per-host Node Manager configuration, you can start the Node Manager on *MFTHOST1*, using the `startNodeManager.sh` script.

To start the Node Manager on *MFTHOST1*:

1. Change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

2. Run the following command to start the Node Manager and send the output of the command to an output file, rather than to the current terminal shell:

   ```
   nohup ./startNodeManager.sh > ./nodemanager.out 2>&1 &
   ```

3. Monitor the the nodemanager.out file; make sure the NodeManager starts successfully. The output should eventually contain a string similar to the following:

   ```
   <INFO><Plain socket listener started on port 5556>
   ```

20.11 Configuring the Node Manager Credentials and Type

By default, a per-host Node Manager configuration does not use Secure Socket Layer (SSL) for Node Manager-to-server communications. As a result, you must configure each machine in the domain to use a communication type of “plain,” rather than SSL. In addition, you should set the Node Manager credentials so you can connect to the Administration Server and Managed Servers in the domain.

The following procedure temporarily starts the Administration Server with the default start script, so you can perform these tasks. After you perform these tasks, you can stop this temporary session and use the Node Manager to start the Administration Server.

1. Start the Administration Server, using the default start script:

   a. Change directory to the following directory:

      ```
      cd ASERVER_HOME/bin
      ```

   b. Run the start script:

      ```
      ./startWebLogic.sh
      ```

      Watch the output to the terminal, until you see the following:

      ```
      <Server state changed to RUNNING>
      ```

2. Log in to the WebLogic Server Administration Console, using the WebLogic administrator user and password.

3. Configure the Node Manager type:

   > **Note:**
   >
   > Be sure to perform this task for each WebLogic Server machine in the domain.

   a. Click **Lock & Edit**.

   b. In the **Domain Structure** navigation tree, expand **Domain**, and then **Environment**.

   c. Click **Machines**.

   d. Click the link for the **ADMINHOST** machine.

   e. Click the **Node Manager** tab.

   f. Change the **Type** property from SSL to **Plain**.

   g. Click **Save**.

   h. Repeat this task for each machine in the domain.

   i. Click **Activate Changes**.

4. Set the Node Manager credentials:

   a. Click **Lock & Edit**.

   b. In the **Domain Structure** navigation pane, click the name of the domain.

   c. Select the **Security** tab.

      The **Security > General** tab should be selected.

   d. Scroll down and expand the **Advanced** security options.

   e. Make a note of the user name in the **NodeManager Username** field.

      Optionally, you can edit the value to create a new Node Manager user name.

   f. Enter a new password in the **NodeManager Password** and Confirm **NodeManager Password** fields

   g. Click **Save** and then **Activate Changes**.

5. Restart Node Manager.

6. In a new terminal window, use the following steps to refresh the SystemSerialized.dat file. Without this step, you won’t be able to connect to the Node Manager and use it to start the servers in domain:

   a. Change directory to the

      ```
      cd ORACLE_COMMON_HOME/common/bin
      ```

   b. Start the WebLogic Server Scripting Tool (WLST):

```
./wlst.sh
```

c. Connect to the Administration Server, using the following WLST command:

```
connect('admin_user','admin_password','admin_url')
```

For example:

```
connect('weblogic','mypassword','t3://ADMINVHN:7001')
```

d. Use the nmEnroll command to enables the Node Manager to manage servers in a specified WebLogic domain.

```
nmEnroll('ASERVER_HOME')
```

For example:

```
nmEnroll('/u01/oracle/config/domains/mftedg_domain')
```

7. Optionally, if you want to customize any startup properties for the Administration Server, you can use the following WLST command to create a `startup.properties` file for the Administration Server:

```
nmGenBootStartupProps('AdminServer')
```

The `startup.properties` file is created in the following directory:

```
ASERVER_HOME/servers/AdminServer/data/nodemanager/
```

8. Return to the terminal window where you started the Administration Server with the start script.

9. Press **Ctrl/C** to stop the Administration Server process.

   Wait for the Administration Server process to end and for the terminal command prompt to appear.

20.12 Configuring the Domain Directories and Starting the Servers on MFTHOST1

After the domain is created and the node manager is configured, you can then configure the additional domain directories and start the Administration Server and the Managed Servers on *MFTHOST1*.

Starting the Administration Server Using the Node Manager
After you have configured the domain and configured the Node Manager, you can start the Administration Server, using the Node Manager. In an enterprise Deployment, the Node Manager is used to start and stop the Administration Server and all the Managed Servers in the domain.

Validating the Administration Server
Before proceeding with the configuration steps, validate that the Administration Server has started successfully by making sure you have access to the Oracle WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control, which both are installed and configured on the Administration Servers.

Disabling the Derby Database

Creating a Separate Domain Directory for Managed Servers on MFTHOST1
When you initially create the domain for enterprise deployment, the domain directory resides on a shared disk. This default domain directory will be used to run the Administration Server. You can now create a copy of the domain on the local storage for both MFTHOST1 and MFTHOST2. The domain directory on the local (or private) storage will be used to run the Managed Servers.

Starting and Validating the WLS_MFT1 Managed Server on MFTHOST1
After you have configured Node Manager and created the Managed Server domain directory, you can use Oracle Enterprise Manager Fusion Middleware Control to start the WLS_MFT1 Managed Server on MFTHOST1.

20.12.1 Starting the Administration Server Using the Node Manager

After you have configured the domain and configured the Node Manager, you can start the Administration Server, using the Node Manager. In an enterprise Deployment, the Node Manager is used to start and stop the Administration Server and all the Managed Servers in the domain.

To start the Administration Server using the Node Manager:

1. Start the WebLogic Scripting Tool (WLST):

```
cd ORACLE_COMMON_HOME/common/bin
./wlst.sh
```

2. Connect to Node Manager using the Node Manager credentials:

```
wls:/offline>nmConnect('nodemanager_username','nodemanager_password',
            'ADMINVHN','5556','domain_name',
            'ASERVER_HOME','PLAIN')
```

Note:

This user name and password are used only to authenticate connections between Node Manager and clients. They are independent of the server administrator ID and password and are stored in the `nm_password.properties` file located in the following directory:

```
ASERVER_HOME/config/nodemanager
```

3. Start the Administration Server:

```
nmStart('AdminServer')
```

Note:

When you start the Administration Server, it attempts to connect to Oracle Web Services Manager for WebServices policies. It is expected that, since the WSM-PM Managed Servers are not yet started, the following message appears in the Administration Server log:

```
<Warning><oracle.wsm.resources.policymanager>
<WSM-02141><Unable to connect to the policy access service due to Oracle WSM
policy manager host server being down.>
```

4. Exit WLST:

   ```
   exit()
   ```

20.12.2 Validating the Administration Server

Before proceeding with the configuration steps, validate that the Administration Server has started successfully by making sure you have access to the Oracle WebLogic Server Administration Console and Oracle Enterprise Manager Fusion Middleware Control, which both are installed and configured on the Administration Servers.

To navigate to Fusion Middleware Control, enter the following URL, and log in with the Oracle WebLogic Server administrator credentials:

```
ADMINVHN:7001/em
```

To navigate to the Oracle WebLogic Server Administration Console, enter the following URL, and log in with the same administration credentials:

```
ADMINVHN:7001/console
```

20.12.3 Disabling the Derby Database

Before you create the Managed Server directory and start the Managed Servers, disable the embedded Derby database, which is a file-based database, packaged with Oracle WebLogic Server. The Derby database is used primarily for development environments. As a result, you must disable it when you are configuring a production-ready enterprise deployment environment; otherwise, the Derby database process will start automatically when you start the Managed Servers.

To disable the Derby database:

1. Navigate to the following directory in the Oracle home.

   ```
   WL_HOME/common/derby/lib
   ```

2. Rename the Derber library jar file:

   ```
   mv derby.jar disable_derby.jar
   ```

3. Complete steps 1 through 2 on each `ORACLE_HOME` for *MFTHOST1* and *MFTHOST2* if they use separate shared file systems.

20.12.4 Creating a Separate Domain Directory for Managed Servers on MFTHOST1

When you initially create the domain for enterprise deployment, the domain directory resides on a shared disk. This default domain directory will be used to run the Administration Server. You can now create a copy of the domain on the local storage for both MFTHOST1 and MFTHOST2. The domain directory on the local (or private) storage will be used to run the Managed Servers.

Placing the MSERVER_HOME on local storage is recommended to eliminate the potential contention and overhead cause by servers writing logs to shared storage. It is also faster to load classes and jars need from the domain directory, so any tmp or cache data that Managed Servers use from the domain directory is processed quicker.

As described in Preparing the File System for an Enterprise Deployment, the path to the Administration Server domain home is represented by the ASERVER_HOME variable, and the path to the Managed Server domain home is represented by the MSERVER_HOME variable.

To create the Managed Server domain directory:

1. Log in to MFTHOST1 and run the `pack` command to create a template as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./pack.sh -managed=true
             -domain=ASERVER_HOME
             -template=complete_path/mftdomaintemplate.jar
             -template_name=soa_domain_template
   ```

   In this example:

   - Replace *ASERVER_HOME* with the actual path to the domain directory you created on the shared storage device.
   - Replace *complete_path* with the complete path to the location where you want to create the domain template jar file. You will need to reference this location when you copy or unpack the domain template jar file.
   - `mftdomaintemplate` is a sample name for the jar file you are creating, which will contain the domain configuration files.
   - `mft_domain_template` is the name assigned to the domain template file.

2. Make a note of the location of the template jar file you created with the pack command.

   You must specify a full path for the template jar file as part of the `-template` argument to the pack command:

   ```
   ORACLE_COMMON_HOME/common/bin/
   ```

   Tip:

   For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

3. If you haven't already, create the recommended directory structure for the Managed Server domain on the MFTHOST1 local storage device.

   Use the examples in File System and Directory Variables Used in This Guide as a guide.

4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

   ```
   cd ORACLE_COMMON_HOME/common/bin

   ./unpack.sh -domain=MSERVER_HOME \
               -overwrite_domain=true \
               -template=complete_path/mftdomaintemplate.jar \
               -log_priority=DEBUG \
               -log=/tmp/unpack.log \
               -app_dir=APPLICATION_HOME \
   ```

Note:

The `-overwrite_domain` option in the unpack command allows unpacking a managed server template into an existing domain and existing applications directories. For any file that is overwritten, a backup copy of the original is created. If any modifications had been applied to the start scripts and ear files in the managed server domain directory, they must be restored after this unpack operation.

Additionally, to customize server startup parameters that apply to all servers in a domain, you can create a file called setUserOverrides.sh and configure it to, for example, add custom libraries to the WebLogic Server classpath, specify additional java command line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to remote servers when using the pack and unpack commands.

In this example:

- Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.
- Replace *complete_path* with the complete path to the location where you created or copied the template jar file.
- `mftdomaintemplate.jar` is the name of the template jar file you created when you ran the pack command to pack up the domain on the shared storage device.

Tip:

For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created Managed Server directory and verify that the domain configuration files were copied to the correct location on the MFTHOST1 local storage device.

20.12.5 Starting and Validating the WLS_MFT1 Managed Server on MFTHOST1

After you have configured Node Manager and created the Managed Server domain directory, you can use Oracle Enterprise Manager Fusion Middleware Control to start the WLS_MFT1 Managed Server on MFTHOST1.

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

   ```
   http://ADMINVHN:7001/em
   ```

   In this example:

   - Replace *ADMINVHN* with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Downloads for an Enterprise Deployment.

- Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that was displayed at the end of the Configuration Wizard session when you created the domain.

  Tip:

  For more information about managing Oracle Fusion Middleware using Oracle Enterprise Manager Fusion Middleware, see Getting Started Using Oracle Enterprise Manager Fusion Middleware Control in *Oracle Fusion Middleware Administering Oracle Fusion Middleware*.

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. Select the **Servers** pane to view the Managed Servers in the domain.

4. Select only the **WLS_MFT1** Managed Server, and then click **Control** > **Start** on the tool bar.

5. To verify that the Managed Server is working correctly, open your browser and enter the following URLs:

   ```
   MFTHOST1:7500/wsm-pm/
   MFTHOST1:7500/mftconsole/
   ```

   Note:

   To validate the server URLs, disable (set to blank) the front-end host until you have completed the configuration for Oracle Traffic Director. If you do not disable the front-end host, all requests fail because they are redirected to the front-end address.

   Enter the domain admin user name and password when prompted.

20.13 Propagating the Domain and Starting the Servers on MFTHOST2

After you start and validate the Administration Server and WLS_MFT1 Managed Server on *MFTHOST1*, you can then perform the following tasks on *MFTHOST2*.

Unpacking the Domain Configuration on MFTHOST2

Starting the Node Manager on MFTHOST2

Starting and Validating the WLS_MFT2 Managed Server on MFTHOST2

20.13.1 Unpacking the Domain Configuration on MFTHOST2

Now that you have the Administration Server and the first WLS_WSM1 Managed Server running on *MFTHOST1*, you can configure the domain on *MFTHOST2*.

1. Log in to *MFTHOST2*.

2. If you haven't already, create the recommended directory structure for the Managed Server domain on the MFTHOST2 storage device.

Use the examples in File System and Directory Variables Used in This Guide as a guide.

3. Make sure the `mftedgdomaintemplate.jar` accessible to *MFTHOST2*.

   For example, if you are using a separate shared storage volume or partition for *MFTHOST2*, then copy the template to the volume or partition mounted to *MFTHOST2*.

4. Run the `unpack` command to unpack the template in the domain directory onto the local storage, as follows:

```
cd ORACLE_COMMON_HOME/common/bin

./unpack.sh -domain=MSERVER_HOME
            -overwrite_domain=true
            -template=/full_path/mftedgdomaintemplate.jar
            -log_priority=DEBUG
            -log=/tmp/unpack.log
            -app_dir=APPLICATION_HOME
```

   In this example:

   - Replace *MSERVER_HOME* with the complete path to the domain home to be created on the local storage disk. This is the location where the copy of the domain will be unpacked.
   - Replace *full_path* with the complete path and file name of the domain template jar file that you created when you ran the pack command to pack up the domain on the shared storage device.
   - Replace *APPLICATION_HOME* with the complete path to the Application directory for the domain on shared storage. For more information, see File System and Directory Variables Used in This Guide.

     Tip:

     For more information about the pack and unpack commands, see Overview of the Pack and Unpack Commands in *Oracle Fusion Middleware Creating Templates and Domains Using the Pack and Unpack Commands*.

5. Change directory to the newly created MSERVER_HOME directory and verify that the domain configuration files were copied to the correct location on the *MFTHOST2* local storage device.

20.13.2 Starting the Node Manager on MFTHOST2

After you manually set up the Node Manager to use a per host Node Manager configuration, you can start the Node Manager using the following commands on MFTHOST2:

1. Change directory to the Node Manager home directory:

```
cd NM_HOME
```

2. Run the following command to start the Node Manager and send the output of the command to an output file, rather than to the current terminal shell:

```
nohup ./startNodeManager.sh > nodemanager.out 2>&1 &
```

20.13.3 Starting and Validating the WLS_MFT2 Managed Server on MFTHOST2

Use the procedure that is explained in Starting and Validating the WLS_MFT1 Managed Server on MFTHOST1 to start and validate the WLS_MFT2 Managed Server on MFTHOST2.

20.14 Modifying the Upload and Stage Directories to an Absolute Path

After configuring the domain and unpacking it to the Managed Server domain directories on all the hosts, verify and update the upload and stage directories for Managed Servers in the new clusters.

This step is necessary to avoid potential issues when performing remote deployments and for deployments that require the stage mode.

To update these directory paths for all the Managed Servers in the Managed Server domain home directory:

1. Log in to the Oracle WebLogic Server Administration Console.
2. In the left navigation tree, expand **Domain**, and then **Environment**.
3. Click **Lock & Edit**.
4. Navigate to and edit the appropriate objects for your cluster type.
   a. For Static Clusters, navigate to Servers and click on the name of the Managed Server to be edited.
5. For each new Managed Server or Server Template to be edited:
   a. Click the **Configuration** tab, and then click the **Deployment** tab.
   b. Verify that the **Staging Directory Name** is set to the following:

      ```
      MSERVER_HOME/servers/server_or_template_name/stage
      ```

      Replace *MSERVER_HOME* with the directory path for the *MSERVER_HOME* directory; If using static clusters, update with the correct name of the Managed Server you are editing.
   c. Update the **Upload Directory Name** to the following value:

      ```
      ASERVER_HOME/servers/AdminServer/upload
      ```

      Replace *ASERVER_HOME* with the directory path for the ASERVER_HOME directory.
   d. Click **Save**.
   e. Return to the Summary of Servers or Summary of Server Templates screen as applicable.
6. When you have modified all of the appropriate objects, click **Activate Changes**.
7. Restart all Managed Servers effected by these change.

20.15 Configuring and Enabling the SSH-FTP Service for Managed File Transfer

The Oracle Managed File Transfer enterprise deployment topology is based on the Secure File Transfer Protocol (SFTP) for file transfer. SFTP is a separate protocol, packaged with SSH and designed to work like FTP, but over a secure connection.

SFTP allows you to limit the number of ports used for file transfer connections. It is preferable to FTP because of its underlying security features and ability to use a standard SSH connection.

20.15.1 Configuring the SFTP Ports

Before you can use the Secure File Transfer Protocol (SFTP) for Oracle Managed File Transfer, you must configure the SFTP Ports.

1. Connect to the Managed File Transfer console, using the domain admin user name and password:

   ```
   mft.example.com:80/mftconsole
   ```

2. Select the **Administration** tab.
3. In the left navigation pane, expand **Embedded Servers**.
4. Click **Ports**.
5. Enter `7022` as the **Configured Port** for the Managed File Transfer servers.
6. Click **Save**.
7. Click **Restart** to restart the service.

20.15.2 Generating the Required SSH Keys

To enable SFTP, you must generate SSH keys. This procedure needs to be done only once on one of the Managed Servers, because Managed File Transfer shares the same SFTP key for all the servers in the cluster.

Without a valid private key, SSH-FTP server will fail to start. To comply with security best practices, you should always use a password-protected private key. The password you use must match the one specified in the Managed File Transfer Console. To locate the password in the Console, select **Keystores > SSH Keystores > Private Key Password**.

1. a. Run the `ssh-keygen` command to generate a key.

   For example:

   ```
   ssh-keygen \-t rsa \-b 2048
   ```

   `ssh-keygen` is a standard Unix/Linux command. Refer to your Operating System documentation for more information.

   Make a note of the location of the generated key. You will need this information later.

2. Import the key into the Managed File Transfer keystore:

   a. Make sure the Managed File Transfer Managed Servers are up and running.

   b. Change directory to the following location:

   ```
   ORACLE_COMMON_HOME/common/bin
   ```

   c. Start the WebLogic Server Scripting Tool (WLST):

   ```
   ./wlst.sh
   ```

   d. Connect to the first Managed Server, using the following command syntax:

   ```
   connect('admin_user','admin_password','server_url')
   ```

   For example:

   ```
   connect('weblogic','mypassword','t3://MFTHOST1:7500')
   ```

   e. Run the following WLST command to import the key:

   ```
   importCSFKey('SSH', 'PRIVATE', 'alias', 'pvt_key_file_path')
   ```

   Replace *alias* with the a name you can use to identify the Managed Server.

   Replace *pvt_key_file_path* with the name and directory location of the key you generated it earlier in this procedure.

   For more information, see importCSFKey in *Oracle Fusion Middleware WLST Command Reference for SOA Suite*.

3. After you successfully import the SSH key, enable SSH-FTP and select the private key alias:

   a. Connect to the Managed File Transfer console at the following URL, using the domain administration user and password:

   ```
   mft.mycompany.com:80/mftconsole
   ```

   b. In the **SSH Keystore** field, enter the keystore password you created earlier in this procedure.

   c. Save the changes you just made.

   d. Select the **Administration** tab, and in the navigation tree, expand **Embedded Servers**.

   e. On the SSH-FTP tab, select **Enabled**.

f. Select the private key alias you created earlier in this procedure from the **Host Key Alias** drop-down menu.

g. Save your changes.

h. Click **Start** to start the SSH-FTP service.

4. Use any standard SFTP client application to verify that you can use SFTP to access the Managed File Transfer servers.

20.15.3 Additional SFTP Configuration Steps for Managed File Transfer

There are several additional configuration steps that you should perform when you are using SFTP with Managed File Transfer.

1. Connect to the Managed File Transfer console at the following URL:

   ```
   mft.example.com:80/mftconsole
   ```

2. Select **Administration**, and then in the navigation tree, select **Server Properties**.

3. Update the High Availability Properties:

   a. Update the payload and callout directories so they point to a shared storage location that can be accessed by the different servers in the cluster.

      For example:

      ORACLE_RUNTIME/mftedg_domain/MFT_Cluster/storage

      ORACLE_RUNTIME/mftedg_domain/MFT_Cluster/callouts

   b. Set the **Control Directory** to a shared location.

      For example:

      ORACLE_RUNTIME/mftedg_domain/MFT_Cluster/control_dir

      The **Control Directory** is the directory path that the Managed File Transfer File and FTP adapters use to handle high availability use cases. This field is required if the MFT is running in HA environment. You must set it to a shared location if multiple Oracle WebLogic Server instances run in a cluster.

   c. If the Control Directory is not provided, then you must verify the values of the **Inbound Datasource** and **Outbound Datasource** fields.

      The default (and valid) value for **Inbound Datasource** is `jdbc/MFTLocalTxDataSource`.

      The default (and valid) value for **Outbound Datasource** is `jdbc/MFTDataSource`.

   d. Save the changes you made so far.

   e. In the Navigation tree, expand **Advanced Delivery Properties** .

      The Advanced Delivery Properties capture the Internal Address and External Address (IP addresses) and the FTP, FTPS, and SFTP ports that the load balancer uses.

Use these settings when Oracle Managed File Transfer sends a payload as an FTP or SFTP reference. If the values are set, they are used to construct the FTP reference (FTP/SFTP host address and ports).

If Managed File Transfer is running behind internal and external proxies, then the Internal and External IP addresses are required.

- **Internal Address**: Leave this field blank, unless you are using an internal load balancer for SFTP. The default enterprise deployment uses an external load balancer, but not an internal load balancer.
- **External Address**: Enter the address that will be used as the entry point for your SFT requests through the external load balancer.

  For example, enter `sftp.example.com` as the address and `7022` as SFTP port.

  `sftp.mycompany.com`

f. Save the changes you made and exit the console.

4. Restart the WLS_MFT Managed servers.
5. Use any standard SFTP client application to verify that you can use SFTP to access the Managed File Transfer servers.

20.16 Configuring Oracle Traffic Director for Managed File Transfer

Oracle Traffic Director can be used as an alternative to Oracle HTTP Server on the Web tier. Like Oracle HTTP Server, it can route HTTP requests from the front-end load balancer to the application-tier WebLogic Managed Servers. However, only Oracle Traffic Director provides TCP load balancing and failover. As a result, Oracle Traffic Director is required by Oracle Managed File Transfer, which requires TCP for the routing of secure FTP requests.

For complete instructions on configuring Oracle Traffic Director, see Configuring Oracle Traffic Director for an Enterprise Deployment.

20.17 Creating a New LDAP Authenticator and Provisioning Users for Managed File Transfer

When you configure an Oracle Fusion Middleware domain, the domain is configured by default to use the WebLogic Server authentication provider (DefaultAuthenticator). However, for an enterprise deployment, Oracle recommends that you use a dedicated, centralized LDAP-compliant authentication provider.

This procedure is required for each new Oracle Fusion Middleware domain. For an Oracle Managed File Transfer domain, you can perform this task as follows:

1. Review Creating a New LDAP Authenticator and Provisioning Enterprise Deployment Users and Group to understand the required concepts and to create the new LDAP Authenticator.
2. When you provision the users and groups, use the following user and group names for Managed File Transfer administration authentication:

   Administrative user: `weblogic_mft`

   Administrative group: `MFT Administrators`

3. Assign product-specific administration role to the group by logging in to Oracle Enterprise Manager Fusion Middleware Control.

   For more information, see Configuring Roles for Administration of an Enterprise Deployment.

20.18 Enabling Automatic Service Migration and JDBC Persistent Stores for Managed File Transfer

To ensure that your software is configured for high availability, configure the Oracle Managed File Transfer Managed Servers for automatic service migration.

For more information on enabling server migration, see Configuring Automatic Service Migration in an Enterprise Deployment.

For additional high availability, you can also configure your transaction logs store and JMS store in a database. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

21

Extending the Domain with Oracle Real-Time Integration Business Insight

You can extend your domain to include Oracle Real-Time Integration Business Insight, an application designed for business users. The application enables users to model, collect, and monitor business-level metrics using web-based dashboards, and reports.

This chapter includes the following sections:

Configuring the Web Tier for the Extended Domain
Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

Validating the Access to Oracle Insight Through the Hardware Load Balancer
Verify that Oracle Insight URLs are successfully routing requests from the hardware load balancer to the Oracle HTTP Server instances to the Oracle Insight software in the middle tier.

Backing Up the Oracle Insight Configuration
As a best practice, Oracle recommends you to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation done until the point at which you decide to create the backup is successful. A quick backup is used for the express purpose of immediate restoration if problems are encountered in later steps.

21.1 Variables Used When Configuring Business Insight

As you perform the tasks in this chapter, refer the directory variables that are listed in this section.

The values for several directory variables are defined in File System and Directory Variables Used in This Guide.

- ORACLE_HOME
- ASERVER_HOME
- MSERVER_HOME
- OHS_DOMAIN_HOME

In addition, refer the virtual IP (VIP) addresses that are defined in Physical and Virtual IP Addresses Required by the Enterprise Topology:

- ADMINVHN

The actions that are described in this chapter are performed on the following host computers:

- SOAHOST1
- SOAHOST2
- WEBHOST1
- WEBHOST2
- BAMHOST1
- BAMHOST2

21.2 Prerequisites for Adding Oracle Insight to the Domain

Before you add Oracle Insight to your existing Oracle SOA Suite domain, you must ensure that the prerequisites are met.

About Installation Requirements for Adding Oracle Insight to the Domain

About Database Schema Requirements for Oracle Insight

Backing Up the Existing Installation

21.2.1 About Installation Requirements for Adding Oracle Insight to the Domain

This chapter assumes that you are configuring Oracle Real-Time Integration Business Insight in a domain that is already running Oracle SOA Suite (SOA, OSB, BPM, and BAM), as shown in Figure 3-2.

In the default Oracle SOA Suite and Oracle Real-Time Integration Business Insight topology, you target Oracle Insight to BAM Managed Servers. Insights agents are also deployed in SOA and OSB servers to collect business metrics. For more information, see Configuring the Oracle Real-Time Integration Business Insight Domain in *Oracle Fusion Middleware Installing and Configuring Oracle SOA Suite and Business Process Management*. It is assumed that Service Migration, JDBC stores, WebLogic Proxy Plugin, SOA servers, and the other recommended configuration best practices have been applied to the existing BAM servers.

For more information, see the following sections:

- Configuring Automatic Service Migration in an Enterprise Deployment.
- Using JDBC Persistent Stores for TLOGs and JMS in an Enterprise Deployment
- Configuring the WebLogic Proxy Plug-In

In the default topology, there is no need to install Oracle Insight because Oracle Insight is included in the Oracle SOA Suite and Oracle Business Process Management distribution. Oracle Insight installed into the Oracle home directories when you install Oracle SOA Suite as illustrated in Understanding the SOA Enterprise Deployment Topology .

21.2.2 About Database Schema Requirements for Oracle Insight

The schemas required for Oracle Insight are created in the database when you run the Repository Creation Utility (RCU) to create the required Oracle BAM/SOA schemas. As a result, there is no need to run RCU specifically for Oracle Insight.

21.2.3 Backing Up the Existing Installation

If you have not yet backed up the existing Fusion Middleware Home and domain, back it up now.

To back up the existing Fusion Middleware Home and domain, see Performing Backups and Recoveries for an Enterprise Deployment.

21.3 Roadmap for Adding Oracle Insight to the Domain

Before extending a SOA domain for Oracle Real-Time Integration Business Insight, familiarize yourself with the high-level steps that you must perform to extend the domain.

Step	Description	More Information
Run the Configuration Wizard to Extend the Domain in the Administration Server domain home	Extend the SOA domain to contain Oracle Insight components	Extending the SOA Domain to Include Oracle Real-Time Integration Business Insight
Propagate the Domain Configuration to the Managed Server domain directories	Oracle Insight requires some updates to the WebLogic Server start scripts. Propagate these changes using the Pack and Unpack commands.	Propagating the Extended Domain to the Domain Directories and Machines
Add the SOA Administrator role to the Oracle Insight Administration Group	This step allows you to use one set of credentials to access the various product-specific management utilities.	Adding the Enterprise Deployment Administration User to the Oracle Insight Administration Group
Start the involved Servers	Oracle Insight servers extend an existing domain. As a result, the Administration Server and the respective Node Managers are already running in SOAHOST1 and SOAHOST2.	Starting the Managed Servers
Validate the WLS_BAM Managed Servers	Verify that the server status is reported as Running in the Admin Console and access URLs to verify status of servers.	Starting and Validating the WLS_BAM2 Managed Server
Update the Oracle HTTP Server for the WLS_BAM Managed Servers	To enable Oracle HTTP Server to route to Oracle Insight, add the required directives to the Oracle HTTP Server configuration files, and then set the WebLogicCluster parameter to the list of nodes in the cluster.	Configuring Oracle HTTP Server for the WLS_BAM Managed Servers
Configure the WebLogic Server Proxy Plugin	Enable the WebLogic Server Proxy Plugin for Oracle Insight	Configuring the WebLogic Proxy Plug-In
Validate the Access Through Oracle HTTP Server	Verify that the server status is reported as Running.	Validating the Access to Oracle Insight Through the Hardware Load Balancer

21.4 Extending the SOA Domain to Include Oracle Real-Time Integration Business Insight

This section provides instructions for extending the existing enterprise deployment SOA domain with the Oracle Real-Time Integration Business Insight.

Extending the domain involves the following tasks:

Starting the Configuration Wizard

Navigating the Configuration Wizard Screens for Oracle Insight

21.4.1 Starting the Configuration Wizard

> **Note:**
>
> If you have added any customizations directly to the start scripts in the domain, those customizations are overwritten by the configuration wizard. To customize server startup parameters that apply to all servers in a domain, create a file called `setUserOverrides.sh` and configure it. For example, add custom libraries to the WebLogic Server classpath, specify additional JAVA command-line options for running the servers, or specify additional environment variables. Any customizations you add to this file are preserved during domain upgrade operations, and are carried over to the remote servers when you use the `Pack` and `Unpack` commands.

To begin domain configuration:

1. Shut down the Administration Server to prevent any configuration locks, saves, or activations from occurring during the configuration of the domain.

2. Navigate to the following directory and start the WebLogic Server Configuration Wizard.

   ```
   ORACLE_HOME/oracle_common/common/bin
   ./config.sh
   ```

21.4.2 Navigating the Configuration Wizard Screens for Oracle Insight

Follow the instructions in these sections to create and configure the domain for the topology, with static clusters.

Extending the Domain with Static Cluster

21.4.2.1 Extending the Domain with Static Cluster

In this step, you extend the domain created in Extending the Domain with Business Activity Monitoring to contain Oracle Real-Time Integration Business Insight components.

Domain creation and configuration include the following tasks:

- Task 1, Selecting the Domain Type and Domain Home Location
- Task 2, Selecting the Configuration Template
- Task 3, Providing the GridLink Oracle RAC Database Connection Details
- Task 4, Testing the JDBC Connections
- Task 5, Selecting Advanced Configuration
- Task 6, Reviewing Your Configuration Specifications and Configuring the Domain
- Task 7, Starting the Administration Server

Task 1 Selecting the Domain Type and Domain Home Location

On the Configuration Type screen, select **Update an existing domain**.

In the **Domain Location** field, select the value of the ASERVER_HOME variable, which represents the complete path to the Administration Server domain home that you have created in Creating the Initial Infrastructure Domain for an Enterprise Deployment.

For more information about the directory location variables, see File System and Directory Variables Used in This Guide.

> **Tip:**
> For more information about the other options on this screen, see Configuration Type in *Oracle Fusion Middleware Creating WebLogic Domains Using the Configuration Wizard*.

Task 2 Selecting the Configuration Template

On the Templates screen, make sure that **Update Domain Using Product Templates** is selected, then select the following templates:

- **Insight SOA Agent - 12.2.1.2.0[soa]**
- **Insight Service Bus Agent - 12.2.1.2.0[osb]**
- **Insight - 12.2.1.2.0[soa]**

Click **Next**.

Task 3 Providing the GridLink Oracle RAC Database Connection Details

On the GridLink Oracle RAC Component Schema screen, provide the information required to connect to the RAC database and component schemas, as shown in the following table.

Element	Description and Recommended Value
SCAN, Host Name, and Port	Select the **SCAN** check box. In the **Host Name** field, enter the Single Client Access Name (SCAN) Address for the Oracle RAC database. In the **Port** field, enter the SCAN listening port for the database (for example, `1521`)
ONS Host and Port	In the **ONS Host** field, enter the SCAN address for the Oracle RAC database. In the **Port** field, enter the ONS Remote port (typically, `6200`).
Enable Fan	Verify that the **Enable Fan** check box is selected, so the database can receive and process FAN events.

Task 4 Testing the JDBC Connections

On the Test JDBC Data Sources screen, confirm that all connections were successful.

The connections are tested automatically. The Status column displays the results. If all connections are not successful, click **Previous** to return to the previous screen and correct your entries.

Click **Next** when all the connections are successful.

Task 5 Selecting Advanced Configuration
Click **Next** to continue.

Task 6 Reviewing Your Configuration Specifications and Configuring the Domain
The Configuration Summary screen contains the detailed configuration information for the domain you are about to create. Review the details of each item on the screen and verify that the information is correct.

Click **Update**.

In the Extending Domain screen, click **Done**.

Task 7 Starting the Administration Server
Start the Administration Server to ensure the changes you have made to the domain have been applied.

21.5 Propagating the Extended Domain to the Domain Directories and Machines

After you have extended the domain with the Insight components, and you have restarted the Administration Server on SOAHOST1, you must then propagate the domain changes to the domain directories and machines.

The following table summarizes the steps required to propagate the changes to all the domain directories and machines.

Task	Description	More Information
Pack up the Extended Domain on SOAHOST1	Use the Pack command to create a new template jar file that contains the new BAM Servers configuration. When you pack up the domain, create a template jar file called `insightdomaintemplateExtBAM.jar`.	Packing Up the Extended Domain on SOAHOST1
Unpack the Domain in the Managed Servers Directory on SOAHOST1*	Unpack the template jar file in the Managed Servers directory on SOAHOST1 local storage.	Unpacking the Domain in the Managed Servers Domain Directory on SOAHOST1
Unpack the Domain on SOAHOST2	Unpack the template jar file in the Managed Servers directory on the SOAHOST2 local storage.	Unpacking the Domain on SOAHOST2

*If you are configuring Oracle BAM on separate hosts, then you would unpack the domain on all nodes: BAMHOST1, BAMHOST2, SOAHOST1 and SOAHOST2.

21.6 Adding the Enterprise Deployment Administration User to the Oracle Insight Administration Group

Before you validate the Oracle Insight configuration on the Managed Server, add the `InsightAdmin` administration role to the enterprise deployment administration group (`SOA Administrators`).

To perform this task, refer to Configuring Roles for Administration of Oracle SOA Suite Products.

21.7 Starting the Managed Servers

After extending the domain, restarting the Administration Server, and propagating the domain to the other hosts, start the configured SOA, OSB, and BAM servers.

1. To display the Fusion Middleware Control login screen, type the following URL into a browser.

   ```
   http://ADMINVHN:7001/em
   ```

2. Log in to Fusion Middleware Control using the Administration Server credentials.

3. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.

4. Select the SOA, OSB, and BAM Managed Servers and click **Start Up** on the Oracle WebLogic Server toolbar

   > **Note:**
   >
   > BAM Servers depend on the policy access service to be functional, so the WSM-PM Managed Servers in the domain must be up and running and reachable before you start the BAM servers.

5. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_BAM1 Managed Server is up and running.

6. To verify that the Insight software is configured properly:

   a. Enter the following URLs in the browser:

      ```
      http://SOAHOST1:9001/insight
      http://SOAHOST2:9001/insight
      ```

      If you have configured Oracle Insight on separate host computers, enter BAMHOST1 in the URL, rather than SOAHOST1.

      The login screen for Insights appears.

   b. Enter the `weblogic_soa` login credentials.

      The Insight screen appears.

7. For the verification of the Insight agents in the SOA and OSB servers, use the following URLs:

   ```
   http://SOAHOST1:8001/insight-soa/
   http://SOAHOST1:8011/insight-osb/resources/
   ```

```
http://SOAHOST2:8001/insight-soa/
http://SOAHOST2:8011/insight-osb/resources/
```

Note:

If a front-end address was configured for the BAM cluster, ensure that you have defined the required URLs in the Web Tier (OHS or OTD) for a successful Insight verification.

21.8 Validating the WLS_BAM1 and WLS_BAM2 Managed Servers

If you have not already started the managed servers, follow the instructions in this section to start and validate WLS_BAM1 and WLS_BAM2.

1. Log in to Fusion Middleware Control using the Administration Server credentials.
2. In the Target Navigation pane, expand the domain to view the Managed Servers in the domain.
3. Select WLS_BAM1 and WLS_BAM2 Managed Servers and click **Start Up** on the Oracle WebLogic Server tool bar.
4. When the startup operation is complete, navigate to the Domain home page and verify that the WLS_BAM1 and WLS_BAM2 Managed Servers are up and running. Access the equivalent URLs for WLS_BAM1 and WLS_BAM2:

   ```
   http://SOAHOST1:9001/bam/composer
   http://SOAHOST2:9001/bam/composer
   ```

   The login screen for BAM composer appears. Enter the login credentials. The BAM composer menu is displayed.
5. Enter the following URLs:

   ```
   http://SOAHOST1:9001/inspection.wsil/
   http://SOAHOST2:9001/inspection.wsil/
   ```

   A list of links is displayed.
6. Enter the following URLs in the browser:

   ```
   http://SOAHOST1:9001/bam/cqservice/
   http://SOAHOST2:9001/bam/cqservice/
   ```

   The message "BAM Service is running" appears in the browser.

Note:

If you configured Oracle BAM on separate host computers, enter *BAMHOSTN* in the URL, rather than *SOAHOSTN*.

21.9 Configuring the Web Tier for the Extended Domain

Configure the Web server instances on the Web tier so that the instances route requests for both public and internal URLs to the proper clusters in the extended domain.

For additional steps in preparation for possible scale-out scenarios, see Updating Cross Component Wiring Information.

Configuring Oracle Traffic Director for the Extended Domain

Configuring Oracle HTTP Server for the WLS_BAM Managed Servers
Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier routes Oracle Insight requests correctly to the Oracle Insight software on the Oracle SOA, OSB, and BAM clusters.

Configuring the WebLogic Proxy Plug-In
Set the WebLogic Plug-In Enabled parameter for the BAM cluster.

21.9.1 Configuring Oracle Traffic Director for the Extended Domain

If you have configured Oracle Traffic Director for this domain, you might be required to add additional origin server pools, virtual servers, or routes to the Oracle Traffic Director configuration. To understand the Oracle Traffic Director requirements for each Oracle Fusion Middleware product and for instructions on adding origin server pools, virtual servers, and routes, see Defining Oracle Traffic Director Virtual Servers for an Enterprise Deployment.

21.9.2 Configuring Oracle HTTP Server for the WLS_BAM Managed Servers

Make the following modifications to the Oracle HTTP Server instance configuration files to ensure that the Oracle HTTP Server instances in the Web tier routes Oracle Insight requests correctly to the Oracle Insight software on the Oracle SOA, OSB, and BAM clusters.

These instructions assume that you are configuring Oracle BAM/Insight on the same host as Oracle SOA Suite. If you are using separate hosts for Oracle BAM/Insight, you must modify the WebLogicCluster parameter in the Oracle HTTP Server configuration files to reference the BAMHOST computers, rather than the SOAHOST computers.

To enable Oracle HTTP Server to route requests to Oracle Insight:

1. Log in to WEBHOST1 and change directory to the configuration directory for the first Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/moduleconf
   ```

2. Add the following directives inside the `<VirtualHost>` tag in the `soa_vh.conf` file:

   Note:

   If BAM is configured on separate hosts, replace SOAHOST1 and SOAHOST2 with BAMHOST1 and BAMHOST2, respectively.

```
<Location /insight >
  WLSRequest ON
  WebLogicCluster SOAHOST1:9001,SOAHOST2:9001
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>

<Location /insight-soa>
  WLSRequest ON
  WebLogicCluster SOAHOST1:8001,SOAHOST2:8001
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>
```

3. Add the following directive inside the `<VirtualHost>` tag in the `osb_vh.conf` file:

   ```
   <Location /insight-osb/resources/>
     WLSRequest ON
     WebLogicCluster SOAHOST1:8011,SOAHOST2:8011
     WLProxySSL ON
     WLProxySSLPassThrough ON
   </Location>
   ```

4. Change directory to the following location so you can update the configuration file for the second Oracle HTTP Server instance (ohs1):

   ```
   cd OHS_DOMAIN_HOME/config/fmwconfig/components/OHS/ohs2/moduleconf
   ```

5. Open the `soa_vh.conf` file and add the directives to the `<VirualHost>` tag.

6. Open the `osb_vh.conf` file and add the directives to the `<VirualHost>` tag.

7. Restart the Oracle HTTP Server instances on WEBHOST1 and WEBHOST2.

21.9.3 Configuring the WebLogic Proxy Plug-In

Set the WebLogic Plug-In Enabled parameter for the BAM cluster.

1. Log in to the Oracle WebLogic Server Administration Console.

2. In the Domain Structure pane, expand the **Environment** node.

3. Click on **Clusters**.

4. Select the BAM_Cluster cluster to which you want to proxy requests from Oracle HTTP Server.

   The **Configuration: General** tab is displayed.

5. Scroll down to the Advanced section and expand it.

6. Click **Lock and Edit.**

7. Set the WebLogic Plug-In Enabled to **yes**.

8. Click **Save and Activate the changes**. Restart the BAM servers for the changes to be effective.

21.10 Validating the Access to Oracle Insight Through the Hardware Load Balancer

Verify that Oracle Insight URLs are successfully routing requests from the hardware load balancer to the Oracle HTTP Server instances to the Oracle Insight software in the middle tier.

You can also use this procedure test the failover of the Managed Servers where Oracle Insight is configured.

To verify the URLs:

1. While the WLS_BAM1 Managed Server is running, stop the WLS_BAM2 Managed Server by using the Oracle WebLogic Server Administration Console.
2. Access the following URL and verify the HTTP response as indicated in Starting WLS_BAM1 Managed Server:

   ```
   https://soa.example.com/insight
   ```

3. Log in with your credentials to access the Insight UI.
4. Access the following URLs to ensure that the Insight agent is running as expected:

   ```
   https://soa.example.com/insight-soa
   https://soa.example.com/insight-osb/resources/application.wadl
   ```

   After you log in with your credentials, the following message appears:

   ```
   "Welcome to procmon war"
   ```

5. Start WLS_BAM2 from the Oracle WebLogic Server Administration Console.
6. Stop WLS_BAM1 from the Oracle WebLogic Server Administration Console.
7. Access the /insight URL again, and verify that the HTTP response is still valid, as indicated in Starting and Validating the WLS_BAM2 Managed Server.

21.11 Backing Up the Oracle Insight Configuration

As a best practice, Oracle recommends you to create a backup after successfully extending a domain or at another logical point. Create a backup after verifying that the installation done until the point at which you decide to create the backup is successful. A quick backup is used for the express purpose of immediate restoration if problems are encountered in later steps.

The backup destination is the local disk. You can discard this backup when the enterprise deployment setup is complete. After the enterprise deployment setup is complete, you can initiate the regular deployment-specific Backup and Recovery process.

For information about backing up your configuration, see Performing Backups and Recoveries in the SOA Enterprise Deployments.

Part IV

Common Configuration and Management Procedures for an Enterprise Deployment

There are certain configuration and management procedures that are recommended for a typical enterprise deployment.

The following topics contain configuration and management procedures that are required for a typical enterprise deployment.

22

Common Configuration and Management Tasks for an Enterprise Deployment

The configuration and management tasks that may need to be performed on the enterprise deployment environment are detailed in this section.

22.1 Configuration and Management Tasks for All Enterprise Deployments

These are some of the typical configuration and management tasks you are likely need to perform on an Oracle Fusion Middleware enterprise deployment.

Configuring Roles for Administration of an Enterprise Deployment
In order to manage each product effectively within a single enterprise deployment domain, you must understand which products require specific administration roles or groups, and how to add a product-specific administration role to the Enterprise Deployment Administration group.

Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment
For an enterprise deployment, Oracle recommends using JDBC persistent stores for transactions logs (TLOGs) and JMS.

About JDBC Persistent Stores for Web Services
By default, Web services use the WebLogic Server default persistent store for persistence. This store provides high-performance storage solution for web services.

Performing Backups and Recoveries for an Enterprise Deployment
It is recommended that you follow the below mentioned guidelines for making sure you back up the necessary directories and configuration data for an Oracle SOA Suite enterprise deployment.

22.1.1 Verifying Manual Failover of the Administration Server

In case a host computer fails, you can fail over the Administration Server to another host. The steps to verify the failover and failback of the Administration Server from SOAHOST1 and SOAHOST2 are detailed in the following sections.

Assumptions:

- The Administration Server is configured to listen on ADMINVHN, and not on localhost or ANY address.

  For more information about the ADMINVHN virtual IP address, see Reserving the Required IP Addresses for an Enterprise Deployment.

- These procedures assume that the Administration Server domain home (ASERVER_HOME) has been mounted on both host computers. This ensures that the Administration Server domain configuration files and the persistent stores are saved on the shared storage device.

- The Administration Server is failed over from SOAHOST1 to SOAHOST2, and the two nodes have these IPs:

  – SOAHOST1: 100.200.140.165

  – SOAHOST2: 100.200.140.205

  – ADMINVHN : 100.200.140.206. This is the Virtual IP where the Administration Server is running, assigned to a virtual sub-interface (e.g. eth0:1), to be available on SOAHOST1 or SOAHOST2.

- Oracle WebLogic Server and Oracle Fusion Middleware components have been installed in SOAHOST2 as described in the specific configuration chapters in this guide.

  Specifically, both host computers use the exact same path to reference the binary files in the Oracle home.

The following topics provide details on how to perform a test of the Administration Server failover procedure.

Failing Over the Administration Server When Using a Per Host Node Manager
The following procedure shows how to fail over the Administration Server to a different node (SOAHOST2). Note that even after failover, the Administration Server will still use the same Oracle WebLogic Server *machine* (which is a logical machine, not a physical machine).

Validating Access to the Administration Server on SOAHOST2 Through Oracle HTTP Server
After you perform a manual failover of the Administration Server, it is important to verify that you can access the Administration Server, using the standard administration URLs.

Failing the Administration Server Back to SOAHOST1 When Using a Per Host Node Manager
After you have tested a manual Administration Server failover, and after you have validated that you can access the administration URLs after the failover, you can then migrate the Administration Server back to its original host.

22.1.1.1 Failing Over the Administration Server When Using a Per Host Node Manager

The following procedure shows how to fail over the Administration Server to a different node (SOAHOST2). Note that even after failover, the Administration Server will still use the same Oracle WebLogic Server *machine* (which is a logical machine, not a physical machine).

This procedure assumes you've configured a per host Node Manager for the enterprise topology, as described in Creating a Per Host Node Manager Configuration. For more information, see About the Node Manager Configuration in a Typical Enterprise Deployment.

To fail over the Administration Server to a different host:

1. Stop the Administration Server on SOAHOST1.

2. Stop the Node Manager on SOAHOST1.

   If you started the per host Node Manager using the procedure earlier in this guide, then return to the terminal window where you started the Node Manager and press Ctrl/C to stop the process.

3. Migrate the ADMINVHN virtual IP address to the second host:

   a. Run the following command as root on SOAHOST1 (where X:Y is the current interface used by ADMINVHN):

      ```
      /sbin/ifconfig ethX:Y down
      ```

   b. Run the following command as root on SOAHOST2:

      ```
      /sbin/ifconfig <interface:index> ADMINVHN netmask <netmask>
      ```

      For example:

      ```
      /sbin/ifconfig eth0:1 100.200.140.206 netmask 255.255.255.0
      ```

Note:

Ensure that the netmask and interface to be used to match the available network configuration in SOAHOST2.

4. Update the routing tables using `arping`, for example:

   ```
   /sbin/arping -q -U -c 3 -I eth0 100.200.140.206
   ```

5. From SOAHOST1, change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

6. Edit the `nodemanager.domains` file and remove the reference to *ASERVER_HOME*.

   The resulting entry in the SOAHOST1 `nodemanager.domains` file should appear as follows:

   ```
   soaedg_domain=MSERVER_HOME;
   ```

7. From SOAHOST2, change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

8. Edit the `nodemanager.domains` file and add the reference the *MSERVER_HOME*.

   The resulting entry in the SOAHOST2 `nodemanager.domains` file should appear as follows:

   ```
   soaedg_domain=MSERVER_HOME;ASERVER_HOME
   ```

9. Start the Node Manager on SOAHOST1 and restart the Node Manager on SOAHOST2.

10. Start the Administration Server on SOAHOST2.

11. Test that you can access the Administration Server on SOAHOST2 as follows:

    a. Ensure that you can access the Oracle WebLogic Server Administration Console using the following URL:

       ```
       http://ADMINVHN:7001/console
       ```

    b. Check that you can access and verify the status of components in Fusion Middleware Control using the following URL:

       ```
       http://ADMINVHN:7001/em
       ```

22.1.1.2 Validating Access to the Administration Server on SOAHOST2 Through Oracle HTTP Server

After you perform a manual failover of the Administration Server, it is important to verify that you can access the Administration Server, using the standard administration URLs.

From the load balancer, access the following URLs to ensure that you can access the Administration Server when it is running on SOAHOST2:

- http://admin.example.com/console

This URL should display the WebLogic Server Administration console.

- http://admin.example.com/em

  This URL should display Oracle Enterprise Manager Fusion Middleware Control.

22.1.1.3 Failing the Administration Server Back to SOAHOST1 When Using a Per Host Node Manager

After you have tested a manual Administration Server failover, and after you have validated that you can access the administration URLs after the failover, you can then migrate the Administration Server back to its original host.

This procedure assumes you've configured a per host Node Manager for the enterprise topology, as described in Creating a Per Host Node Manager Configuration. For more information, see About the Node Manager Configuration in a Typical Enterprise Deployment.

1. Stop the Administration Server on SOAHOST2.

2. Stop the Node Manager on SOAHOST2.

3. Run the following command as root on SOAHOST2.

   ```
   /sbin/ifconfig ethZ:N down
   ```

4. Run the following command as root on SOAHOST1:

   ```
   /sbin/ifconfig ethX:Y 100.200.140.206 netmask 255.255.255.0
   ```

   Note:

   Ensure that the netmask and interface to be used match the available network configuration in SOAHOST1

5. Update the routing tables using `arping` on SOAHOST1:

   ```
   /sbin/arping -q -U -c 3 -I ethX 100.200.140.206
   ```

6. From SOAHOST2, change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

7. Edit the `nodemanager.domains` file and remove the reference to *MSERVER_HOME*.

8. From SOAHOST1, change directory to the Node Manager home directory:

   ```
   cd NM_HOME
   ```

9. Edit the `nodemanager.domains` file and add the reference the *MSERVER_HOME*.

10. Start the Node Manager on SOAHOST2 and restart the Node Manager on SOAHOST1.

11. Start the Administration Server on SOAHOST1.

12. Test that you can access the Oracle WebLogic Server Administration Console using the following URL:

    ```
    http://ADMINVHN:7001/console
    ```

13. Check that you can access and verify the status of components in the Oracle Enterprise Manager using the following URL:

    ```
    http://ADMINVHN:7001/em
    ```

22.1.2 Enabling SSL Communication Between the Middle Tier and the Hardware Load Balancer

It is important to understand how to enable SSL communication between the middle tier and the hardware load balancer.

> **Note:**
>
> The following steps are applicable if the hardware load balancer is configured with SSL and the front end address of the system has been secured accordingly.

22.1.2.1 When is SSL Communication Between the Middle Tier and Load Balancer Necessary?

In an enterprise deployment, there are scenarios where the software running on the middle tier must access the front-end SSL address of the hardware load balancer. In these scenarios, an appropriate SSL handshake must take place between the load balancer and the invoking servers. This handshake is not possible unless the Administration Server and Managed Servers on the middle tier are started using the appropriate SSL configuration.

For example, in an Oracle SOA Suite enterprise deployment, the following examples apply:

- Oracle Business Process Management requires access to the front-end load balancer URL when it attempts to retrieve role information through specific Web services.

- Oracle Service Bus performs invocations to endpoints exposed in the Load Balancer SSL virtual servers.

- Oracle SOA Suite composite applications and services often generate callbacks that need to perform invocations using the SSL address exposed in the load balancer.
- Finally, when you test a SOA Web services endpoint in Oracle Enterprise Manager Fusion Middleware Control, the Fusion Middleware Control software running on the Administration Server must access the load balancer front-end to validate the endpoint.

22.1.2.2 Generating Self-Signed Certificates Using the utils.CertGen Utility

This section describes the procedure for creating self-signed certificates on SOAHOST1. Create these certificates using the network name or alias of the host.

The directory where keystores and trust keystores are maintained must be on shared storage that is accessible from all nodes so that when the servers fail over (manually or with server migration), the appropriate certificates can be accessed from the failover node. Oracle recommends using central or shared stores for the certificates used for different purposes (for example, SSL set up for HTTP invocations).For more information, see the information on filesystem specifications for the KEYSTORE_HOME location provided in About the Recommended Directory Structure for an Enterprise Deployment.

For information on using trust CA certificates instead, see the information about configuring identity and trust in *Oracle Fusion Middleware Administering Security for Oracle WebLogic Server*.

About Passwords

The passwords used in this guide are used only as examples. Use secure passwords in a production environment. For example, use passwords that include both uppercase and lowercase characters as well as numbers.

To create self-signed certificates:

1. Temporarily, set up your environment by running the following command: *WL_HOME*/server/bin/setWLSEnv.sh script:

   ```
   . WL_HOME/server/bin/setWLSEnv.sh
   ```

   Note that there is a dot(.) and space( ) preceding the script name in order to source the shell script in the current shell.

2. Verify that the CLASSPATH environment variable is set:

   ```
   echo $CLASSPATH
   ```

3. Verify that the shared configuration directory folder has been created and mounted to shared storage correctly as described in Preparing the File System for an Enterprise Deployment.

   For example, use the following command to verify that the shared configuration directory is available to each host:

   ```
   df -h | grep -B1 SHARED_CONFIG_DIR
   ```

   Replace *SHARED_CONFIG_DIR* with the actual path to your shared configuration directory.

   You can also do a listing of the directory to ensure it is available to the host:

```
ls -al SHARED_CONFIG_DIR
```

4. Create the keystore home folder structure if does not already exist.

   For example:

   ```
   cd SHARED_CONFIG_DIR
   mkdir keystores
   chown oracle:oinstall keystores
   chmod 750 keystores
   export KEYSTORE_HOME=SHARED_CONFIG_DIR/keystores
   ```

5. Change directory to the keystore home:

   ```
   cd KEYSTORE_HOME
   ```

6. Run the `utils.CertGen` tool to create the certificates for both the physical host names and the virtual host names used by servers on each host.

   > **Note:**
   >
   > You must run the `utils.CertGen` tool to create certificates for all the other hosts that run the Manager Servers.

   Syntax:

   ```
   java utils.CertGen key_passphrase cert_file_name key_file_name [export |
   domestic] [hostname]
   ```

   Examples:

   ```
   java utils.CertGen password ADMINVHN.example.com_cert \
         ADMINVHN.example.com_key domestic ADMINVHN.example.com

   java utils.CertGen password SOAHOST1.example.com_cert \
         SOAHOST1.example.com_key domestic SOAHOST1.example.com
   ```

7. Repeat the above step for all the remaining hosts used in the system (for example, SOAHOST2).

22.1.2.3 Creating an Identity Keystore Using the utils.ImportPrivateKey Utility

This section describes how to create an Identity Keystore on SOAHOST1.example.com.

In previous sections you have created certificates and keys that reside on shared storage. In this section, the certificate and private keys created earlier for all hosts and ADMINVHN are imported into a new Identity Store. Make sure that you use a different alias for each of the certificate/key pair imported.

> **Note:**
>
> The Identity Store is created (if none exists) when you import a certificate and the corresponding key into the Identity Store using the `utils.ImportPrivateKey` utility.

1. Import the certificate and private key for ADMINVHN and SOAHOST1 into the Identity Store. Make sure that you use a different alias for each of the certificate/key pair imported.

   Syntax:

   ```
   java utils.ImportPrivateKey
         -certfile cert_file
         -keyfile private_key_file
         [-keyfilepass private_key_password]
         -keystore keystore
         -storepass storepass
         [-storetype storetype]
         -alias alias
         [-keypass keypass]
   ```

   > **Note:**
   >
   > Default keystore_type is `jks`.

   Examples:

   ```
   java utils.ImportPrivateKey\
        -certfile KEYSTORE_HOME/ADMINVHN.example.com_cert.pem\
        -keyfile KEYSTORE_HOME/ADMINVHN.example.com_key.pem\
        -keyfilepass password\
        -keystore appIdentityKeyStore.jks\
        -storepass password\
        -alias ADMINVHN\
        -keypass password

   java utils.ImportPrivateKey\
        -certfile KEYSTORE_HOME/SOAHOST1.example.com_cert.pem\
        -keyfile KEYSTORE_HOME/SOAHOST1.example.com_key.pem\
        -keyfilepass password\
        -keystore appIdentityKeyStore.jks\
        -storepass password\
        -alias SOAHOST1\
        -keypass password
   ```

2. Repeat the java importPrivateKey command for each of the remaining host-specific certificate and key pairs. (for example, for SOAHOST2, SOAHOST1, SOAHOST2).

   > **Note:** Make sure to use a unique alias for each certificate/key pair imported.

22.1.2.4 Creating a Trust Keystore Using the Keytool Utility

To create the Trust Keystore on SOAHOST1.example.com.

1. Copy the standard java keystore to create the new trust keystore since it already contains most of the root CA certificates needed.

   Oracle does not recommend modifying the standard Java trust key store directly. Copy the standard Java keystore CA certificates located under the WL_HOME/ server/lib directory to the same directory as the certificates. For example:

   ```
   cp WL_HOME/server/lib/cacerts KEYSTORE_HOME/appTrustKeyStore.jks
   ```

2. Use the keytool utility to change the default password.

   The default password for the standard Java keystore is `changeit`. Oracle recommends always changing the default password, as follows:

   ```
   keytool -storepasswd -new NewPassword -keystore TrustKeyStore -storepass
   Original_Password
   ```

   For example:

   ```
   keytool -storepasswd -new password -keystore appTrustKeyStore.jks -storepass
   changeit
   ```

3. Import the CA certificate into the `appTrustKeyStore` using the keytool utility.

   The CA certificate `CertGenCA.der` is used to sign all certificates generated by the `utils.CertGen` tool and is located at *WL_HOME*`/server/lib` directory.

   Use the following syntax to import the certificate:

   ```
   keytool -import -v -noprompt -trustcacerts -alias AliasName -file CAFileLocation -
   keystore KeyStoreLocation -storepass KeyStore_Password
   ```

   For example:

   ```
   keytool -import -v -noprompt -trustcacerts -alias clientCACert -file WL_HOME/
   server/lib/CertGenCA.der -keystore appTrustKeyStore.jks -storepass password
   ```

22.1.2.5 Importing the Load Balancer Certificate into the Truststore

For the SSL handshake to behave properly, the load balancer's certificate must be added to the WLS servers truststore. For adding it, follow these steps:

1. Access the site on SSL with a browser (this adds the server's certificate to the browser's repository).

2. From the browser's certificate management tool, export the certificate to a file that is on the server's file system (with a file name such as `wcp.example.com.crt`).

3. Use the keytool to import the load balancer's certificate into the truststore:

   For example:

   ```
   keytool -import -file /oracle/certificates/soa1.cz.oracle.com -v -keystore
   appTrustKeyStore.jks -alias aliasSOA
   keytool -import -file /oracle/certificates/soa1-osb.cz.oracle.com.crt -v -
   keystore appTrustKeyStore.jks -alias aliasOSB
   ```

Note:

The need to add the load balancer certificate to the WLS server truststore applies only to self-signed certificates. If the load balancer certificate is issued by a third-party CA, you have to import the public certificates of the root and the intermediate CAs into the truststore.

22.1.2.6 Adding the Updated Trust Store to the Oracle WebLogic Server Start Scripts

The `setDomainEnv.sh` script is provided by Oracle WebLogic Server and is used to start the Administration Server and the Managed Servers in the domain. To ensure that each server accesses the updated trust store, edit the `setDomainEnv.sh` script in each of the domain home directories in the enterprise deployment.

1. Log in to SOAHOST1 and open the following file with a text editor:

   ASERVER_HOME/bin/setDomainEnv.sh

2. Replace reference to the existing `DemoTrustStore` entry with the following entry:

   Note:

   All the values for EXTRA_JAVA_PROPERTIES must be on one line in the file, followed by the export command on a new line.

```
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES} -Dsoa.archives.dir=$
{SOA_ORACLE_HOME}/soa -Djavax.net.ssl.trustStore=/u01/oracle/certs/
appTrustKeyStore.jks"
export EXTRA_JAVA_PROPERTIES
```

3. Make the same change to the `setDomainEnv.sh` file in the *MSERVER_HOME*/bin directory SOAHOST2, SOAHOST1, and SOAHOST2.

   Note:

   The `setDomainEnv.sh` file cannot be copied between *ASERVER_HOME*/bin and *MSERVER_HOME*/bin as there are differences in the files for these two domain home locations. *MSERVER_HOME*/bin/setDomainEnv.sh can be copied between hosts.

   WebLogic Server will automatically overwrite the `setDomainEnv.sh` file after each domain extension. Some patches may also replace this file. Verify your customizations to `setDomainEnv.sh` after each of these types of maintenance operations.

22.1.2.7 Configuring WebLogic Servers to Use the Custom Keystores

Configure the WebLogic Servers to use the custom keystores using the Oracle WebLogic Server Administration Console. Complete this procedure for the Administration Server and the Managed Servers that require access to the front end LBR on SSL.

To configure the identity and trust keystores:

1. Log in to the Administration Console, and click **Lock & Edit**.

2. In the left pane, expand **Environment**, and select **Servers**.

3. Click the name of the server for which you want to configure the identity and trust keystores.

4. Select **Configuration**, and then **Keystores**.

5. In the **Keystores** field, click **Change**, and select **Custom Identity and Custom Trust** method for storing and managing private keys/digital certificate pairs and trusted CA certificates, and click Save.

6. In the Identity section, define attributes for the identity keystore.

   - Custom Identity Keystore: Enter the fully qualified path to the identity keystore:

     ```
     KEYSTORE_HOME/appIdentityKeyStore.jks
     ```

   - Custom Identity Keystore Type: Leave this field blank, it defaults to JKS.

   - Custom Identity Keystore Passphrase: Enter the password Keystore_Password you provided in Creating an Identity Keystore Using the utils.ImportPrivateKey Utility

     This attribute may be optional or required depending on the type of keystore. All keystores require the passphrase in order to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. WebLogic Server reads only from the keystore, so whether or not you define this property depends on the requirements of the keystore.

7. In the Trust section, define properties for the trust keystore:

   - Custom Trust Keystore: Enter the fully qualified path to the trust keystore:

     ```
     KEYSTORE_HOME/appTrustKeyStore.jks
     ```

   - Custom Trust Keystore Type: Leave this field blank, it defaults to JKS.

   - Custom Trust Keystore Passphrase: The password you provided as the New_Password value in `Creating a Trust Keystore Using the Keytool Utility`.

     As mentioned in the previous step, this attribute may be optional or required depending on the type of keystore.

8. Click **Save**.

9. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

10. Click **Lock & Edit**.

11. Select **Configuration**, then **SSL**.

12. In the Private Key Alias field, enter the alias you used for the host name the managed server listens on.

    In the Private Key Passphrase and the Confirm Private Key Passphrase fields, enter the password for the keystore that you created in Creating an Identity Keystore Using the utils.ImportPrivateKey Utility

13. Click **Save**.

14. Click **Activate Changes** in the Administration Console's Change Center to make the changes take effect.

15. Restart the Administration Server.

16. Restart the Managed Servers where the keystore has been updated.

> **Note:**
>
> The fact that servers can be restarted using the Administration Console/Node Manager is a good verification that the communication between Node Manager, Administration Server, and the managed servers is correct.

22.1.2.8 Testing Composites Using SSL Endpoints

Once SSL has been enabled and a composite has been deployed, composite endpoints can be verified on SSL from Oracle Enterprise Manager FMW Control. To test a SSL endpoint follow this steps:

1. Enter the following URL into a browser to display the Fusion Middleware Control login screen:

   ```
   http://ADMINVHN:7001/em
   ```

   In this example:

   - Replace ADMINVHN with the host name assigned to the ADMINVHN Virtual IP address in Identifying and Obtaining Software Distributions for an Enterprise Deployment.

   - Port 7001 is the typical port used for the Administration Server console and Fusion Middleware Control. However, you should use the actual URL that was displayed at the end of the Configuration Wizard session when you created the domain.

2. Log in to Fusion Middleware Control using the administrative user credentials.

3. From the tree on the left, expand SOA, then click **soa-infra**(WLS_SOA1).

4. Click on the Deployed Composites navigation tab link.

5. Click **Composite** to open the composite's dashboard view.

6. Click on the Test Button and selected one of the services from drop-down.

7. In the WSDL or WADL address, replace the base URL (`http://SOAHOST1:8001`) with the front-end loadbalancer base url (`https://soa.example.com:443`) keeping the URI resource path and query string intact.

8. Click **Parse WSDL or WADL**.

9. Verify that the Endpoint URL shown is SSL, and no errors are returned.

10. Test the composite. If the response is as expected for the web service, the SSL communication between the Administration Server and the Load Balancer has been configured properly.

22.1.3 Configuring Roles for Administration of an Enterprise Deployment

In order to manage each product effectively within a single enterprise deployment domain, you must understand which products require specific administration roles or groups, and how to add a product-specific administration role to the Enterprise Deployment Administration group.

Each enterprise deployment consists of multiple products. Some of the products have specific administration users, roles, or groups that are used to control administration access to each product.

However, for an enterprise deployment, which consists of multiple products, you can use a single LDAP-based authorization provider and a single administration user and group to control access to all aspects of the deployment. For more information about creating the authorization provider and provisioning the enterprise deployment administration user and group, see Creating a New LDAP Authenticator and Provisioning a New Enterprise Deployment Administrator User and Group.

To be sure that you can manage each product effectively within the single enterprise deployment domain, you must understand which products require specific administration roles or groups, you must know how to add any specific product administration roles to the single, common enterprise deployment administration group, and if necessary, you must know how to add the enterprise deployment administration user to any required product-specific administration groups.

For more information, see the following topics.

Summary of Products with Specific Administration Roles

Summary of Oracle SOA Suite Products with Specific Administration Groups

Adding a Product-Specific Administration Role to the Enterprise Deployment Administration Group

Adding the Enterprise Deployment Administration User to a Product-Specific Administration Group

22.1.3.1 Summary of Products with Specific Administration Roles

The following table lists the Fusion Middleware products that have specific administration roles, which must be added to the enterprise deployment administration group (`SOA Administrators`), which you defined in the LDAP Authorization Provider for the enterprise deployment.

Use the information in the following table and the instructions in Adding a Product-Specific Administration Role to the Enterprise Deployment Administration Group to add the required administration roles to the enterprise deployment Administration group.

Product	Application Stripe	Administration Role to be Assigned
Oracle Web Services Manager	wsm-pm	policy.updater
SOA Infrastructure	soa-infra	SOAAdmin
Oracle Service Bus	Service_Bus_Console	MiddlewareAdministrator

Product	Application Stripe	Administration Role to be Assigned
Enterprise Scheduler Service	ESSAPP	ESSAdmin
Oracle B2B	b2bui	B2BAdmin
Oracle MFT	mftapp	MFTAdmin
Oracle MFT	mftes	MFTESAdmin
Oracle Insight	insight	InsightAdmin

22.1.3.2 Summary of Oracle SOA Suite Products with Specific Administration Groups

Table 22-1 lists the Oracle SOA Suite products that need to use specific administration groups.

For each of these components, the common enterprise deployment Administration user must be added to the product-specific Administration group; otherwise, you won't be able to manage the product resources using the enterprise manager administration user that you created in Provisioning an Enterprise Deployment Administration User and Group.

Use the information in Table 22-1 and the instructions in Adding the Enterprise Deployment Administration User to a Product-Specific Administration Group to add the required administration roles to the enterprise deployment Administration group.

Table 22-1 Oracle SOA Suite Products with a Product-Specific Administration Group

Product	Product-Specific Administration Group
Oracle Business Activity Monitoring	BAMAdministrators
Oracle Business Process Management	Administrators
Oracle Service Bus Integration	IntegrationAdministrators
MFT	OracleSystemGroup

Note: MFT requires a specific user, namely OracleSystemUser, to be added to the central LDAP. This user must belong to the OracleSystemGroup group. You must add both the user name and the user group to the central LDAP to ensure that MFT job creation and deletion work properly.

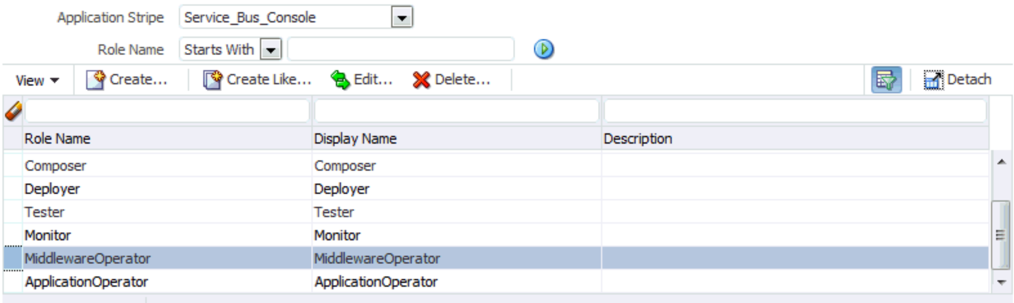
22.1.3.3 Adding a Product-Specific Administration Role to the Enterprise Deployment Administration Group

For products that require a product-specific administration role, use the following procedure to add the role to the enterprise deployment administration group:

1. Use the Oracle WebLogic Server Administration Server credentials to log in to Oracle Enterprise Manager Fusion Middleware Control.

These are the credentials you created when you initially configured the domain and created the Oracle WebLogic Server Administration user name (typically, `weblogic_soa`) and password.

2. From the **WebLogic Domain** menu, select **Security**, and then **Application Roles**.
3. For each production-specific application role, select the corresponding application stripe from the **Application Stripe** drop-down menu.
4. Click Search Application Roles icon to display all the application roles available in the domain.
5. Select the row for the application role you are adding to the enterprise deployment administration group.

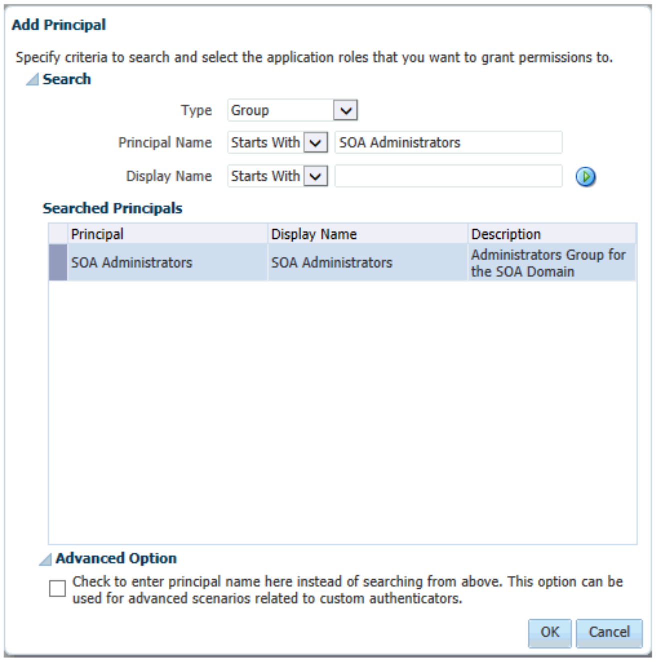


Application Stripe: Service_Bus_Console

Role Name: Starts With

Role Name	Display Name	Description
Composer	Composer	
Deployer	Deployer	
Tester	Tester	
Monitor	Monitor	
MiddlewareOperator	MiddlewareOperator	
ApplicationOperator	ApplicationOperator	

6. Click the Edit icon to edit the role.
7. Click the Add icon on the Edit Application Role page.
8. In the Add Principal dialog box, select **Group** from the **Type** drop-down menu.
9. Search for the enterprise deployment administrators group, by entering the group name (for example, `SOA Administrators`) in the **Principal Name Starts With** field and clicking the right arrow to start the search.
10. Select the administrator group in the search results and click **OK**.



Add Principal

Specify criteria to search and select the application roles that you want to grant permissions to.

Search

Type: Group

Principal Name: Starts With — SOA Administrators

Display Name: Starts With

Searched Principals

Principal	Display Name	Description
SOA Administrators	SOA Administrators	Administrators Group for the SOA Domain

Advanced Option

□ Check to enter principal name here instead of searching from above. This option can be used for advanced scenarios related to custom authenticators.

11. Click **OK** on the Edit Application Role page.

22.1.3.4 Adding the Enterprise Deployment Administration User to a Product-Specific Administration Group

For products with a product-specific administration group, use the following procedure to add the enterprise deployment administration user (`weblogic_soa` to the group. This will allow you to manage the product using the enterprise manager administrator user:

1. Create an ldif file called `product_admin_group.ldif` similar to the one shown below:

   ```
   dn: cn=product-specific_group_name, cn=groups, dc=us, dc=oracle, dc=com
   displayname: product-specific_group_display_name
   objectclass: top
   objectclass: groupOfUniqueNames
   objectclass: orclGroup
   uniquemember: cn=weblogic_soa,cn=users,dc=us,dc=oracle,dc=com
   cn: product-specific_group_name
   description: Administrators Group for the Domain
   ```

   In this example, replace *product-specific_group_name* with the actual name of the product administrator group, as shown in Table 22-1.

   Replace *product-specific_group_display_name* with the display name for the group that appears in the management console for the LDAP server and in the Oracle WebLogic Server Administration Console.

2. Use the ldif file to add the enterprise deployment administrator user to the product-specific administration group.

   For Oracle Unified Directory:

   ```
   OUD_INSTANCE_HOME/bin/ldapmodify -a
                                    -D "cn=Administrator"
   ```

```
                                   -X
                                   -p 1389
                                   -f product_admin_group.ldif
```

For Oracle Internet Directory:

```
OID_ORACLE_HOME/bin/ldapadd -h oid.example.com
                            -p 389
                            -D cn="orcladmin"
                            -w <password>
                            -c
                            -v
                            -f product_admin_group.ldif
```

22.1.4 Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment

For an enterprise deployment, Oracle recommends using JDBC persistent stores for transactions logs (TLOGs) and JMS.

This section analyzes the benefits of using JDBC versus File persistent stores and explains the procedure for configuring the persistent stores in a supported database. If you want to use File persistent stores instead of JDBC stores, the procedure for configuring them is also explained in this section.

JDBC Persistent Stores vs. File Persistent Stores

Using JDBC Persistent Stores for TLOGs and JMS in an Enterprise Deployment

Using File Persistent Stores for TLOGs and JMS in an Enterprise Deployment

22.1.4.1 JDBC Persistent Stores vs. File Persistent Stores

Oracle Fusion Middleware supports both database-based and file-based persistent stores for Oracle WebLogic Server transaction logs (TLOGs) and JMS. Before deciding on a persistent store strategy for your environment, consider the advantages and disadvantages of each approach.

Note:

Regardless of which storage method you choose, Oracle recommends that for transaction integrity and consistency, you use the same type of store for both JMS and TLOGs.

About JDBC Persistent Stores for JMS and TLOGs

Products and Components that use JMS Persistence Stores and TLOGs

Performance Impact of TLOGs and JMS Persistent Stores

22.1.4.1.1 About JDBC Persistent Stores for JMS and TLOGs

When you store your TLOGs and JMS data in an Oracle database, you can take advantage of the replication and high availability features of the database. For example, you can use OracleData Guard to simplify cross-site synchronization. This is especially important if you are deploying Oracle Fusion Middleware in a disaster recovery configuration.

Storing TLOGs and JMS data in a database also means you don’t have to identity a specific shared storage location for this data. Note, however, that shared storage is still required for other aspects of an enterprise deployment. For example, it is necessary for Administration Server configuration (to support Administration Server failover), for deployment plans, and for adapter artifacts, such as the File/FTP Adapter control and processed files.

If you are storing TLOGs and JMS stores on a shared storage device, then you can protect this data by using the appropriate replication and backup strategy to guarantee zero data loss, and you will potentially realize better system performance. However, the file system protection will always be inferior to the protection provided by an Oracle Database.

For more information about the potential performance impact of using a database-based TLOGs and JMS store, see Performance Impact of TLOGs and JMS Persistent Stores.

22.1.4.1.2 Products and Components that use JMS Persistence Stores and TLOGs

Determining which installed FMW products and components utilize persistent stores can be done through the WebLogic Server Console in the Domain Structure navigation under ***DomainName*** > **Services** > **Persistent Stores**. The list will indicate the name of the store, the store type (usually **FileStore**), the targeted managed server, and whether the target can be migrated to or not.

The persistent stores with migratable targets are the appropriate candidates for consideration of the use of JDBC Persistent Stores. The stores listed that pertain to MDS are outside the scope of this chapter and should not be considered.

22.1.4.1.3 Performance Impact of TLOGs and JMS Persistent Stores

One of the primary considerations when selecting a storage method for Transaction Logs and JMS persistent stores is the potential impact on performance. This topic provides some guidelines and details to help you determine the performance impact of using JDBC persistent stores for TLOGs and JMS.

Performance Impact of Transaction Logs Versus JMS Stores

For transaction logs, the impact of using a JDBC store is relatively small, because the logs are very transient in nature. Typically, the effect is minimal when compared to other database operations in the system.

On the other hand, JMS database stores can have a higher impact on performance if the application is JMS intensive. For example, the impact of switching from a file-based to database-based persistent store is very low when you are using the SOA Fusion Order Demo (a sample application used to test Oracle SOA Suite environments), because the JMS database operations are masked by many other SOA database invocations that are much heavier.

Factors that Affect Performance

There are multiple factors that can affect the performance of a system when it is using JMS DB stores for custom destinations. The main ones are:

- Custom destinations involved and their type
- Payloads being persisted
- Concurrency on the SOA system (producers on consumers for the destinations)

Depending on the effect of each one of the above, different settings can be configured in the following areas to improve performance:

- Type of data types used for the JMS table (using raw vs. lobs)

- Segment definition for the JMS table (partitions at index and table level)

Impact of JMS Topics

If your system uses Topics intensively, then as concurrency increases, the performance degradation with an Oracle RAC database will increase more than for Queues. In tests conducted by Oracle with JMS, the average performance degradation for different payload sizes and different concurrency was less than 30% for Queues. For topics, the impact was more than 40%. Consider the importance of these destinations from the recovery perspective when deciding whether to use database stores.

Impact of Data Type and Payload Size

When choosing to use the RAW or SecureFiles LOB data type for the payloads, consider the size of the payload being persisted. For example, when payload sizes range between 100b and 20k, then the amount of database time required by SecureFiles LOB is slightly higher than for the RAW data type.

More specifically, when the payload size reach around 4k, then SecureFiles tend to require more database time. This is because 4k is where writes move out-of-row. At around 20k payload size, SecureFiles data starts being more efficient. When payload sizes increase to more than 20k, then the database time becomes worse for payloads set to the RAW data type.

One additional advantage for SecureFiles is that the database time incurred stabilizes with payload increases starting at 500k. In other words, at that point it is not relevant (for SecureFiles) whether the data is storing 500k, 1MB or 2MB payloads, because the write is asynchronized, and the contention is the same in all cases.

The effect of concurrency (producers and consumers) on the queue’s throughput is similar for both RAW and SecureFiles until the payload sizes reach 50K. For small payloads, the effect on varying concurrency is practically the same, with slightly better scalability for RAW. Scalability is better for SecureFiles when the payloads are above 50k.

Impact of Concurrency, Worker Threads, and Database Partioning

Concurrency and worker threads defined for the persistent store can cause contention in the RAC database at the index and global cache level. Using a reverse index when enabling multiple worker threads in one single server or using multiple Oracle WebLogic Server clusters can improve things. However, if the Oracle Database partitioning option is available, then global hash partition for indexes should be used instead. This reduces the contention on the index and the global cache buffer waits, which in turn improves the response time of the application. Partitioning works well in all cases, some of which will not see significant improvements with a reverse index.

22.1.4.2 Using JDBC Persistent Stores for TLOGs and JMS in an Enterprise Deployment

This section explains the guidelines to use JDBC persistent stores for transaction logs (TLOGs) and JMS. It also explains the procedures to configure the persistent stores in a supported database.

Roadmap for Configuring a JDBC Persistent Store for TLOGs
The following topics describe how to configure a database-based persistent store for transaction logs.

Roadmap for Configuring a JDBC Persistent Store for JMS
The following topics describe how to configure a database-based persistent store for JMS.

Creating a User and Tablespace for TLOGs
Before you can create a database-based persistent store for transaction logs, you must create a user and tablespace in a supported database.

Creating a User and Tablespace for JMS
Before you can create a database-based persistent store for JMS, you must create a user and tablespace in a supported database.

Creating GridLink Data Sources for TLOGs and JMS Stores
Before you can configure database-based persistent stores for JMS and TLOGs, you must create two data sources: one for the TLOGs persistent store and one for the JMS persistent store.

Assigning the TLOGs JDBC store to the Managed Servers
After you create the tablespace and user in the database, and you have created the datasource, you can then assign the TLOGs persistence store to each of the required Managed Servers.

Creating a JDBC JMS Store
After you create the JMS persistent store user and table space in the database, and after you create the data source for the JMS persistent store, you can then use the Administration Console to create the store.

Assigning the JMS JDBC store to the JMS Servers
After you create the JMS tablespace and user in the database, create the JMS datasource, and create the JDBC store, then you can then assign the JMS persistence store to each of the required JMS Servers.

Creating the Required Tables for the JMS JDBC Store
The final step in using a JDBC persistent store for JMS is to create the required JDBC store tables. Perform this task before restarting the Managed Servers in the domain.

22.1.4.2.1 Roadmap for Configuring a JDBC Persistent Store for TLOGs

The following topics describe how to configure a database-based persistent store for transaction logs.

1. Creating a User and Tablespace for TLOGs
2. Creating GridLink Data Sources for TLOGs and JMS Stores
3. Assigning the TLOGs JDBC store to the Managed Servers

22.1.4.2.2 Roadmap for Configuring a JDBC Persistent Store for JMS

The following topics describe how to configure a database-based persistent store for JMS.

1. Creating a User and Tablespace for JMS
2. Creating GridLink Data Sources for TLOGs and JMS Stores
3. Creating a JDBC JMS Store
4. Assigning the JMS JDBC store to the JMS Servers
5. Creating the Required Tables for the JMS JDBC Store

22.1.4.2.3 Creating a User and Tablespace for TLOGs

Before you can create a database-based persistent store for transaction logs, you must create a user and tablespace in a supported database.

1. Create a tablespace called `tlogs`.

   For example, log in to SQL*Plus as the `sysdba` user and run the following command:

   ```
   SQL> create tablespace tlogs
           logging datafile 'path-to-data-file-or-+asmvolume'
           size 32m autoextend on next 32m maxsize 2048m extent management local;
   ```

2. Create a user named `TLOGS` and assign to it the `tlogs` tablespace.

   For example:

   ```
   SQL> create user TLOGS identified by password;

   SQL> grant create table to TLOGS;

   SQL> grant create session to TLOGS;

   SQL> alter user TLOGS default tablespace tlogs;

   SQL> alter user TLOGS quota unlimited on tlogs;
   ```

22.1.4.2.4 Creating a User and Tablespace for JMS

Before you can create a database-based persistent store for JMS, you must create a user and tablespace in a supported database.

1. Create a tablespace called `jms`.

   For example, log in to SQL*Plus as the `sysdba` user and run the following command:

   ```
   SQL> create tablespace jms
           logging datafile 'path-to-data-file-or-+asmvolume'
           size 32m autoextend on next 32m maxsize 2048m extent management local;
   ```

2. Create a user named `JMS` and assign to it the `jms` tablespace.

   For example:

   ```
   SQL> create user JMS identified by password;

   SQL> grant create table to JMS;

   SQL> grant create session to JMS;

   SQL> alter user JMS default tablespace jms;

   SQL> alter user JMS quota unlimited on jms;
   ```

22.1.4.2.5 Creating GridLink Data Sources for TLOGs and JMS Stores

Before you can configure database-based persistent stores for JMS and TLOGs, you must create two data sources: one for the TLOGs persistent store and one for the JMS persistent store.

For an enterprise deployment, you should use GridLink data sources for your TLOGs and JMS stores. To create a GridLink data source:

1. Log in to the Oracle WebLogic Server Administration Console.

2. If you have not already done so, in the **Change Center**, click **Lock & Edit**.

3. In the **Domain Structure** tree, expand **Services**, then select **Data Sources**.

4. On the Summary of Data Sources page, click **New** and select **GridLink Data Source**, and enter the following:

   - Enter a logical name for the data source in the **Name** field.

     For the TLOGs store, enter TLOG; for the JMS store, enter JMS.

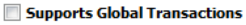
   - Enter a name for **JNDI**.

     For the TLOGs store, enter `jdbc/tlogs`; for the JMS store, enter `jdbc/jms`.

   - For the Database Driver, select **Oracle's Driver (Thin) for GridLink Connections Versions: Any**.

   - Click **Next**.

5. In the Transaction Options page, clear the **Supports Global Transactions** check box, and then click **Next**.



☐ Supports Global Transactions

6. In the GridLink Data Source Connection Properties Options screen, select **Enter individual listener information** and click **Next**.

7. Enter the following connection properties:

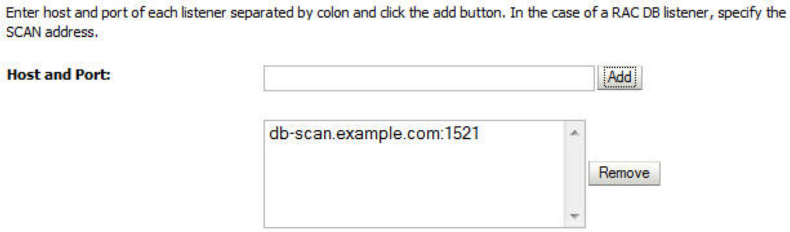
   - **Service Name**: Enter the service name of the database with lowercase characters. For a GridLink data source, you must enter the Oracle RAC service name. For example:

     ```
     soaedg.example.com
     ```

   - **Host Name and Port**: Enter the SCAN address and port for the RAC database, separated by a colon. For example:

     ```
     db-scan.example.com:1521
     ```

     Click **Add** to add the host name and port to the list box below the field.



Enter host and port of each listener separated by colon and click the add button. In the case of a RAC DB listener, specify the SCAN address.

Host and Port:

db-scan.example.com:1521

You can identify the SCAN address by querying the appropriate parameter in the database using the TCP Protocol:

```
SQL>show parameter remote_listener;

NAME                 TYPE        VALUE

------------------------------------------------

remote_listener     string      db-scan.example.com
```

Note:

For Oracle Database 11*g* Release 1 (11.1), use the virtual IP and port of each database instance listener, for example:

```
dbhost1-vip.mycompany.com (port 1521)
```

and

```
dbhost2-vip.mycompany.com (1521)
```

- **Database User Name**: Enter the following:

  For the TLOGs store, enter `TLOGS`; for the JMS persistent store, enter `JMS`.

- **Password**: Enter the password you used when you created the user in the database.

- **Confirm Password**: Enter the password again and click **Next**.

8. On the Test GridLink Database Connection page, review the connection parameters and click **Test All Listeners**.

   Here is an example of a successful connection notification:

   ```
   Connection test for
   jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=db-
   scan.example.com)
   (PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=soaedg.example.com))) succeeded.
   ```

   Click **Next**.

9. In the ONS Client Configuration page, do the following:

   - Select **FAN Enabled** to subscribe to and process Oracle FAN events.

   - Enter here also the SCAN address: ONS remote port for the RAC database and the ONS remote port as reported by the database (example below) and click **Add**:

     ```
     [orcl@db-scan1 ~]$ srvctl config nodeapps -s

     ONS exists: Local port 6100, remote port 6200, EM port 2016
     ```

   - Click **Next**.

Note:

For Oracle Database 11*g* Release 1 (11.1), use the hostname and port of each database's ONS service, for example:

```
custdbhost1.example.com (port 6200)
```

and

```
custdbhost2.example.com (6200)
```

10. On the Test ONS Client Configuration page, review the connection parameters and click **Test All ONS Nodes**.

    Here is an example of a successful connection notification:

    ```
    Connection test for db-scan.example.com:6200 succeeded.
    ```

    Click **Next**.

11. In the Select Targets page, select the cluster that will be using the persistent store, and then select **All Servers in the cluster**.

12. Click **Finish**.

13. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

14. Repeat step 4 through step 13 to create the GridLink Data Source for JMS File Stores.

22.1.4.2.6 Assigning the TLOGs JDBC store to the Managed Servers

After you create the tablespace and user in the database, and you have created the datasource, you can then assign the TLOGs persistence store to each of the required Managed Servers.

1. Login in to the Oracle WebLogic Server Administration Console.
2. In the **Change Center**, click **Lock and Edit**.
3. In the Domain Structure tree, expand **Environment**, then **Servers**.
4. Click the name of the Managed Server you want to use the TLOGs store.
5. Select the **Configuration** > **Services** tab.
6. Under **Transaction Log Store**, select **JDBC** from the **Type** menu.
7. From the **Data Source** menu, select the data source you created for the TLOGs persistence store.
8. In the **Prefix Name** field, specify a prefix name to form a unique JDBC TLOG store name for each configured JDBC TLOG store
9. Click **Save**.
10. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

22.1.4.2.7 Creating a JDBC JMS Store

After you create the JMS persistent store user and table space in the database, and after you create the data source for the JMS persistent store, you can then use the Administration Console to create the store.

1. Log in to the Oracle WebLogic Server Administration Console.
2. If you have not already done so, in the **Change Center**, click **Lock & Edit**.
3. In the **Domain Structure** tree, expand **Services**, then select **Persistent Store**.
4. Click **New**, and then click **JDBC Store**.
5. Enter a persistent store name that easily relates it to the pertaining JMS servers that will be using it.
6. Specify a unique prefix qualifying the installation and cluster and associate it with the data source you created for the JMS persistent store.
7. Target the store to the entity that will host the JTA services.

   In the case of a server using service migration, this will be the migratable target to which the JMS server belongs.
8. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

22.1.4.2.8 Assigning the JMS JDBC store to the JMS Servers

After you create the JMS tablespace and user in the database, create the JMS datasource, and create the JDBC store, then you can then assign the JMS persistence store to each of the required JMS Servers.

1. Login in to the Oracle WebLogic Server Administration Console.
2. In the **Change Center**, click **Lock and Edit**.
3. In the Domain Structure tree, expand **Services**, then **Messaging**, then **JMS Servers**.
4. Click the name of the JMS Server that you want to use the persistent store.
5. From the **Persistent Store** menu, select the JMS persistent store you created earlier.
6. Click **Save**.
7. Repeat steps 3 to 6 for each of the additional JMS Servers in the cluster.
8. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

22.1.4.2.9 Creating the Required Tables for the JMS JDBC Store

The final step in using a JDBC persistent store for JMS is to create the required JDBC store tables. Perform this task before restarting the Managed Servers in the domain.

1. Review the information in Performance Impact of TLOGs and JMS Persistent Stores, and decide which table features are appropriate for your environment..

There are three Oracle DB schema definitions provided in this release and were extracted for review in the previous step. The basic definition includes the RAW data type without any partition for indexes. The second uses the blob data type, and the third uses the blob data type and secure files.

2. Create a domain-specific well-named folder structure for the custom DDL file on shared storage. The ORACLE_RUNTIME shared volume is recommended so it is available to all servers.

   Example:

   ```
   mkdir -p ORACLE_RUNTIME/domain_name/ddl
   ```

3. Create a `jms_custom.ddl` file in new shared ddl folder based on your requirements analysis.

   For example, to implement an optimized schema definition that uses both secure files and hash partitioning, create the jms_custom.ddl file with the following content:

   ```
   CREATE TABLE $TABLE (
     id     int  not null,
     type   int  not null,
     handle int  not null,
     record blob not null,
   PRIMARY KEY (ID) USING INDEX GLOBAL PARTITION BY HASH (ID) PARTITIONS 8)
   LOB (RECORD) STORE AS SECUREFILE (ENABLE STORAGE IN ROW);
   ```

   This example can be compared to the default schema definition for JMS stores, where the RAW data type is used without any partitions for indexes.

   Note that the number of partitions should be a power of two. This will ensure that each partition will be a similar size. The recommended number of partitions will vary depending on the expected table or index growth. You should have your database administrator (DBA) analyze the growth of the tables over time and adjust the tables accordingly. For more information, see Partitioning Concepts in *Database VLDB and Partitioning Guide*.

4. Use the Administration Console to edit the existing JDBC Store you created earlier; create the table that will be used for the JMS data:

   a. Login in to the Oracle WebLogic Server Administration Console.

   b. In the **Change Center**, click **Lock and Edit**.

   c. In the Domain Structure tree, expand **Services**, then **Persistent Stores**.

   d. Click the persistent store you created earlier.

   e. Under the **Advanced** options, enter *`ORACLE_RUNTIME/domain_name/`*`ddl/jms_custom.ddl` in the **Create Table from DDL File** field.

   f. Click **Save**.

   g. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**.

5. Restart the Managed Servers.

22.1.4.3 Using File Persistent Stores for TLOGs and JMS in an Enterprise Deployment

This section explains the procedures to configure TLOGs and JMS File persistent stores in a shared folder.

Configuring TLOGs File Persistent Store in a Shared Folder

Configuring JMS File Persistent Store in a Shared Folder

22.1.4.3.1 Configuring TLOGs File Persistent Store in a Shared Folder

Oracle WebLogic Server uses the transaction logs to recover from system crashes or network failures.

Each Managed Server uses a transaction log that stores information about committed transactions that are coordinated by the server and that may not have been completed.

Oracle WebLogic Server uses this transaction log for recovery from system crashes or network failures. To leverage the migration capability of the Transaction Recovery Service for the Managed Servers within a cluster, store the transaction log in a location accessible to each Managed Server and its backup server.

> **Note:**
>
> To enable migration of the Transaction Recovery Service, specify a location on a persistent storage solution that is available to other servers in the cluster. All Managed Servers in the cluster must be able to access this directory. This directory must also exist before you restart the server.
>
> The recommended location is a dual-ported SCSI disk or on a Storage Area Network (SAN). Note that it is important to set the appropriate replication and backup mechanisms at the storage level to guarantee protection in cases of a storage failure.
>
> This information applies for file-based transaction logs. You can also configure a database-based persistent store for translation logs. For more information, see Using Persistent Stores for TLOGs and JMS in an Enterprise Deployment.

For instructions to configure a default persistence store with static clusters, see Configuring a Default Persistence Store for Transaction Recovery with a Static Cluster.

22.1.4.3.2 Configuring JMS File Persistent Store in a Shared Folder

If you have already configured and extended your domain, the JMS Persistent Files are already configured in a shared location. If you need to change any other persistent store file to the shared folder, perform the following steps:

1. Log in to the Oracle WebLogic Server Administration Console.
2. Navigate to **Domain** > **Services** > **Persistent Store** and click the name of the persistent store that you want to move to the shared folder.

   The **Configuration: General** tab is displayed
3. Change the directory to `ORACLE_RUNTIME/domain_name/soa_cluster/jms`.
4. Click **Save**.

5. Click **Activate Changes**.

22.1.5 About JDBC Persistent Stores for Web Services

By default, Web services use the WebLogic Server default persistent store for persistence. This store provides high-performance storage solution for web services.

The default web service persistence store is used by the following advanced features:

- Reliable Messaging
- Make Connection
- SecureConversation
- Message buffering

You also have the option to use a JDBC persistence store in your WebLogic Server web service, instead of the default store. For information about web service persistence, see Managing Web Service Persistence.

22.1.6 Performing Backups and Recoveries for an Enterprise Deployment

It is recommended that you follow the below mentioned guidelines for making sure you back up the necessary directories and configuration data for an Oracle SOA Suite enterprise deployment.

> **Note:**
>
> Some of the static and run-time artifacts listed in this section are hosted from Network Attached Storage (NAS). If possible, backup and recover these volumes from the NAS filer directly rather than from the application servers.

For general information about backing up and recovering Oracle Fusion Middleware products, see the following sections in *Oracle Fusion Middleware Administering Oracle Fusion Middleware*:

- Backing Up Your Environment
- Recovering Your Environment

Table 22-2 lists the static artifacts to back up in a typical Oracle SOA Suite enterprise deployment.

Table 22-2 Static Artifacts to Back Up in the Oracle SOA Suite Enterprise Deployment

Type	Host	Tier
Database Oracle home	DBHOST1 and DBHOST2	Data Tier
Oracle Fusion Middleware Oracle home	WEBHOST1 and WEBHOST2	Web Tier
Oracle Fusion Middleware Oracle home	SOAHOST1 and SOAHOST2 (or NAS Filer)	Application Tier

Table 22-2 (Cont.) Static Artifacts to Back Up in the Oracle SOA Suite Enterprise Deployment

Type	Host	Tier
Installation-related files	WEBHOST1, WEHOST2, and shared storage	N/A

Table 22-3 lists the runtime artifacts to back up in a typical Oracle SOA Suite enterprise deployment.

Table 22-3 Run-Time Artifacts to Back Up in the Oracle SOA Suite Enterprise Deployment

Type	Host	Tier
Administration Server domain home (ASERVER_HOME)	SOAHOST1 (or NAS Filer)	Application Tier
Application home (APPLICATION_HOME)	SOAHOST1 (or NAS Filer)	Application Tier
Oracle RAC databases	DBHOST1 and DBHOST2	Data Tier
Scripts and Customizations	Per host	Application Tier
Deployment Plan home (DEPLOY_PLAN_HOME)	SOAHOST1 (or NAS Filer)	Application Tier
OHS Configuration directory	WEBHOST1 and WEBHOST2	Web Tier

22.2 Configuration and Management Tasks for an Oracle SOA Suite Enterprise Deployment

These are some of the key configuration and management tasks that you will likely need to perform on an Oracle SOA Suite enterprise deployment.

Deploying Oracle SOA Suite Composite Applications to an Enterprise Deployment

Using Shared Storage for Deployment Plans and SOA Infrastructure Applications Updates

Managing Database Growth in an Oracle SOA Suite Enterprise Deployment

22.2.1 Deploying Oracle SOA Suite Composite Applications to an Enterprise Deployment

Oracle SOA Suite applications are deployed as composites, consisting of different kinds of Oracle SOA Suite components. SOA composite applications include the following:

- Service components such as Oracle Mediator for routing, BPEL processes for orchestration, BAM processes for orchestration (if Oracle BAM Suite is also installed), human tasks for workflow approvals, spring for integrating Java interfaces into SOA composite applications, and decision services for working with business rules.

- Binding components (services and references) for connecting SOA composite applications to external services, applications, and technologies.

These components are assembled into a single SOA composite application.

When you deploy an Oracle SOA Suite composite application to an Oracle SOA Suite enterprise deployment, be sure to deploy each composite to a specific server or cluster address and not to the load balancer address (`soa.example.com`).

Deploying composites to the load balancer address often requires direct connection from the deployer nodes to the external load balancer address. As a result, you will have to open additional ports in the firewalls.

For more information about Oracle SOA Suite composite applications, see the following sections in *Oracle Fusion Middleware Administering Oracle SOA Suite and Oracle Business Process Management Suite*:

- Deploying SOA Composite Applications
- Monitoring SOA Composite Applications
- Managing SOA Composite Applications

22.2.2 Using Shared Storage for Deployment Plans and SOA Infrastructure Applications Updates

When redeploying a SOA infrastructure application or resource adapter within the SOA cluster, the deployment plan along with the application bits should be accessible to all servers in the cluster.

SOA applications and resource adapters are installed using nostage deployment mode. Because the administration sever does not copy the archive files from their source location when the nostage deployment mode is selected, each server must be able to access the same deployment plan.

To ensure deployment plan location is available to all servers in the domain, use the Deployment Plan home location described in File System and Directory Variables Used in This Guide and represented by the DEPLOY_PLAN_HOME variable in the *Enterprise Deployment Workbook*.

22.2.3 Managing Database Growth in an Oracle SOA Suite Enterprise Deployment

When the amount of data in the Oracle SOA Suite database grows very large, maintaining the database can become difficult, especially in an Oracle SOA Suite enterprise deployment where potentially many composite applications are deployed.

For more information, review the following sections in *Oracle Fusion Middleware Administering Oracle SOA Suite and Oracle Business Process Management Suite*:

- Developing a Database Growth Management Strategy
- Managing Database Growth

22.3 Considerations for Cross-Component Wiring

Cross-Component Wiring (CCW) enables the FMW components to publish and bind to some of the services available in a WLS domain, by using specific APIs.

CCW performs a bind of the wiring information only during the Configuration Wizard session or when manually forced by the WLS domain Administrator. When you add a Weblogic Server to a cluster (in a scale out/up operation in a static cluster), although the new server publishes its services, all the clients that use the service are not automatically updated and bound to the new service provider. The update does not happen because the existing servers that are already bound to a CCW table, do not automatically “know” about the new member that joins the cluster. It is the same case with ESS and WSMPM when they provide their services to SOA: both publish their service to the service table dynamically, but SOA servers do not know about these updates unless a bind is forced again.

Note:

There is an additional cross-component wiring information similar to the one used by the OHS configuration, which is not affected by this wiring because of the proxy plug-in behavior. For more information, see the following sections:

- Wiring Components to Work Together in *Oracle Fusion Middleware Administering Oracle Fusion Middleware*.
- Oracle-Developed Modules for Oracle HTTP Server in *Oracle Fusion Middleware Administering Oracle HTTP Server*

22.3.1 Cross-Component Wiring for WSMPM and ESS

The cross-component wiring t3 information is used by WSMPM and ESS to obtain the list of severs to be used in a JNDI invocation URL.

The CCW t3 information limits the impact of the lack of dynamic updates. When the invocation is done, the JNDI URL is used to obtain the RMI stubs with the list of members in the cluster. The JNDI URL does not need to contain the entire list of servers. The RMI stubs contain the list of all the servers in the cluster at any given time, and are used to load balance requests across all of them. Therefore, without a bind, the servers that are added to the cluster are used even if not present in the bind URL. The only drawback is that at least one of the original servers provided in the first CCW bind must be up to keep the system working when the cluster expands or shrinks. To avoid this issue, you can use the “cluster name” syntax in the service table instead of using the static list of members.

The cluster name syntax is as follows:

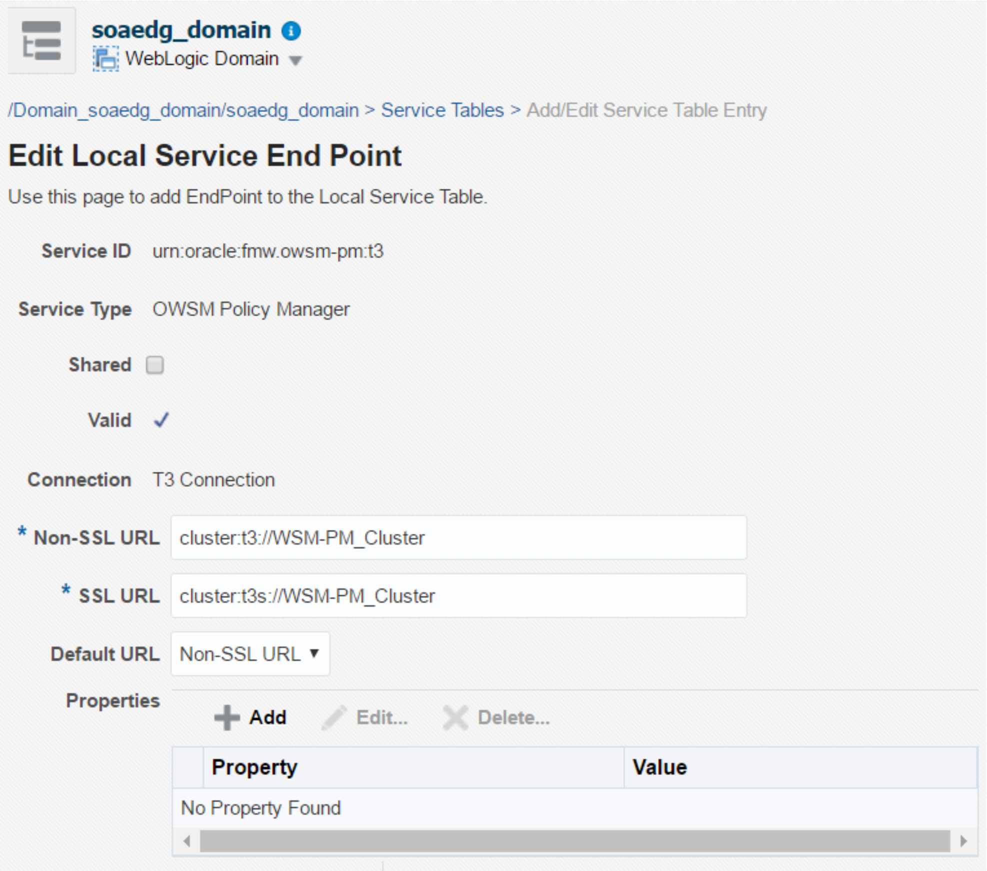
```
cluster:t3_cluster_name
```

When you use `cluster:t3_cluster_name` , the CCW invocation fetches the complete list of members in the cluster at any given time, thus avoiding any dependencies on the initial servers and accounting for every member that is alive in the cluster then.

22.3.2 Using the cluster_name Syntax with WSMPM

This procedure makes WSMPM use a t3 syntax that accounts for servers being added or removed from the WSMPM cluster without having to reupdate the CCW information.

1. Use the Oracle WebLogic Server Administration Server credentials to log in to Oracle Enterprise Manager Fusion Middleware Control. You have created these credentials when you initially configured the domain and created the Oracle WebLogic Server Administration user name (typically, weblogic) and password.
2. From the WebLogic Domain drop-down menu, select **Cross component Wiring-Service Tables**.
3. Select the **OWSM Policy Manager urn:oracle:fmw.owsm-pm:t32** row.
4. Click **Edit** and update the t3 and t3s values with the cluster name syntax.
5. Click **OK**.



/Domain_soaedg_domain/soaedg_domain > Service Tables > Add/Edit Service Table Entry

Edit Local Service End Point

Use this page to add EndPoint to the Local Service Table.

Service ID urn:oracle:fmw.owsm-pm:t3

Service Type OWSM Policy Manager

Shared □

Valid ✓

Connection T3 Connection

* Non-SSL URL cluster:t3://WSM-PM_Cluster

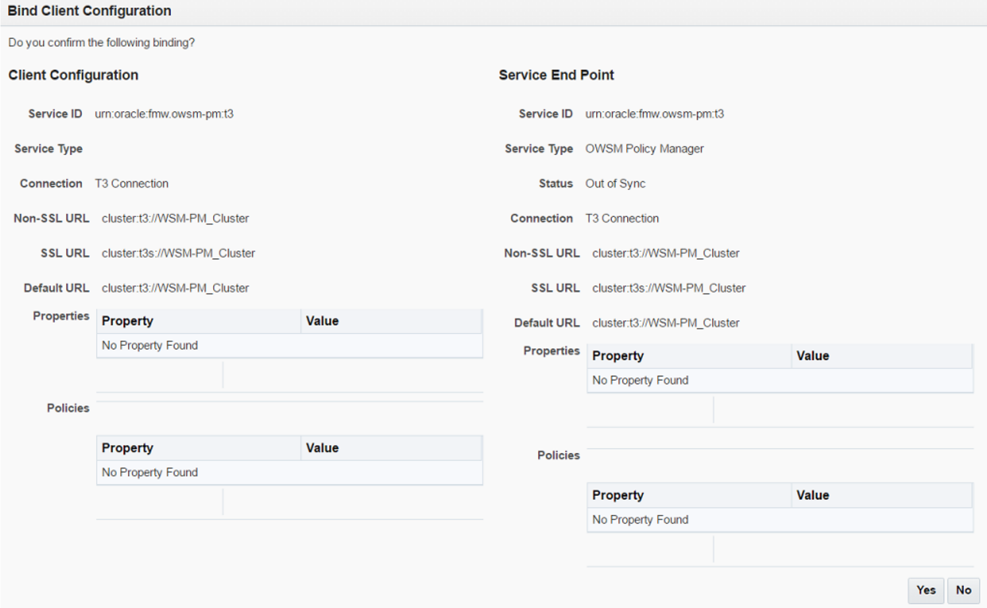
* SSL URL cluster:t3s://WSM-PM_Cluster

Default URL Non-SSL URL ▾

Properties

Property	Value
No Property Found	

6. From the WebLogic Domain drop-down menu, select **Cross component Wiring - Components**.
7. Select **OWSM Agent**.
8. In the Client Configuration section, select the **owsm-pm-connection-t3** row and click **Bind**.



Bind Client Configuration

Do you confirm the following binding?

Client Configuration

Service ID urn:oracle:fmw.owsm-pm:t3

Service Type

Connection T3 Connection

Non-SSL URL cluster:t3://WSM-PM_Cluster

SSL URL cluster:t3s://WSM-PM_Cluster

Default URL cluster:t3://WSM-PM_Cluster

Properties

Property	Value
No Property Found	

Policies

Property	Value
No Property Found	

Service End Point

Service ID urn:oracle:fmw.owsm-pm:t3

Service Type OWSM Policy Manager

Status Out of Sync

Connection T3 Connection

Non-SSL URL cluster:t3://WSM-PM_Cluster

SSL URL cluster:t3s://WSM-PM_Cluster

Default URL cluster:t3://WSM-PM_Cluster

Properties

Property	Value
No Property Found	

Policies

Property	Value
No Property Found	

9. Click **OK**.

> **Note:**
>
> The wiring table is updated with each cluster scale out or scale up, but it does not replace the cluster syntax until a manual rebind is used. Hence, it withstands all updates (additions and removals) in the lifecycle of the cluster.

22.4 Setting the Front End Host and Port for a WebLogic Cluster

You must set the front-end HTTP host and port for the Oracle WebLogic Server cluster that hosts the Oracle SOA Suite servers. You can specify these values in the Configuration Wizard while you are specifying the properties of the domain. However, when you add a SOA Cluster as part of an Oracle SOA Suite enterprise deployment, Oracle recommends that you perform this task after you verify the SOA Managed Servers.

To set the front end host and port from the Weblogic Server Administration Console:

1. Log in to the WebLogic Server Administration Console.
2. In the Change Center, click **Lock & Edit**.
3. In the Domain Structure panel, expand **Environment**, and click **Clusters**.
4. On the Clusters page, click the cluster that you want to modify, and then select the **HTTP** tab.
5. Set the following values:
   - **Frontend Host**: `soa.example.com`
   - **Frontend HTTP Port**: `80`
   - **Frontend HTTPS Port**: `443`

6. Click **Save**.
7. Click **Activate Changes**.
8. Restart the managed servers of the cluster.

23

Using Whole Server Migration and Service Migration in an Enterprise Deployment

The Oracle WebLogic Server migration framework supports Whole Server Migration and Service Migration. The following sections explain how these features can be used in an Oracle Fusion Middleware enterprise topology.

23.1 About Whole Server Migration and Automatic Service Migration in an Enterprise Deployment

Oracle WebLogic Server provides a migration framework that is an integral part of any highly available environment. The following sections provide more information about how this framework can be used effectively in an enterprise deployment.

23.1.1 Understanding the Difference between Whole Server and Service Migration

The Oracle WebLogic Server migration framework supports two distinct types of automatic migration:

- **Whole Server Migration**, where the Managed Server instance is migrated to a different physical system upon failure.

  Whole server migration provides for the automatic restart of a server instance, with all its services, on a different physical machine. When a failure occurs in a server that is part of a cluster which is configured with server migration, the server is restarted on any of the other machines that host members of the cluster.

  For this to happen, the servers must use a floating IP as listen address and the required resources (transactions logs and JMS persistent stores) must be available on the candidate machines.

  For more information, see Whole Server Migration in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

- **Service Migration**, where specific services are moved to a different Managed Server within the cluster.

  To understand service migration, it's important to understand *pinned services*.

  In a WebLogic Server cluster, most subsystem services are hosted homogeneously on all server instances in the cluster, enabling transparent failover from one server to another. In contrast, pinned services, such as JMS-related services, the JTA Transaction Recovery Service, and user-defined singleton services, are hosted on individual server instances within a cluster—for these services, the WebLogic Server migration framework supports failure recovery with service migration, as opposed to failover.

  For more information, see Understanding the Service Migration Framework in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

23.1.2 Implications of Using Whole Server Migration or Service Migration in an Enterprise Deployment

When a server or service is started in another system, the required resources (such as services data and logs) must be available to both the original system and to the failover system; otherwise, the service cannot resume the same operations successfully on the failover system.

For this reason, both whole server and service migration require that all members of the cluster have access to the same transaction and JMS persistent stores (whether the persistent store is file-based or database-based).

This is another reason why shared storage is important in an enterprise deployment. When you properly configure shared storage, you ensure that in the event of a manual failover (Administration Server failover) or an automatic failover (whole server migration or service migration), both the original machine and the failover machine can access the same file store with no change in service.

In the case of an automatic service migration, when a pinned service needs to be resumed, the JMS and JTA logs that it was using before failover need to be accessible.

In addition to shared storage, Whole Server Migration requires the procurement and assignment of a virtual IP address (VIP). When a Managed Server fails over to another machine, the VIP is automatically reassigned to the new machine.

Note that service migration does not require a VIP.

23.1.3 Understanding Which Products and Components Require Whole Server Migration and Service Migration

Note that the table lists the recommended best practice. It does not preclude you from using Whole Server or Automatic Server Migration for those components that support it.

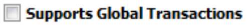
Component	Whole Server Migration (WSM)	Automatic Service Migration (ASM)
Oracle Web Services Manager (OWSM)	NO	NO
Oracle SOA Suite	NO	YES
Oracle Service Bus	NO	YES
Oracle Business Process Management	NO	YES
Enterprise Enterprise Scheduler	NO	NO
Oracle Business Activity Monitoring	NO	YES
Oracle B2B	NO	YES

23.2 Creating a GridLink Data Source for Leasing

Whole Server Migration and Automatic Service Migration require a data source for the leasing table, which is a tablespace created automatically as part of the Oracle WebLogic Server schemas by the Repository Creation Utility (RCU).

For an enterprise deployment, you should create a GridLink data source:

1. Log in to the Oracle WebLogic Server Administration Console.
2. If you have not already done so, in the **Change Center**, click **Lock & Edit**.
3. In the **Domain Structure** tree, expand **Services**, then select **Data Sources**.
4. On the Summary of Data Sources page, click **New** and select **GridLink Data Source**, and enter the following:
   - Enter a logical name for the data source in the **Name** field. For example, **Leasing**.
   - Enter a name for **JNDI**. For example, **jdbc/leasing**.
   - For the Database Driver, select **Oracle's Driver (Thin) for GridLink Connections Versions: Any**.
   - Click **Next**.
5. In the Transaction Options page, clear the **Supports Global Transactions** check box, and then click **Next**.



□ Supports Global Transactions

6. In the GridLink Data Source Connection Properties Options screen, select **Enter individual listener information** and click **Next**.

7. Enter the following connection properties:

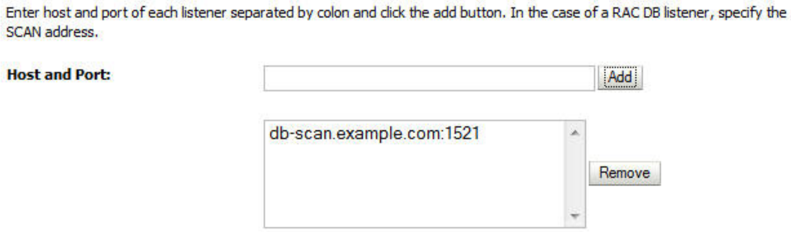
   - **Service Name**: Enter the service name of the database with lowercase characters. For a GridLink data source, you must enter the Oracle RAC service name. For example:

     ```
     soaedg.example.com
     ```

   - **Host Name and Port**: Enter the SCAN address and port for the RAC database, separated by a colon. For example:

     ```
     db-scan.example.com:1521
     ```

     Click **Add** to add the host name and port to the list box below the field.

     Enter host and port of each listener separated by colon and click the add button. In the case of a RAC DB listener, specify the SCAN address.

     Host and Port:

     db-scan.example.com:1521

     You can identify the SCAN address by querying the appropriate parameter in the database using the TCP Protocol:

     ```
     SQL>show parameter remote_listener;

     NAME                 TYPE        VALUE

     --------------------------------------------------

     remote_listener     string      db-scan.example.com
     ```

     Note:

     For Oracle Database 11*g* Release 1 (11.1), use the virtual IP and port of each database instance listener, for example:

     ```
     dbhost1-vip.mycompany.com (port 1521)
     ```

     and

     ```
     dbhost2-vip.mycompany.com (1521)
     ```

     For Oracle Database 10*g*, use multi data sources to connect to an Oracle RAC database. For information about configuring multi data sources see Using Multi Data Sources with Oracle RAC.

   - **Database User Name**: Enter the following:

     ```
     FMW1221_WLS_RUNTIME
     ```

In this example, FMW1221 is the prefix you used when you created the schemas as you prepared to configure the initial enterprise manager domain.

Note that in previous versions of Oracle Fusion Middleware, you had to manually create a user and tablespace for the migration leasing table. In Fusion Middleware 12*c* (12.2.1), the leasing table is created automatically when you create the WLS schemas with the Repository Creation Utility (RCU).

- **Password**: Enter the password you used when you created the WLS schema in RCU.
- **Confirm Password**: Enter the password again and click **Next**.

8. On the Test GridLink Database Connection page, review the connection parameters and click **Test All Listeners**.

   Here is an example of a successful connection notification:

   ```
   Connection test for
   jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=db-
   scan.example.com)
   (PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=soaedg.example.com))) succeeded.
   ```

   Click **Next**.

9. In the ONS Client Configuration page, do the following:

   - Select **FAN Enabled** to subscribe to and process Oracle FAN events.
   - Enter the SCAN address in the **ONS Host and Port** field, and then click **Add** and click **Add**:

     This value should be the ONS host and ONS remote port for the RAC database. To find the ONS remote port for the database, you can use the following command on the database host:

     ```
     [orcl@db-scan1 ~]$ srvctl config nodeapps -s

     ONS exists: Local port 6100, remote port 6200, EM port 2016
     ```

   - Click **Next**.

   Note:

   For Oracle Database 11*g* Release 1 (11.1), use the hostname and port of each database's ONS service, for example:

   ```
   custdbhost1.example.com (port 6200)
   ```

   and

   ```
   custdbhost2.example.com (6200)
   ```

10. On the Test ONS Client Configuration page, review the connection parameters and click **Test All ONS Nodes**.

    Here is an example of a successful connection notification:

    ```
    Connection test for db-scan.example.com:6200 succeeded.
    ```

Click **Next**.

11. In the Select Targets page, select the cluster that you are configuring for Whole Server Migration or Automatic Service Migration, and then select **All Servers in the cluster**.
12. Click **Finish**.
13. Click **Activate Changes**.

23.3 Configuring Whole Server Migration for an Enterprise Deployment

After you have prepared your domain for whole server migration or automatic service migration, you can configure Whole Server Migration for specific Managed Servers within a cluster.

> **Note:**
>
> As mentioned earlier, for migration to work, servers must use a virtual hostname that matches a floating IP, as the listen address. You can specify the listen address directly in the Configuration Wizard or update it in the administration console.

Editing the Node Manager's Properties File to Enable Whole Server Migration

Setting Environment and Superuser Privileges for the wlsifconfig.sh Script

Configuring Server Migration Targets

Testing Whole Server Migration

23.3.1 Editing the Node Manager's Properties File to Enable Whole Server Migration

Use the section to edit the Node Manager properties file on the two nodes where the servers are running.

1. Locate and open the following file with a text editor:

   ```
   MSERVER_HOME/nodemanager/nodmeanager.properties
   ```

2. If not done already, set the `StartScriptEnabled` property in the `nodemanager.properties` file to true.

   This is required to enable Node Manager to start the managed servers.

3. Add the following properties to the `nodemanager.properties` file to enable server migration to work properly:

   - `Interface`

     ```
     Interface=eth0
     ```

     This property specifies the interface name for the floating IP (`eth0`, for example).

Note:

Do not specify the sub interface, such as `eth0:1` or `eth0:2`. This interface is to be used without the `:0`, or `:1`.

The Node Manager's scripts traverse the different `:X` enabled IPs to determine which to add or remove. For example, the valid values in Linux environments are `eth0`, `eth1`, or, `eth2`, `eth3`, `eth`*n*, depending on the number of interfaces configured.

- `NetMask`

  ```
  NetMask=255.255.255.0
  ```

  This property specifies the net mask for the interface for the floating IP.

- `UseMACBroadcast`

  ```
  UseMACBroadcast=true
  ```

  This property specifies whether or not to use a node's MAC address when sending ARP packets, that is, whether or not to use the `-b` flag in the arping command.

4. Restart the Node Manager.

5. Verify in the output of Node Manager (the shell where the Node Manager is started) that these properties are in use. Otherwise, problems may occur during migration. The output should be similar to the following:

   ```
   ...
   SecureListener=true
   LogCount=1
   eth0=*,NetMask=255.255.255.0
   ...
   ```

23.3.2 Setting Environment and Superuser Privileges for the wlsifconfig.sh Script

Use this section to set the environment and superuser privileges for the `wlsifconfig.sh` script, which is used to transfer IP addresses from one machine to another during migration. It must be able to run `ifconfig`, which is generally only available to superusers.

For more information about the `wlsifconfig.sh` script, see Configuring Automatic Whole Server Migration in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

Refer to the following sections for instructions on preparing your system to run the `wlsifconfig.sh` script.

Setting the PATH Environment Variable for the wlsifconfig.sh Script

Granting Privileges to the wlsifconfig.sh Script

23.3.2.1 Setting the PATH Environment Variable for the wlsifconfig.sh Script

Ensure that the commands listed in the following table are included in the PATH environment variable for each host computers.

File	Directory Location
`wlsifconfig.sh`	*MSERVER_HOME*/bin/server_migration
`wlscontrol.sh`	*WL_HOME*/common/bin
`nodemanager.domains`	*MSERVER_HOME*/nodemanager

23.3.2.2 Granting Privileges to the wlsifconfig.sh Script

Grant sudo privilege to the operating system user (for example, `oracle`) with no password restriction, and grant execute privilege on the `/sbin/ifconfig` and `/sbin/arping` binaries.

> **Note:**
>
> For security reasons, `sudo` should be restricted to the subset of commands required to run the `wlsifconfig.sh` script.
>
> Ask the system administrator for the sudo and system rights as appropriate to perform this required configuration task.

The following is an example of an entry inside */etc/sudoers* granting sudo execution privilege for `oracle` to run `ifconfig` and `arping`:

```
Defaults:oracle !requiretty
oracle ALL=NOPASSWD: /sbin/ifconfig,/sbin/arping
```

23.3.3 Configuring Server Migration Targets

To configure migration in a cluster:

1. Log in to the Oracle WebLogic Server Administration Console.
2. In the Domain Structure window, expand **Environment** and select **Clusters**. The Summary of Clusters page appears.
3. Click the cluster for which you want to configure migration in the Name column of the table.
4. Click the **Migration** tab.
5. Click **Lock & Edit**.
6. Select **Database** as Migration Basis. From the drop-down list, select **Leasing** as Data Source For Automatic Migration.
7. Under **Candidate Machines For Migratable Server**, in the Available filed, select the Managed Servers in the cluster and click the right arrow to move them to **Chosen**.

8. Select the Leasing data source that you created in Creating a GridLink Data Source for Leasing.

9. Click **Save**.

10. Set the Candidate Machines for Server Migration. You must perform this task for all of the managed servers as follows:

    a. In Domain Structure window of the Oracle WebLogic Server Administration Console, expand **Environment** and select **Servers**.

    b. Select the server for which you want to configure migration.

    c. Click the **Migration** tab.

    d. Select **Automatic Server Migration Enabled** and click **Save**.

       This enables the Node Manager to start a failed server on the target node automatically.

       For information on targeting applications and resources, see Using Multi Data Sources with Oracle RAC.

    e. In the **Available** field, located in the Migration Configuration section, select the machines to which to allow migration and click the right arrow.

       In this step, you are identifying host to which the Managed Server should failover if the current host is unavailable. For example, for the Managed Server on the HOST1, select HOST2; for the Managed Server on HOST2, select HOST1.

    Tip:

    Click **Customize this table** in the Summary of Servers page, move Current Machine from the Available Window to the Chosen window to view the machine on which the server is running. This is different from the configuration if the server is migrated automatically.

11. Click **Activate Changes**.

12. Restart the Administration Server and the servers for which server migration has been configured.

23.3.4 Testing Whole Server Migration

Perform the steps in this section to verify that automatic whole server migration is working properly.

To test from Node 1:

1. Stop the managed server process.

   ```
   kill -9 pid
   ```

   pid specifies the process ID of the managed server. You can identify the pid in the node by running this command:

2. Watch the Node Manager console (the terminal window where you performed the kill command): you should see a message indicating that the managed server's floating IP has been disabled.

3. Wait for the Node Manager to try a second restart of the Managed Server. Node Manager waits for a period of 30 seconds before trying this restart.

4. After node manager restarts the server and before it reaches "RUNNING" state, kill the associated process again.

   Node Manager should log a message indicating that the server will not be restarted again locally.

> **Note:**
>
> The number of restarts required is determined by the `RestartMax` parameter in the following configuration file:
>
> The default value is `RestartMax=2`.

To test from Node 2:

1. Watch the local Node Manager console. After 30 seconds since the last try to restart the managed server on Node 1, Node Manager on Node 2 should prompt that the floating IP for the managed server is being brought up and that the server is being restarted in this node.

2. Access a product URL using same IP address. If the URL is successful, then the migration was successful.

Verification From the Administration Console

You can also verify migration using the Oracle WebLogic Server Administration Console:

1. Log in to the Administration Console.

2. Click **Domain** on the left console.

3. Click the **Monitoring** tab and then the **Migration** subtab.

   The Migration Status table provides information on the status of the migration.

> **Note:**
>
> After a server is migrated, to fail it back to its original machine, stop the managed server from the Oracle WebLogic Administration Console and then start it again. The appropriate Node Manager starts the managed server on the machine to which it was originally assigned.

23.4 Configuring Automatic Service Migration in an Enterprise Deployment

You may need to configure automatic service migration for specific services in an enterprise deployment.

Note:

This SOA Suite feature is part of Oracle Integration Continuous Availability. For more details on Oracle SOA Suite for Middleware Options, see *Oracle Fusion Middleware Licensing Information*.

23.4.1 Setting the Leasing Mechanism and Data Source for an Enterprise Deployment Cluster

Before you can configure automatic service migration, you must verify the leasing mechanism and data source that will be used by the automatic service migration feature:

Note:

The following procedure assumes you have already created the Leasing data source, as described in Creating a GridLink Data Source for Leasing.

1. Log in to the Oracle WebLogic Server Administration Console.
2. Click **Lock & Edit**.
3. In the Domain Structure window, expand **Environment** and select **Clusters**.

   The Summary of Clusters page appears.
4. In the **Name** column of the table, click the cluster for which you want to configure migration.
5. Click the **Migration** tab.
6. Verify that **Database** is selected in the **Migration Basis** drop-down menu.
7. From the **Data Source for Automatic Migration** drop-down menu, select the Leasing data source that you created in Creating a GridLink Data Source for Leasing.
8. Click **Save**.
9. Activate changes.

10. Restart the managed servers for the changes to be effective. If you are configuring other aspects of ASM in the same configuration change session, you can use a final unique restart to reduce downtime.

23.4.2 Changing the Migration Settings for the Managed Servers in the Cluster

After you set the leasing mechanism and data source for the cluster, you can then enable automatic JTA migration for the Managed Servers that you want to configure for service migration. Note that this topic applies only if you are deploying JTA services as part of your enterprise deployment.

To change the migration settings for the Managed Servers in each cluster:

1. If you haven't already, log in to the Administration Console, and click **Lock & Edit**.
2. In the Domain Structure pane, expand the **Environment** node and then click **Servers**.

   The Summary of Servers page appears.
3. Click the name of the server you want to modify in **Name** column of the table.

   The settings page for the selected server appears and defaults to the Configuration tab.
4. Click the **Migration** tab.
5. From the **JTA Migration Policy** drop-down menu, select **Failure Recovery**.
6. In the **JTA Candidate Servers** section of the page, select the Managed Servers in the **Available** list box, and then click the move button to move them into the **Chosen** list box.
7. In the **JMS Service Candidate Servers** section of the page, select the Managed Servers in the **Available** list box, and then click the move button to move them into the **Chosen** list box.
8. Click **Save**.
9. Restart the managed servers and the Administration Server for the changes to be effective. If you are configuring other aspects of ASM in the same configuration change session, you can use a final unique restart to reduce downtime.

23.4.3 About Selecting a Service Migration Policy

When you configure Automatic Service Migration, you select a Service Migration Policy for each cluster. This topic provides guidelines and considerations when selecting the Service Migration Policy.

For example, products or components running singletons or using Path services can benefit from the **Auto-Migrate Exactly-Once** policy. With this policy, if at least one Managed Server in the candidate server list is running, the services hosted by this migratable target will be active somewhere in the cluster if servers fail or are administratively shut down (either gracefully or forcibly). This can cause multiple homogenous services to end up in one server on startup.

When you are using this policy, you should monitor the cluster startup to identify what servers are running on each server. You can then perform a manual failback, if necessary, to place the system in a balanced configuration.

Other Fusion Middleware components are better suited for the **Auto-Migrate Failure-Recovery Services** policy.

Based on these guidelines, the following policies are recommended for an Oracle SOA Suite enterprise topology:

- SOA_Cluster: **Auto-Migrate Failure-Recovery Services**
- OSB_Cluster: **Auto-Migrate Exactly-Once Services**
- BAM_Cluster: **Auto-Migrate Exactly-Once Services**
- MFT_Cluster: **Auto-Migrate Failure-Recovery Services**

For more information, see Policies for Manual and Automatic Service Migration in *Oracle Fusion Middleware Administering Clusters for Oracle WebLogic Server*.

23.4.4 Setting the Service Migration Policy for Each Managed Server in the Cluster

After you modify the migration settings for each server in the cluster, you can then identify the services and set the migration policy for each Managed Server in the cluster, using the WebLogic Administration Console:

1. If you haven’t already, log in to the Administration Console, and click **Lock & Edit**.
2. In the Domain Structure pane, expand **Environment**, then expand **Clusters**, then select **Migratable Targets**.
3. Click the name of the first Managed Server in the cluster.
4. Click the **Migration** tab.
5. From the **Service Migration Policy** drop-down menu, select the appropriate policy for the cluster.

   For more information, see About Selecting a Service Migration Policy.
6. Click **Save**.
7. Repeat steps 2 through for each of the additional Managed Servers in the cluster.
8. Activate the changes.
9. Restart the managed servers for the changes to be effective. If you are configuring other aspects of ASM in the same configuration change session, you can use a final unique restart to reduce downtime.

23.4.5 Validating Automatic Service Migration

After you configure automatic service migration for your cluster and Managed Servers, validate the configuration, as follows:

1. If you have not already done so, log in to the Administration Console.
2. In the Domain Structure pane, select **Environment**, then **Clusters**.
3. In the Domain Structure pane, expand **Environment**, and then expand **Clusters**.
4. Click **Migratable Targets**.

5. Click the **Control** tab.

   The console displays a list of migratable targets and their current hosting server.

6. In the Migratable Targets table, select a row for the one of the migratable targets.

7. Note the value in the **Current Hosting Server** column.

8. Use the operating system command line to stop the first Managed Server.

   Use the following command to end the Managed Server Process and simulate a crash scenario:

   ```
   kill -9 pid
   ```

   In this example, replace *pid* with the process ID (PID) of the Managed Server. You can identify the PID by running the following UNIX command:

   ```
   ps -ef | grep managed_server_name
   ```

   Note that after you kill the process, the Managed Server might be configured to start automatically after you initially kill the process. In this case, you must kill the second process using the `kill -9` command again.

9. Watch the terminal window (or console) where the Node Manager is running.

   You should see a message indicating that the selected Managed Server has failed. The message will be similar to the following:

   ```
   <INFO> <domain_name> <server_name>
   <The server 'server_name' with process id 4668 is no longer alive; waiting for
   the process to die.>
   <INFO> <domain_name> <server_name>
   <Server failed during startup. It may be retried according to the auto restart
   configuration.>
   <INFO> <domain_name> <server_name>
   <Server failed but will not be restarted because the maximum number of restart
   attempts has been exceeded.>
   ```

10. Return to the Oracle WebLogic Server Administration Console and refresh the table of migratable targets; verify that the migratable targets are transferred to the remaining, running Managed Server in the cluster:

    - Verify that the Current Hosting Server for the process you killed is now updated to show that it has been migrated to a different host.

    - Verify that the value in the **Status of Last Migration** column for the process is "Succeeded".

11. Open and review the log files for the Managed Servers that are now hosting the services; look for any JTA or JMS errors.

Note:

For JMS tests, it is a good practice to get message counts from destinations and make sure that there are no stuck messages in any of the migratable targets:

For example, for uniform distributed destinations (UDDs):

a. Access the JMS Subdeployment module in the Administration Console:

   In the Domain Structure pane, select **Services**, then **Messaging**, and then **JMS Modules**.

b. Click the JMS Module.

c. Click the destination in the **Summary of Resources** table. destination->Select monitoring and get the Messages Total and Messages Pending Counts

d. Select the Monitoring tab, and review the **Messages Total** and **Messages Pending** values in the **Destinations** table.

23.4.6 Failing Back Services After Automatic Service Migration

When Automatic Service Migration occurs, Oracle WebLogic Server does not support failing back services to their original server when a server is back online and rejoins the cluster.

As a result, after the Automatic Service Migration migrates specific JMS services to a backup server during a fail-over, it does not migrate the services back to the original server after the original server is back online. Instead, you must migrate the services back to the original server manually.

To fail back a service to its original server, follow these steps:

1. If you have not already done so, in the Change Center of the Administration Console, click **Lock & Edit.**

2. In the Domain Structure tree, expand **Environment**, expand **Clusters**, and then select **Migratable Targets**.

3. To migrate one or more migratable targets at once, on the Summary of Migratable Targets page:

   a. Click the **Control** tab.

   b. Use the check boxes to select one or more migratable targets to migrate.

   c. Click **Migrate**.

   d. Use the **New hosting server** drop-down to select the original Managed Server.

   e. Click **OK**.

      A request is submitted to migrate the JMS-related service and the configuration edit lock is released. In the Migratable Targets table, the Status of Last Migration column indicates whether the requested migration has succeeded or failed.

4. To migrate a specific migratable target, on the Summary of Migratable Targets page:

   a. Select the migratable target to migrate.

   b. Click the **Control** tab.

   c. Reselect the migratable target to migrate.

   d. Click **Migrate**.

   e. Use the New hosting server drop-down to select a new server for the migratable target.

   f. Click **OK**.

24

Configuring Single Sign-On for an Enterprise Deployment

You will need to configure the Oracle HTTP Server WebGate in order to enable single sign-on with Oracle Access Manager.

24.1 About Oracle HTTP Server Webgate

Oracle HTTP Server WebGate is a Web server plug-in that intercepts HTTP requests and forwards them to an existing Oracle Access Manager instance for authentication and authorization.

For Oracle Fusion Middleware 12*c*, the WebGate software is installed as part of the Oracle HTTP Server 12*c* software installation.

For more extensive information about WebGate, see Registering and Managing OAM 11g Agents in *Adminstrator's Guide for Oracle Access Management*.

24.2 General Prerequisites for Configuring Oracle HTTP Server Webgate

Before you can configure Oracle HTTP Server WebGate, you must have installed and configured a certified version of Oracle Access Manager.

At the time this document was published, the supported versions of Oracle Access Manager were 11*g* Release 2 (11.1.2.2) and 11*g* Release 2 (11.1.2.3). For the most up-to-date information, see the certification document for your release on the *Oracle Fusion Middleware Supported System Configurations* page.

Note:

For production environments, it is highly recommended that you install Oracle Access Manager in its own environment and not on the machines that are hosting the enterprise deployment.

For more information about Oracle Access Manager, see the latest Oracle Identity and Access Management documentation, which you can find in the **Middleware** documentation on the Oracle Help Center.

24.3 Enterprise Deployment Prerequisites for Configuring OHS 12*c* Webgate

When you are configuring Oracle HTTP Server Webgate to enable Single Sign-On for an enterprise deployment, consider the prerequisites mentioned in this section.

- Oracle recommends that you deploy Oracle Access Manager as part of a highly available, secure, production environment. For more information about deploying Oracle Access Manager in an enterprise environment, see the Enterprise Deployment Guide for your version of Oracle Identity and Access Mangement.
- To enable single sign-on for the WebLogic Server Administration Console and the Oracle Enterprise Manager Fusion Middleware Control, you must add a central LDAP-provisioned administration user to the directory service that Oracle Access Manager is using (for example, Oracle Internet Directory or Oracle Unified Directory). For more information about the required user and groups to add to the LDAP directory, follow the instructions in Creating a New LDAP Authenticator and Provisioning Enterprise Deployment Users and Group.

24.4 Configuring Oracle HTTP Server 12*c* WebGate for an Enterprise Deployment

You will need to perform the following steps in order to configure Oracle HTTP Server 12*c* WebGate for Oracle Access Manager on both WEBHOST1 and WEBHOST2.

In the following procedure, replace the directory variables, such as *OHS_ORACLE_HOME* and *OHS_CONFIG_DIR*, with the values, as defined in File System and Directory Variables Used in This Guide.

1. Perform a complete backup of the Web Tier domain.

2. Change directory to the following location in the Oracle HTTP Server Oracle home:

   ```
   cd OHS_ORACLE_HOME/webgate/ohs/tools/deployWebGate/
   ```

3. Run the following command to create the WebGate Instance directory and enable WebGate logging on OHS Instance:

   ```
   ./deployWebGateInstance.sh -w OHS_CONFIG_DIR -oh OHS_ORACLE_HOME
   ```

4. Verify that a `webgate` directory and subdirectories was created by the `deployWebGateInstance` command:

   ```
   ls -lat OHS_CONFIG_DIR/webgate/
   total 16
   drwxr-x---+ 8 orcl oinstall 20 Oct  2 07:14 ..
   drwxr-xr-x+ 4 orcl oinstall  4 Oct  2 07:14 .
   drwxr-xr-x+ 3 orcl oinstall  3 Oct  2 07:14 tools
   drwxr-xr-x+ 3 orcl oinstall  4 Oct  2 07:14 config
   ```

5. Run the following command to ensure that the `LD_LIBRARY_PATH` environment variable contains *`OHS_ORACLE_HOME/`*`lib` directory path:

   ```
   export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:OHS_ORACLE_HOME/lib
   ```

6. Change directory to the following directory

   ```
   OHS_ORACLE_HOME/webgate/ohs/tools/setup/InstallTools
   ```

7. Run the following command from the `InstallTools` directory.

   ```
   ./EditHttpConf -w OHS_CONFIG_DIR -oh OHS_ORACLE_HOME -o
   output_file_name
   ```

   Note:

   The `-oh` *`OHS_ORACLE_HOME`* and `-o` *`output_file_name`* parameters are optional.

   This command:

   - Copies the `apache_webgate.template` file from the Oracle HTTP Server Oracle home to a new `webgate.conf` file in the Oracle HTTP Server configuration directory.
   - Updates the `httpd.conf` file to add one line, so it includes the `webgate.conf`.
   - Generates a WebGate configuration file. The default name of the file is `webgate.conf`, but you can use a custom name by using the `-o` *`output_file_name`* argument to the command.

24.5 Registering the Oracle HTTP Server WebGate with Oracle Access Manager

You can register the WebGate agent with Oracle Access Manager using the Oracle Access Manager Administration console.

For more information, see Registering an OAM Agent Using the Console in *Administrator's Guide for Oracle Access Management*.

24.5.1 About RREG In-Band and Out-of-Band Mode

You can run the RREG Tool in one of two modes: in-band and out-of-band.

Use **in-band** mode when you have the privileges to access the Oracle Access Manager server and run the RREG tool yourself from the Oracle Access Manager Oracle home. You can then copy the generated artifacts and files to the Web server configuration directory after you run the RREG Tool.

Use **out-of-band** mode if you do *not* have privileges or access to the Oracle Access Manager server. For example, in some organizations, only the Oracle Access Manager server administrators have privileges access the server directories and perform administration tasks on the server. In out-of-band mode, the process can work as follows:

1. The Oracle Access Manager server administrator provides you with a copy of the RREG archive file (RREG.tar.gz).

2. Untar the `RREG.tar.gz` file that was provided to you by the server administrator.

   For example:

   ```
   gunzip RREG.tar.gz
   ```

   ```
   tar -xvf RREG.tar
   ```

   After you unpack the RREG archive, you can find the tool for registering the agent in the following location:

   ```
   RREG_HOME/bin/oamreg.sh
   ```

   In this example, *`RREG_Home`* is the directory in which you extracted the contents of RREG archive.

3. Use the instructions in Updating the Standard Properties in the OAM11gRequest.xml File to update the `OAM11GRequest.xml` file, and send the completed `OAM11GRequest.xml` file to the Oracle Access Manager server administrator.

4. The Oracle Access Manager server administrator then uses the instructions in Running the RREG Tool in Out-Of-Band Mode to run the RREG Tool and generate the *`AgentID`*`_response.xml` file.

5. The Oracle Access Manager server administrator sends the *AgentID*_response.xml file to you.

6. Use the instructions in Running the RREG Tool in Out-Of-Band Mode to run the RREG Tool with the *AgentID*_response.xml file and generate the required artifacts and files on the client system.

24.5.2 Updating the Standard Properties in the OAM11gRequest.xml File

Before you can register the Webgate agent with Oracle Access Manager, you must update some required properties in the OAM11gRequest.xml file.

Note:

If you plan to use the default values for most of the parameters in the provided XML file, then you can use the shorter version (OAM11gRequest_short.xml, in which all non-listed fields will take a default value.

Note: In the primary server list, the default names are mentioned as OAM_SERVER1 and OAM_SERVER2 for OAM servers. Rename these names in the list if the server names are changed in your environment.

To perform this task:

1. If you are using in-band mode, then change directory to the following location on one of the OAM Servers:

   ```
   OAM_ORACLE_HOME/oam/server/rreg/input
   ```

   If you are using out-of-band mode, then change directory to the location where you unpacked the RREG archive on the WEBHOST1 server.

2. Make a copy of the OAM11GRequest.xml file template with an environment-specific name.

   ```
   cp OAM11GRequest.xml OAM11GRequest_edg.xml
   ```

3. Review the properties listed in the file, and then update your copy of the OAM11GRequest.xml file to make sure the properties reference the host names and other values specific to your environment.

OAM11gRequest.xml Property	Set to...
serverAddress	The host and the port of the Administration Server for the Oracle Access Manager domain.
agentName	Any custom name for the agent. Typically, you use a name that identifies the Fusion Middleware product you are configuring for single sign-on.
applicationDomain	A value that identifies the Web tier host and the FMW component you are configuring for single sign-on.

OAM11gRequest.xml Property	Set to...
`security`	Must be set to the security mode configured on the Oracle Access Management server. This will be one of three modes: open, simple, or certificate. **Note:** For an enterprise deployment, Oracle recommends simple mode, unless additional requirements exist to implement custom security certificates for the encryption of authentication and authorization traffic. In most cases, avoid using open mode, because in open mode, traffic to and from the Oracle Access Manager server is not encrypted. For more information using certificate mode or about Oracle Access Manager supported security modes in general, see Securing Communication Between OAM Servers and WebGates in the *Administrator's Guide for Oracle Access Management*.
`cachePragmaHeader`	private
`cacheControlHeader`	private
`ipValidation`	0 `<ipValidation>0<ipValidation>`

`ipValidationExceptions`	The IP address of the front-end load balancer. For example:
	`<ipValidationExceptions>`
	`    <ipAddress>130.35.165.42</ipAddress>`
	`</ipValidation>`

`agentBaseUrl`	Fully-qualified URL with the host and the port of the front-end Load Balancer VIP in front of the WEBHOST*n* machines on which Oracle HTTP 12*c* WebGates are installed.
	For example:
	`<agentBaseUrl>`
	`      https://wcp.example.com:443`
	`</agentBaseUrl>`

`virtualHost`	Set to **true** when protecting more than the `agentBaseUrl`, such as SSO protection for the administrative VIP.

OAM11gRequest.xml Property	Set to...

`hostPortVariationsList`	Add `hostPortVariation` host and port elements for each of the load-balancer URLs that will be protected by the WebGates.
	For example:
	`<hostPortVariationsList>`
	`    <hostPortVariations>`
	`        <host>wcpinternal.example.com</host>`
	
	`        <port>80</port>`
	`    </hostPortVariations>`
	`    <hostPortVariations>`
	`        <host>admin.example.com</host>`
	
	`        <port>80</port>`
	`</hostPortVariations>`

24.5.3 Updating the Protected, Public, and Excluded Resources for an Enterprise Deployment

When you set up an Oracle Fusion Middleware environment for single sign-on, you identify a set of URLs that you want Oracle Access Manager to protect with single sign-on. You identify these using specific sections of the `OAM11gRequest.xml` file. To identify the URLs:

1. If you haven’t already opened the copied `OAM11GRequest_edg.xml` file for editing, locate and open the file in a text editor.

   For more information, see the following:

   - Updating the Standard Properties in the OAM11gRequest.xml File

2. Remove the sample entries from the file, and then enter the list of protected, public, and excluded resources in the appropriate sections of the file, as shown in the following example.

   Note:

   If you are using Oracle Access Manager 11*g* Release 2 (11.1.2.2) or later, then note that the entries with the wildcard syntax (“`.../*`”) are included in this example for backward compatibility with previous versions of Oracle Access Manager.

```
<protectedResourcesList>
    <resource>/insight</resource>
    <resource>/insight/.../*</resource>
    <resource>/integration/worklistapp</resource>
         <resource>/integration/worklistapp/.../*</resource>
        <resource>/workflow/sdpmessagingsca-ui-worklist</resource>
        <resource>/workflow/sdpmessagingsca-ui-worklist/.../*</resource>
        <resource>/b2bconsole</resource>
        <resource>/b2bconsole/.../*</resource>
        <resource>/sdpmessaging/userprefs-ui</resource>
        <resource>/sdpmessaging/userprefs-ui/.../*</resource>
        <resource>/workflow/DefaultToDoTaskFlow</resource>
        <resource>/workflow/DefaultToDoTaskFlow/.../*</resource>
        <resource>/DefaultToDoTaskFlow</resource>
        <resource>/DefaultToDoTaskFlow/.../*</resource>
        <resource>/ess</resource>
        <resource>/ess/.../*</resource>
        <resource>/EssHealthCheck</resource>
        <resource>/EssHealthCheck/.../*</resource>
        <resource>/em</resource>
        <resource>/em/.../*</resource>
        <resource>/console</resource>
        <resource>/console/.../*</resource>
        <resource>/servicebus</resource><!-- (For OSB systems only) -->
        <resource>/servicebus/.../*</resource><!-- (For OSB systems only) -->
        <resource>/sbconsole</resource><!-- (For OSB systems only) -->
        <resource>/sbconsole/.../*</resource><!-- (For OSB systems only) --
>
        <resource>/lwpfconsole</resource><!-- (For OSB systems only) -->
        <resource>/lwpfconsole/.../*</resource><!-- (For OSB systems only) -->
        <resource>/soa/composer</resource>
        <resource>/soa/composer/.../*</resource>
        <resource>/OracleBAM</resource><!-- (For BAM systems only) -->
        <resource>/OracleBAM/.../*</resource><!-- (For BAM systems only) -->
        <resource>/oracle/bam/server</resource><!-- (For BAM systems only) -->
        <resource>/oracle/bam/server/.../*</resource><!-- (For BAM systems only)
-->
        <resource>/bam/composer</resource><!-- (For BAM systems only) -->
        <resource>/bam/composer/.../*</resource><!-- (For BAM systems only) -->
        <resource>/bpm/composer</resource> <!-- (For BPM systems only) -->
        <resource>/bpm/composer/.../*</resource> <!-- (For BPM systems only) -->
        <resource>/bpm/workspace</resource><!-- (For BPM systems only) -->
        <resource>/bpm/workspace/.../*</resource><!-- (For BPM systems only) -->
        <resource>/soa-infra</resource>
        <resource>/soa-infra/deployer</resource>
        <resource>/soa-infra/deployer/.../*</resource>
        <resource>/soa-infra/events/edn-db-log</resource>
       <resource>/soa-infra/events/edn-db-log/.../*</resource>
        <resource>/soa-infra/cluster/info</resource>
        <resource>/soa-infra/cluster/info/.../*</resource>
        <resource>/inspection.wsil</resource>
        <resource>/healthcare/.../*</resource><!-- (For HC systems only) -->
        <resource>/healthcare</resource><!-- (For HC systems only) -->
    <resource>/ess-async/*</resource>
    <resource>/ess-wsjob/.../*</resource>
</protectedResourcesList>
<publicResourcesList>
        <resource>/soa-infra/directWSDL</resource>
        <resource>/sbinspection.wsil</resource><!-- (For OSB systems only) -->
</publicResourcesList>
<excludedResourcesList>
    <resource>/insight-soa</resource>
    <resource>/insight-soa/.../*</resource>
    <resource>/insight-osb</resource>
    <resource>/insight-osb/.../*</resource>
        <resource>/wsm-pm</resource>
        <resource>/wsm-pm/.../*</resource>
        <resource>/soa-infra</resource>
        <resource>/soa-infra/services/.../*</resource>
        <resource>/OracleBAMWS</resource> <!-- (For BAM systems only) -->
        <resource>/OracleBAMWS/.../*</resource><!-- (For BAM systems only) -->
        <resource>/ucs/messaging/webservice</resource>
        <resource>/ucs/messaging/webservice/.../*</resource>
        <resource>/sbresource</resource><!-- (For OSB systems only) -->
        <resource>/sbresource/.../*</resource><!-- (For OSB systems only) -->
        <resource>/integration/services/.../*</resource>
        <resource>/integration/services</resource>
        <resource>/b2b/services/</resource>
        <resource>/b2b/services/.../*</resource>
</excludedResourcesList>
```

3. Save and close the `OAM11GRequest_edg.xml` file.

24.5.4 Running the RREG Tool

The following topics provide information about running the RREG tool to register your Oracle HTTP Server Webgate with Oracle Access Manager.

Running the RREG Tool in In-Band Mode

Running the RREG Tool in Out-Of-Band Mode

24.5.4.1 Running the RREG Tool in In-Band Mode

To run the RREG Tool in in-band mode:

1. Navigate to the RREG home directory.

   If you are using in-band mode, the RREG directory is inside the Oracle Access Manager Oracle home:

   ```
   OAM_ORACLE_HOME/oam/server/rreg
   ```

   If you are using out-of-band mode, then the RREG home directory is the location where you unpacked the RREG archive.

2. In the RREG home directory, navigate to the bin directory:

   ```
   cd RREG_HOME/bin/
   ```

3. Set the permissions of the `oamreg.sh` command so you can execute the file:

   ```
   chmod +x oamreg.sh
   ```

4. Run the following command:

   ```
   ./oamreg.sh inband RREG_HOME/input/OAM11GRequest_edg.xml
   ```

In this example:

- It is assumed the edited `OAM11GRequest.xml` file is located in the ***`RREG_HOME/`*** `input` directory.

- The output from this command will be saved to the following directory:

  ```
  RREG_HOME/output/
  ```

The following example shows a sample RREG session:

```
Welcome to OAM Remote Registration Tool!
Parameters passed to the registration tool are:
Mode: inband
Filename: /u01/oracle/products/fmw/iam_home/oam/server/rreg/client/rreg/input/
OAM11GRequest_edg.xml
Enter admin username:weblogic_idm
```

```
Username: weblogic_idm
Enter admin password:
Do you want to enter a Webgate password?(y/n):
n
Do you want to import an URIs file?(y/n):
n

----------------------------------------
Request summary:
OAM11G Agent Name:WCC1221_EDG_AGENT
URL String:null
Registering in Mode:inband
Your registration request is being sent to the Admin server at: http://
host1.example.com:7001
----------------------------------------

Jul 08, 2015 7:18:13 PM oracle.security.jps.util.JpsUtil disableAudit
INFO: JpsUtil: isAuditDisabled set to true
Jul 08, 2015 7:18:14 PM oracle.security.jps.util.JpsUtil disableAudit
INFO: JpsUtil: isAuditDisabled set to true
Inband registration process completed successfully! Output artifacts are created in
the output folder.
```

24.5.4.2 Running the RREG Tool in Out-Of-Band Mode

To run the RREG Tool in out-of-band mode on the WEBHOST server, the administrator uses the following command:

```
RREG_HOME/bin/oamreg.sh outofband input/OAM11GRequest.xml
```

In this example:

- Replace *RREG_HOME* with the location where the RREG archive file was unpacked on the server.
- The edited `OAM11GRequest.xml` file is located in the *`RREG_HOME/`*`input` directory.
- The RREG Tool saves the output from this command (the *`AgentID`*`_response.xml` file) to the following directory:

  ```
  RREG_HOME/output/
  ```

  The Oracle Access Manager server administrator can then send the *`AgentID`*`_response.xml` to the user who provided the `OAM11GRequest.xml` file.

To run the RREG Tool in out-of-band mode on the Web server client machine, use the following command:

```
RREG_HOME/bin/oamreg.sh outofband input/AgentID_response.xml
```

In this example:

- Replace *RREG_HOME* with the location where you unpacked the RREG archive file on the client system.
- The *`AgentID`*`_response.xml` file, which was provided by the Oracle Access Manager server administrator, is located in the *RREG_HOME*`/`input directory.

- The RREG Tool saves the output from this command (the artifacts and files required to register the Webgate software) to the following directory on the client machine:

  RREG_HOME/output/

24.5.5 Files and Artifacts Generated by RREG

The files that get generated by the RREG Tool vary, depending on the security level you are using for communications between the WebGate and the Oracle Access Manager server. For more information about the supported security levels, see Securing Communication Between OAM Servers and WebGates in *Administrator's Guide for Oracle Access Management*.

Note that in this topic any references to ***RREG_HOME*** should be replaced with the path to the directory where you ran the RREG tool. This is typically the following directory on the Oracle Access Manager server, or (if you are using out-of-band mode) the directory where you unpacked the RREG archive:

```
OAM_ORACLE_HOME/oam/server/rreg/client
```

The following table lists the artifacts that are always generated by the RREG Tool, regardless of the Oracle Access Manager security level.

File	Location
`cwallet.sso`	• *RREG_HOME*/output/Agent_ID/ - For WebGate 11*g* (11.1.2.3). • *RREG_HOME*/output/Agent_ID/wallet - For WebGate 11*g* (11.1.2.2) and OHS 12*c*.
`ObAccessClient.xml`	*RREG_HOME*/output/Agent_ID/

The following table lists the additional files that are created if you are using the SIMPLE or CERT security level for Oracle Access Manager:

File	Location
`aaa_key.pem`	*RREG_HOME*/output/Agent_ID/
`aaa_cert.pem`	*RREG_HOME*/output/Agent_ID/
`password.xml`	*RREG_HOME*/output/Agent_ID/

Note that the `password.xml` file contains the obfuscated global passphrase to encrypt the private key used in SSL. This passphrase can be different than the passphrase used on the server.

You can use the files generated by RREG to generate a certificate request and get it signed by a third-party Certification Authority. To install an existing certificate, you must use the existing `aaa_cert.pem` and `aaa_chain.pem` files along with `password.xml` and `aaa_key.pem`.

24.5.6 Copying Generated Artifacts to the Oracle HTTP Server WebGate Instance Location

After the RREG Tool generates the required artifacts, manually copy the artifacts from the `RREG_Home/output/agent_ID` directory to the Oracle HTTP Server configuration directory on the Web tier host.

The location of the files in the Oracle HTTP Server configuration directory depends upon the Oracle Access Manager security mode setting (OPEN, SIMPLE, or CERT).

The following table lists the required location of each generated artifact in the Oracle HTTP Server configuration directory, based on the security mode setting for Oracle Access Manager. In some cases, you might have to create the directories if they do not exist already. For example, the wallet directory might not exist in the configuration directory.

Note:

For an enterprise deployment, Oracle recommends simple mode, unless additional requirements exist to implement custom security certificates for the encryption of authentication and authorization traffic. The information about using open or certification mode is provided here as a convenience.

Avoid using open mode, because in open mode, traffic to and from the Oracle Access Manager server is not encrypted.

For more information using certificate mode or about Oracle Access Manager supported security modes in general, see Securing Communication Between OAM Servers and WebGates in *Administrator's Guide for Oracle Access Management*.

File	Location When Using OPEN Mode	Location When Using SIMPLE Mode	Location When Using CERT Mode
`wallet/cwallet.sso`	*`OHS_CONFIG_DIR/`* `webgate/config/wallet`	*`OHS_CONFIG_DIR/`* `webgate/config/wallet/` **Note:** By default the wallet folder is not available. Create the wallet folder under *`OHS_CONFIG_DIR/`* `webgate/config/`.	*`OHS_CONFIG_DIR/`* `webgate/config/wallet/`
`ObAccessClient.xml`	*`OHS_CONFIG_DIR/`* `webgate/config`	*`OHS_CONFIG_DIR/`* `webgate/config/`	*`OHS_CONFIG_DIR/`* `webgate/config/`
`password.xml`	N/A	*`OHS_CONFIG_DIR/`* `webgate/config/`	*`OHS_CONFIG_DIR/`* `webgate/config/`

File	Location When Using OPEN Mode	Location When Using SIMPLE Mode	Location When Using CERT Mode
`aaa_key.pem`	N/A	*`OHS_CONFIG_DIR`*`/webgate/config/simple/`	*`OHS_CONFIG_DIR`*`/webgate/config/`
`aaa_cert.pem`	N/A	*`OHS_CONFIG_DIR`*`/webgate/config/simple/`	*`OHS_CONFIG_DIR`*`/webgate/config/`

Note: If you need to redeploy the `ObAccessClient.xml` to `WEBHOST1` and `WEBHOST2`, delete the cached copy of `ObAccessClient.xml` from the servers. The cache location on `WEBHOST1` is:

```
OHS_DOMAIN_HOME/servers/ohs1/cache/
```

And you must perform the similar step for the second Oracle HTTP Server instance on `WEBHOST2`:

```
OHS_DOMAIN_HOME/servers/ohs2/cache/
```

24.5.7 Restarting the Oracle HTTP Server Instance

For information about restarting the Oracle HTTP Server instance, see Restarting Oracle HTTP Server Instances by Using WLST in *Oracle Fusion Middleware Administering Oracle HTTP Server*.

If you have configured Oracle HTTP Server in a WebLogic Server domain, you can also use Oracle Fusion Middleware Control to restart the Oracle HTTP Server instances. For more information, see Restarting Oracle HTTP Server Instances by Using Fusion Middleware Control in *Oracle Fusion Middleware Administering Oracle HTTP Server*.

24.6 Setting Up the WebLogic Server Authentication Providers

To set up the WebLogic Server authentication providers, back up the configuration files, set up the Oracle Access Manager Identity Assertion Provider and set the order of providers.

The following topics assumes that you have already configured the LDAP authenticator by following the steps in Creating a New LDAP Authenticator and Provisioning Enterprise Deployment Users and Group. If you have not already created the LDAP authenticator, then do so before continuing with this section.

Backing Up Configuration Files

Setting Up the Oracle Access Manager Identity Assertion Provider

Updating the Default Authenticator and Setting the Order of Providers

24.6.1 Backing Up Configuration Files

To be safe, you should first back up the relevant configuration files:

```
ASERVER_HOME/config/config.xml
ASERVER_HOME/config/fmwconfig/jps-config.xml
ASERVER_HOME/config/fmwconfig/system-jazn-data.xml
```

Also back up the `boot.properties` file for the Administration Server:

```
ASERVER_HOME/servers/AdminServer/security/boot.properties
```

24.6.2 Setting Up the Oracle Access Manager Identity Assertion Provider

Set up an Oracle Access Manager identity assertion provider in the Oracle WebLogic Server Administration Console.

To set up the Oracle Access Manager identity assertion provider:

1. Log in to the WebLogic Server Administration Console, if not already logged in.
2. Click **Lock & Edit**.
3. Click **Security Realms** in the left navigation bar.
4. Click the **myrealm** default realm entry.
5. Click the **Providers** tab.
6. Click **New**, and select the asserter type **OAMIdentityAsserter** from the drop-down menu.
7. Name the asserter (for example, *OAM ID Asserter*) and click **OK**.
8. Click the newly added asserter to see the configuration screen for the Oracle Access Manager identity assertion provider.
9. Set the control flag to *REQUIRED*.
10. Under Chosen types, select both the **ObSSOCookie** and **OAM_REMOTE_USER** options, if they are not selected by default.
11. Click **Save** to save the settings.
12. Click **Activate Changes** to propagate the changes.

24.6.3 Updating the Default Authenticator and Setting the Order of Providers

Set the order of identity assertion and authentication providers in the WebLogic Server Administration Console.

To update the default authenticator and set the order of the providers:

1. Log in to the WebLogic Server Administration Console, if not already logged in.
2. Click **Lock & Edit**.
3. From the left navigation, select **Security Realms**.
4. Click the **myrealm** default realm entry.
5. Click the **Providers** tab.
6. From the table of providers, click the **DefaultAuthenticator**.

7. Set the Control Flag to `SUFFICIENT`.

8. Click **Save** to save the settings.

9. From the navigation breadcrumbs, click **Providers** to return to the list of providers.

10. Click **Reorder**.

11. Sort the providers to ensure that the OAM Identity Assertion provider is first and the DefaultAuthenticator provider is last.

Table 24-1 Sort order

Sort Order	Provider	Control Flag
1	OAMIdentityAsserter	`REQUIRED`
2	LDAP Authentication Provider	`SUFFICIENT`
3	DefaultAuthenticator	`SUFFICIENT`
4	Trust Service Identity Asserter	`N/A`
5	DefaultIdentityAsserter	`N/A`

12. Click **OK**.

13. Click **Activate Changes** to propagate the changes.

14. Shut down the Administration Server, Managed Servers, and any system components, as applicable.

15. Restart the Administration Server.

24.7 Configuring Oracle ADF and OPSS Security with Oracle Access Manager

Some Oracle Fusion Middleware management consoles use Oracle Application Development Framework (Oracle ADF) security, which can integrate with Oracle Access Manager Single Sign On (SSO). These applications can take advantage of Oracle Platform Security Services (OPSS) SSO for user authentication, but you must first configure the domain-level `jps-config.xml` file to enable these capabilities.

The domain-level `jps-config.xml` file is located in the following location after you create an Oracle Fusion Middleware domain:

`DOMAIN_HOME``/config/fmwconfig/jps-config.xml`

Note:

The domain-level `jps-config.xml` should not be confused with the `jps-config.xml` that is deployed with custom applications.

To update the OPSS configuration to delegate SSO actions in Oracle Access Manager, complete the following steps:

1. Change to the following directory:

   ```
   ORACLE_COMMON_HOME/common/bin
   ```

2. Start the WebLogic Server Scripting Tool (WLST):

   ```
   ./wlst.sh
   ```

3. Connect to the Administration Server, using the following WLST command:

   ```
   connect(‘admin_user’,’admin_password’,’admin_url’)
   ```

   For example:

   ```
   connect(‘weblogic_soa’,’mypassword’,’t3://ADMINVHN:7001’)
   ```

4. Run the `addOAMSSOProvider` command, as shown:

   ```
   addOAMSSOProvider(loginuri="/${app.context}/
   adfAuthentication", logouturi="/oamsso/logout.html")
   ```

   The following table defines the expected value for each argument in the addOAMSSOProvider command.

Argument	Definition
loginuri	Specifies the URI of the login page **Note:** For ADF security enabled applications, "/*context-root*/adfAuthentication" should be provided for the 'loginuri' parameter. For example: `/${app.context}/adfAuthentication` **Note:** `${app.context}` must be entered as shown. At runtime, the application replaces the variable appropriately. Here is the flow: **a.** User accesses a resource that has been protected by authorization policies in OPSS, fox example. **b.** If the user is not yet authenticated, ADF redirects the user to the URI configured in 'loginuri'. **c.** Access Manager, should have a policy to protect the value in 'loginuri': for example, "/*context-root*/adfAuthentication". **d.** When ADF redirects to this URI, Access Manager displays a Login Page (depending on the authentication scheme configured in Access Manager for this URI).

Argument	Definition
logouturi	Specifies the URI of the logout page Notes: • For ADF security enabled applications, `logouturi` should be configured based on logout guidelines in Configuring Centralized Logout for Sessions Involving 11*g* WebGates in *Administrator's Guide for Oracle Access Management*. • When using WebGate 11*g*, the value of the `logouturi` should be sought from the 11g WebGate Administrator. • When using WebGate 10*g*, the value of `logouturi` should be `/oamsso/logout.html`.
autologinuri	Specifies the URI of the autologin page. This is an optional parameter.

5. Disconnect from the Administration Server by entering the following command:

   ```
   disconnect()
   ```

6. Restart the Administration Server.

A

Using Multi Data Sources with Oracle RAC

Oracle recommends using GridLink data sources when developing new Oracle RAC applications. However, if you are using legacy applications and databases that do not support GridLink data sources, refer to the information in this appendix.

This appendix provides information about multi data sources and Oracle RAC and procedure for configuring multi data sources for an Enterprise Deployment.

A.1 About Multi Data Sources and Oracle RAC

A multi data source provides an ordered list of data sources to use to satisfy connection requests.

Normally, every connection request to this kind of multi data source is served by the first data source in the list. If a database connection test fails and the connection cannot be replaced, or if the data source is suspended, a connection is sought sequentially from the next data source on the list.

For more information about configuring Multi Data Sources with Oracle RAC, see Using Multi Data Sources with Oracle RAC in *Oracle Fusion Middleware Administering JDBC Data Sources for Oracle WebLogic Server*.

A.2 Typical Procedure for Configuring Multi Data Sources for an Enterprise Deployment

You need to configure data sources when you configure a domain. If you want to use Multi Data Sources instead of GridLink data sources, replace the GridLink instructions with the instructions provided in this section.

For example, when you are configuring the initial Administration domain for an Enterprise Deployment reference topology, you use the configuration wizard to define the characteristics of the domain, as well as the data sources.

The procedures for configuring the topologies in this Enterprise Deployment Guide include specific instructions for defining GridLink data sources with Oracle RAC. If you want to use Multi Data Sources instead of GridLink data sources, replace the GridLink instructions with the following:

1. In the Configure JDBC Component Schema screen:

   a. Select the appropriate schemas.

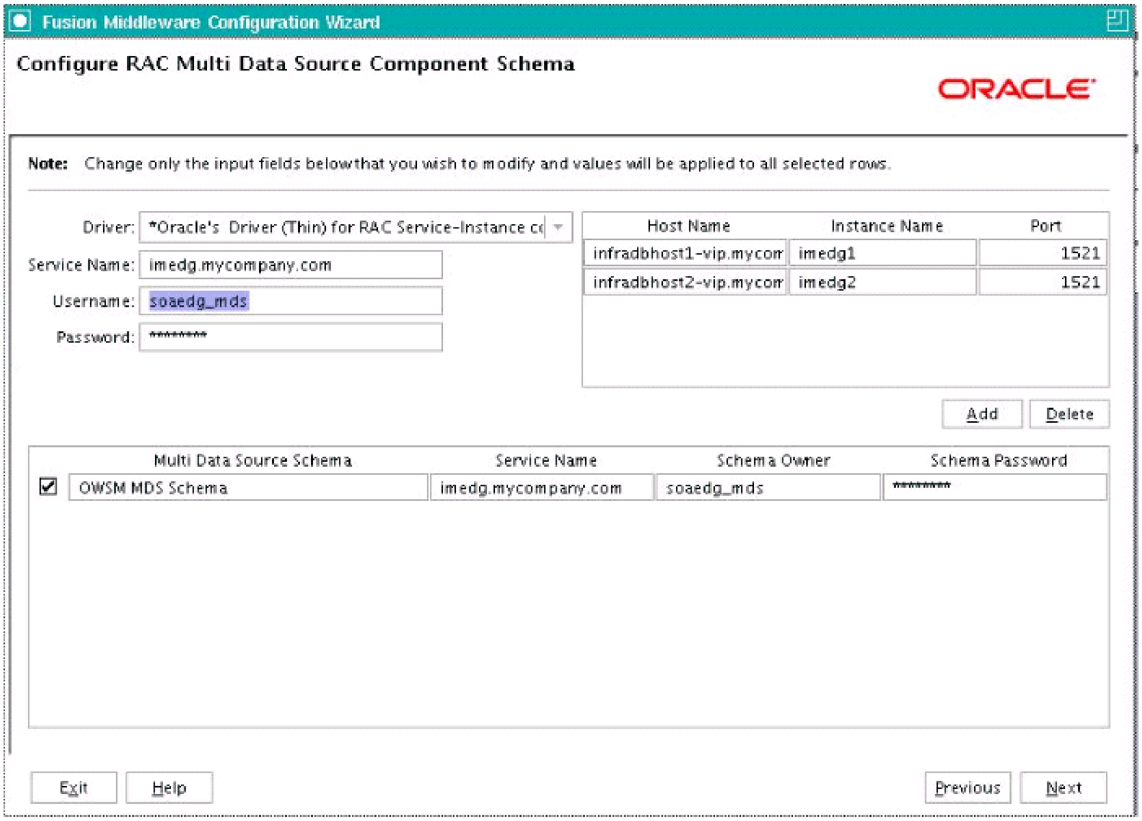
   b. For the RAC configuration for component schemas, **Convert to RAC multi data source**.

   c. Ensure that the following data source appears on the screen with the schema prefix when you ran the Repository Creation Utility.

   d. Click **Next**.

2. The Configure RAC Multi Data Sources Component Schema screen appears (Figure A-1).

Figure A-1 Configure RAC Multi Data Source Component Schema Screen



Configure RAC Multi Data Source Component Schema

Note: Change only the input fields belowthat you wish to modify and values will be applied to all selected rows.

Driver: *Oracle's Driver (Thin) for RAC Service-Instance c(

Service Name: imedg.mycompany.com

Username: soaedg_mds

Password: *********

Host Name	Instance Name	Port
infradbhost1-vip.mycom	imedg1	1521
infradbhost2-vip.mycom	imedg2	1521

	Multi Data Source Schema	Service Name	Schema Owner	Schema Password
☑	OWSM MDS Schema	imedg.mycompany.com	soaedg_mds	*********

In this screen, do the following:

   a. Enter values for the following fields, specifying the connect information for the Oracle RAC database that was seeded with RCU.

      - **Driver:** Select **Oracle driver (Thin) for RAC Service-Instance connections, Versions:10, 11**.

      - **Service Name:** Enter the service name of the database.

      - **Username:** Enter the complete user name (including the prefix) for the schemas.

      - **Password:** Enter the password to use to access the schemas.

   b. Enter the host name, instance name, and port.

c. Click **Add**.

d. Repeat this for each Oracle RAC instance.

e. Click **Next**.

3. In the Test JDBC Data Sources screen, the connections are tested automatically. The **Status** column displays the results. Ensure that all connections were successful. If not, click **Previous** to return to the previous screen and correct your entries.

   Click **Next** when all the connections are successful.

B

Targeting Applications and Resources to Servers

The component-wise list of targets is used to verify that the value used in the config.xml file is correct.

This appendix lists the applications, library, startup class, shutdown class, JMS system resource, and JDBC system resource targets for an Oracle SOA enterprise deployment.

B.1 Oracle SOA Enterprise Application Targets

This table lists the Oracle SOA enterprise deployment application targets.

Table B-1 SOA Application Targets

Application	Targets
api-console	AdminServer, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
AqAdapter	OSB_Cluster, AdminServer, SOA_Cluster
b2bui	SOA_Cluster
BamComposer	BAM_Cluster
BamCQService	BAM_Cluster
BamServer	BAM_Cluster
Basic12212App	SOA_Cluster
BPMComposer	SOA_Cluster
Cloudsdk	AdminServer, OSB_Cluster

Table B-1 (Cont.) SOA Application Targets

Application	Targets
coherence-transaction-rar	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
DbAdapter	AdminServer, OSB_Cluster, SOA_Cluster
DefaultToDoTaskFlow	SOA_Cluster
DMS Application (12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
em	AdminServer
ESSAPP	ESS_Cluster
EssNativeHostingApp (V1.0)	ESS_Cluster
FileAdapter	AdminServer, OSB_Cluster, SOA_Cluster
frevvo	SOA_Cluster
FtpAdapter	AdminServer, OSB_Cluster, SOA_Cluster
insight	BAM_Cluster
insight-service-bus-agent	OSB_Cluster
insight-soa-agent	SOA_Cluster
insight-ui	BAM_Cluster
MQSeriesAdapter	SOA_Cluster
OAAPredictionService	SOA_Cluster
opss-rest	AdminServer, BAM_Cluster
OracleAppsAdapter	SOA_Cluster
OracleBPMBACServerApp	SOA_Cluster
OracleBPMComposerRolesApp	SOA_Cluster
OracleBPMBACServerApp	SOA_Cluster
OracleBPMComposerRolesApp	SOA_Cluster
OracleBPMProcessRolesApp	SOA_Cluster
OracleBPMWorkspace	SOA_Cluster
procmon-listener	SOA_Cluster

Table B-1 (Cont.) SOA Application Targets

Application	Targets
Service Bus Domain Singleton Marker Application	OSB_Cluster
Service Bus DSP Transport Provider	AdminServer, OSB_Cluster
Service Bus EJB Transport Provider	AdminServer, OSB_Cluster
Service Bus Email Transport Provider	AdminServer, OSB_Cluster
Service Bus File Transport Provider	AdminServer, OSB_Cluster
Service Bus Framework Starter Application	AdminServer, OSB_Cluster
Service Bus FTP Transport Provider	AdminServer, OSB_Cluster
Service Bus JCA Transport Provider	AdminServer, OSB_Cluster
Service Bus JEJB Transport Provider	AdminServer, OSB_Cluster
Service Bus JMS Reporting Provider	OSB_Cluster
Service Bus Kernel	AdminServer, OSB_Cluster
Service Bus Logging	AdminServer, OSB_Cluster
Service Bus LWPF_Console	AdminServer
Service Bus Message Reporting Purger	OSB_Cluster
Service Bus MQ Transport Provider	AdminServer, OSB_Cluster
Service Bus OWSM Initializer	AdminServer, OSB_Cluster
Service Bus Publish	AdminServer, OSB_Cluster
Service Bus Resource	OSB_Cluster
Service Bus Result Cache	OSB_Cluster
Service Bus Routing	AdminServer, OSB_Cluster
Service Bus SB Transport Provider	AdminServer, OSB_Cluster
Service Bus SFTP Transport Provider	AdminServer, OSB_Cluster
Service Bus SOA-DIRECT Transport Provider	AdminServer, OSB_Cluster
Service Bus Subscription Listener	OSB_Cluster
Service Bus Test Framework	AdminServer, OSB_Cluster
Service Bus Transform	AdminServer, OSB_Cluster

Table B-1 (Cont.) SOA Application Targets

Application	Targets
Service Bus Tuxedo Transport Provider	AdminServer, OSB_Cluster
Service Bus UDDI Manager	AdminServer
Service Bus WS Transport Async Response	OSB_Cluster
Service Bus WS Transport Provider	OSB_Cluster
Service Bus WSIL	OSB_Cluster
service-bus	AdminServer
SimpleApprovalTaskFlow	SOA_Cluster
soa-infra	SOA_Cluster
soa-webapps	SOA_Cluster
state-management-provider-memory-rar	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
UMSAdapter	SOA_Cluster
usermessagingdriver-apns	OSB_Cluster
usermessagingdriver-email	BAM_Cluster, OSB_Cluster, SOA_Cluster
usermessagingdriver-extension	OSB_Cluster
usermessagingdriver-gcm	OSB_Cluster
usermessagingdriver-smpp	OSB_Cluster
usermessagingdriver-twitter	OSB_Cluster
usermessagingdriver-xmpp	OSB_Cluster
usermessagingserver	BAM_Cluster, OSB_Cluster, SOA_Cluster
worklistapp	SOA_Cluster
wsm-pm	WSM-PM_Cluster

B.2 Oracle SOA Enterprise Deployment Library Targets

This table lists the Oracle SOA enterprise deployment library targets.

Table B-2 SOA Library Targets

Library	Targets
adf.oracle.businesseditor(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
adf.oracle.domain(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
adf.oracle.domain.webapp(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
BamClientLibrary(12.2.1,12.2.1)	BAM_Cluster
BamDatacontrol(12.2.1,12.2.1)	BAM_Cluster
beam.em	Admin Server
beehive-controls-1.0.1-10.0-war(1.0,1.0.2.2)	AdminServer, OSB_Cluster
beehive-netui-1.0.1-10.0(1.0,1.0.2.2)	AdminServer, OSB_Cluster
beehive-netui-resources-1.0.1-10.0(1.0,1.0.2.2)	AdminServer, OSB_Cluster
com.bea.wlp.lwpf.console.app(10.3.0,10.3.0)	AdminServer, OSB_Cluster
com.bea.wlp.lwpf.console.web(10.3.0,10.3.0)	AdminServer, OSB_Cluster
emagentsdkimplpriv_jar(12.4,12.1.0.4.0)	AdminServer
emagentsdkimpl_jar(12.4,12.1.0.4.0)	AdminServer
emagentsdk_jar(12.4,12.1.0.4.0)	AdminServer
emai.ess.fmwctrl.dep	AdminServer
emai.fmwctrl.dep	AdminServer
emas	AdminServer
emcore	AdminServer
emcoreclient_jar	AdminServer
emcorecommon_jar	AdminServer
emcoreconsole_jar	AdminServer
emcoreintsdk_jar(11.2.0.1.0,12.1.0.0.0)	AdminServer
emcorepbs_jar	AdminServer
emcoresdkimpl_jar(11.2.0.1.0,12.1.0.0.0)	AdminServer

Table B-2 (Cont.) SOA Library Targets

Library	Targets
emcoresdk_jar(11.2.0.1.0,12.1.0.0.0)	AdminServer
emcore_jar	AdminServer
em_common(12.4,12.1.0.4.0)	AdminServer
em_core_ppc_pojo_jar	AdminServer
em_error(12.4,12.1.0.4.0)	AdminServer
em_sdkcore_ppc_public_pojo_jar	AdminServer
ess.em	AdminServer
JCAFrameworkImpl(12.1.2.0,12.1.2.0)	AdminServer, OSB_Cluster
JmsAdapter	AdminServer, OSB_Cluster, SOA_Cluster
jsf(2.0,1.0.0.0_2-2-8)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
jstl(1.2,1.2.0.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
log4j_jar(1.3,1.2.15)	AdminServer
odl.clickhistory(1.0,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
odl.clickhistory.webapp(1.0,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
ohw-rcf(5,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
ohw-uix(5,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.adapter.ext(12.1.2,12.1.2)	AdminServer, SOA_Cluster
oracle.adf.dconfigbeans(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster

Table B-2 (Cont.) SOA Library Targets

Library	Targets
oracle.adf.desktopintegration(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.adf.desktopintegration.model(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.adf.management(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.advancedanalytics.prediction(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bi.adf.model.slib(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.bi.adf.view.slib(1.0,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.bi.adf.webcenter.slib(1.0,12.2.1.1.0)v	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.bi.composer(11.1.1,0.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.bi.jbips(11.1.1,0.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.bpm.bac(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bpm.client(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bpm.composerlib(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bpm.management.webapp(12.1.3,12.1.3)	AdminServer
oracle.bpm.processviewer(11.1.1,12.1.3)	BAM_Cluster
oracle.bpm.projectlib(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bpm.runtime(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.bpm.webapp.common(11.1.1,12.1.3)	AdminServer, SOA_Cluster

Table B-2 (Cont.) SOA Library Targets

Library	Targets
oracle.bpm.workspace(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.cloud.adapter(12.1.2,12.1.2)	AdminServer, SOA_Cluster
oracle.dconfig-infra(2.0,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.ess(12,12.2.1.2.0)	AdminServer, ESS_Cluster
oracle.ess.admin(12,12.2.1.2.0)	AdminServer
oracle.ess.client(12,12.2.1.2.0)	AdminServer, ESS_Cluster
oracle.ess.client.api(12,12.2.1.2.0)	AdminServer, ESS_Cluster
oracle.ess.runtime(12,12.2.1.2.0)	AdminServer, ESS_Cluster
oracle.ess.thin.client(12,12.2.1.2.0)	AdminServer, ESS_Cluster, OSB_Cluster, SOA_Cluster
oracle.jrf.system.filter	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.jsp.next(12.2.1,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.pwdgen(2.0,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.rules(11.1.1,12.1.3)	AdminServer, SOA_Cluster
oracle.sdp.client(2.0,12.2.1.2.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.sdp.messaging(2.0,12.2.1.2.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
oracle.soa.apps(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.bpel(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.common.dvmxref(12.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.common.functions(12.2.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.common.resequencer(12.1.1,12.1.2)	AdminServer, SOA_Cluster

Table B-2 (Cont.) SOA Library Targets

Library	Targets
oracle.soa.common.sequencing(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.commonconsole.dependencies(12.1.2,12.1.2)	AdminServer, SOA_Cluster, BAM_Cluster
oracle.soa.commonconsole.webapp(12.1.2,12.1.2)	AdminServer, SOA_Cluster, BAM_Cluster
oracle.soa.composer.webapp(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.ess.dc(12,12.2.1.0.0)	AdminServer
oracle.soa.ext(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.management.webapp(12.1.2,12.1.2)	AdminServer
oracle.soa.mediator(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.procmon(12.2.1,12.2.1)	BAM_Cluster
oracle.soa.procmon.agent(12.2.1,12.2.1)	SOA_Cluster
oracle.soa.procmon.ui(12.2.1,12.2.1)	BAM_Cluster
oracle.soa.rules_dict_dc.webapp(11.1.1,11.1.1)	AdminServer, SOA_Cluster
oracle.soa.sb.em.adf.mgmt(1.0,12.1.2.0.0)	AdminServer, OSB_Cluster
oracle.soa.webmapper(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.webmapper(12.1.3,12.1.3)	AdminServer, OSB_Cluster
oracle.soa.workflow(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.workflow.wc(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.worklist(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.soa.worklist.webapp(11.1.1,11.1.1)	AdminServer, SOA_Cluster
oracle.soa.xquery(11.1.1,12.1.2)	AdminServer, SOA_Cluster
oracle.ucs.userprefs.webapp(2.0,12.2.1.2.0)	BAM_Cluster, OSB_Cluster, SOA_Cluster
oracle.webcenter.composer(2.0,12.2.1)	AdminServer
oracle.webcenter.skin(2.0,12.2.1)	AdminServer
oracle.wsm.console.core.view(1.0,12.2.1.2)	AdminServer
oracle.wsm.seedpolicies(2.0,12.2.1.2)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster

Table B-2 (Cont.) SOA Library Targets

Library	Targets
orai18n-adf(11,11.1.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
osb.em	AdminServer
owasp.esapi(2.0,12.2.1)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
resource-mq-connection(12.1.3,12.1.3)	AdminServer, OSB_Cluster
soa.em	AdminServer
stage-logging(12.1.3,12.1.3)	AdminServer, OSB_Cluster
stage-publish(12.1.3,12.1.3)	AdminServer, OSB_Cluster
stage-routing(12.1.3,12.1.3)	AdminServer, OSB_Cluster
stage-transform(12.1.3,12.1.3)	AdminServer, OSB_Cluster
stage-utils(12.1.3,12.1.3)	AdminServer, OSB_Cluster
struts-1.2(1.2,1.2.9)	AdminServer, OSB_Cluster
transport-bpel10g(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-dsp(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-ejb(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-email(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-file(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-ftp(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-jejb(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-mq(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-pollersdk(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-sftp(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-soa(12.1.3,12.1.3)	AdminServer, OSB_Cluster
transport-tuxedo(12.1.3,12.1.3)	AdminServer, OSB_Cluster
UIX(11,12.2.1.1.0)	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster

Table B-2 (Cont.) SOA Library Targets

Library	Targets
weblogic-controls-10.0-war(10.0,10.2)	AdminServer, OSB_Cluster
wlp-framework-common-web-lib(10.3.0,10.3.0)	AdminServer, OSB_Cluster
wlp-framework-struts-1.2-web-lib(10.3.0,10.3.0)	AdminServer, OSB_Cluster
wlp-light-web-lib(10.3.0,10.3.0)	AdminServer, OSB_Cluster
wlp-lookandfeel-web-lib(10.3.0,10.3.0)	AdminServer, OSB_Cluster
wls-commonslogging-bridge-war(1.0,1.1)	AdminServer, OSB_Cluster

B.3 Oracle SOA Enterprise Deployment Startup Class Targets

This table lists the Oracle SOA enterprise deployment Startup Class targets.

Table B-3 SOA Startup Class Targets

Class	Targets
AWT Application Context Startup Class	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
DMS-Startup	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
JRF Startup Class	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
ODL-Startup	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
OSB JCA Transport Post-Activation Startup Class	OSB_Cluster, AdminServer
SOAStartupClass	SOA_Cluster
Web Services Startup Class	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
WSM Startup Class	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster

B.4 Oracle SOA Enterprise Deployment Shutdown Class Targets

This table lists the Oracle SOA enterprise deployment Shutdown Class targets.

Table B-4 SOA Shutdown Class Targets

Class	Targets
DMSShutdown	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster

B.5 Oracle SOA Enterprise Deployment JMS System Resource Targets

This table lists the Oracle SOA enterprise deployment JMS System Resource targets.

Table B-5 SOA JMS System Resource Targets

JMS Resource	Targets
BamAlertEngineJmsSystemModule	BAM_Cluster
BamCQServiceJmsSystemModule BAM_Cluster	BamCQServiceJmsSystemModule BAM_Cluster
BAMJMSSystemResource	BAM_Cluster
BamPersistenceJmsSystemModule	BAM_Cluster
BamPersistenceJmsSystemModule	BAM_Cluster
BamReportCacheJmsSystemModule	BAM_Cluster
BPMJMSModule	SOA_Cluster
jmsResources	OSB_Cluster
ProcMonJMSModule	SOA_Cluster
SOAJMSModule	SOA_Cluster
UMSJMSSystemResource	BAM_Cluster, OSB_Cluster, SOA_Cluster

B.6 Oracle SOA Enterprise Deployment JDBC System Resource Targets

This table lists the Oracle SOA enterprise deployment JDBC System Resource targets.

Table B-6 SOA JDBC System Resource Targets

JDBC Resource	Targets
BamDataSource	BAM_Cluster, SOA_Cluster
BamJobSchedDataSource	BAM_Cluster

Table B-6 (Cont.) SOA JDBC System Resource Targets

JDBC Resource	Targets
BamLeasingDataSource	BAM_Cluster
BamNonJTADataSource	BAM_Cluster, SOA_Cluster
EDNDataSource	SOA_Cluster
EDNLocalTxDataSource	SOA_Cluster
EssDS	ESS_Cluster
EssInternalDS	ESS_Cluster
EssXADS	ESS_Cluster
JMS	BAM_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
Leasing	BAM_Cluster, OSB_Cluster, SOA_Cluster
LocalSvcTblDataSource	AdminServer, ESS_Cluster
mds-bam	AdminServer, BAM_Cluster, SOA_Cluster
mds-ESS_MDS_DS	ESS_Cluster
mds-owsm	AdminServer, WSM-PM_Cluster
mds-soa	AdminServer, SOA_Cluster
opss-audit-DBDS	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
opss-audit-viewDS	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
opss-data-source	AdminServer, BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
OraSDPMDataSource	BAM_Cluster, OSB_Cluster, SOA_Cluster
SOADataSource	AdminServer, OSB_Cluster, SOA_Cluster
SOALocalTxDataSource	SOA_Cluster
TLOG	BAM_Cluster, ESS_Cluster, OSB_Cluster, SOA_Cluster, WSM-PM_Cluster
wlsbjmsrpDataSource	AdminServer, OSB_Cluster

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